HEAVY DUTY MACK TRUCK STYLING

by

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Signature redacted

Acceptance:

Instructor in Charge of Thesis, Signature redacted

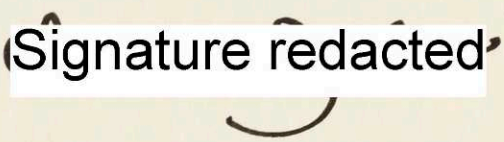
May 24, 1949


Mack
Mack

From early childhood, I have had a terrific fascination for big heavy Mack trucks. "Uncle Billy" (William Letts) Sales Engineer for Mack in Los Angeles played no small part in the growth of this interest. In 1947, I started my first original Mack truck designs. In January, 1949, Harry Bernard, Chief Engineer for the Mack Truck Company graciously opened the engineering and styling departments at Allentown to me, where I looked, asked questions and worked for over a week.

When Professor John Arnold, whose friendship and training I value most highly from these four years at Technology, accepted the responsibility of being my advisor for this rather unusual mechanical engineering thesis, the opportunity was open for me to satisfy this fascination, organize my knowledge and do some original thought and work on the subject of heavy duty truck styling.

In this thesis the background for design, the requirements for design and styling theory will be presented. An original conventional Mack truck design will be included to illustrate the combination of these elements. A study of the styling and dimensions of the major competitors of Mack will establish a basis of comparison. Then, we shall look some years ahead into future Mack truck styling.



HISTORY AND TRADITIONS OF MACK

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As a general background for advanced Mack truck design, the designer should have a knowledge of the history of the Mack Truck Company and the traditions of the company which have been established during the past half century. The designer for Mack has the responsibility of carrying on the famous traditions of the oldest truck manufacturer in the United States and designing trucks which will continue to be leaders in their field. In setting the stage for design, then, it is well to present here a brief history of the Mack Truck Company and the traditions of the company as revealed by its historical background.

Back in the 'Nineties there was a little wagon shop on Atlantic Avenue in Brooklyn. Five brothers, Jack, Joe, Gus, Charlies and Bill Mack ran this shop, specializing in the ponderous wagon and drays which were popular in that horse-drawn era. Motor cars were a novelty and the Mack boys were motor enthusiasts. Naturally it occured to them that if an engine could be used to propel a carriage, that it might also be the motive power of a wagon, a dray or an omnibus. They were not the first to consider this possibility, of course, for experimental power wagons had been built even as far back as the forties -- 100 years ago. But they were the first to build a successful gasoline motor truck; the first to actually manufacture them and the only one of the pioneers whose product

survives to this day.

In 1899 Harris & McGuire secured the concession to operate a sightseeing bus through Prospect Park, Brooklyn and asked the Mack brothers to build it for them. The Macks had already started the development of a truck at that time, so, with a real order in sight, they quickly adapted it to passenger service. Early in 1900, after many vicissitudes, No. 1 Mack was delivered. It ran 17 years in all, 8 years as a bus and then, with a shift of bodies, for 9 years as the truck it was originally intended to be. That year and the following the Macks built a number of buses and trucks. The ninth Mack ever built is still in existence and still runs. It, also, is a bus. It is known to have run between 750,000 and a million miles in the 23 years it was in the hands of its original purchaser and is now on display at the Museum of Science & Industry in Chicago.

By 1905, the business had so far outgrown the little shop on Atlantic Avenue, that the Mack brothers began corresponding with chambers of commerce, with a new location in view. The City Fathers of Allentown, Pa. came through with an offer which Jack Mack, the leader of the family, could not turn down. One of the buildings of the first Mack plant in Allentown is still a part of the Mack factory. Another stands nearby.

It was a very small concern. The Mack brothers never were far ahead of the sheriff. Here was one of the problems they had in those days: They had a shop force of skilled

motor mechanics -- and they were rare birds in those days. Orders still came in before production started. In other words, the business was still operated the reverse of the way in which it is run today.

There would come times when orders were scarce, and in times of scarcity of orders, there was a problem as to what to do with the shop force. Certainly they couldn't afford to keep the men on the payroll with nothing to do. On the other hand, they couldn't afford to lay them off because shop mechanics were scarce; they had to be educated; you had to teach a man his trade when you hired him. If they let the men go, the chances were they would immediately find other jobs and an order which might come the day after would find the shop without personnel to build the truck.

So they undertook to actually build trucks for stock, build up trucks on a guess of what prospects would require, and take a chance that purchasers could be secured. It didn't take very many stock trucks to exhaust all the liquid capital. whereupon the concern would be at a crisis.

One of the Mack brothers acted as salesman. When such a crisis was encountered, he would climb onto a truck and drive it until he found somebody who would buy it. He would bring the money back to the shop. Johnny Mack would then proclaim a holiday, and he would take the shop force up to the pretzel foundry which is part way up the side of the ravine. From there on, having acquired a respectable Lehigh Valley thirst, he would

take them up to the brewery. Then they would go uptown and he would treat them to a dinner -- and some of them needed it! It was a big celebration. There was money in the Treasury, and the celebration, of course, was because of the fact that it was a pay-day.

The Mack brothers succeeded in selling a lot of the old Mack Junior andSenior trucks. They established very strong dealerships, particularly up through New England, but by 1911 they had had sufficient experience to know that it was an extremely hazardous business and they were insufficiently provided with capital.

That leads up to a sort of junction of three different stories; where three stories come into one. We will cut back, to 1894. We will change the scene to Arbon, Switzerland. Adolph Saurer, in that little Swiss village, was a manufacturer of textile machinery. This machinery was manufactured for textile concerns, silk mills and embroidery plants through the mountainous districts, located, as a rule, on power sites, where there was water power. In many cases, these sites were remote from the railroads. The machinery was heavy and it was often a problem to know how that machinery could be transported to the mills of those who bought it. Saurer conceived of a machine which could run along the road and carry a heavy load. He built some machines of that sort, and they worked.

Other concerns who had similar perplexities, observing

how he had solved his transportation problem, prevailed upon him to build some for them. So, all unawares and in spite of himself, he started in the motor truck business, and the business was so profitable that he became in time the foremost builder of motor trucks in Europe, which position the Saurer company still holds.

That brings us up to the present century when the importer of Mercedes cars in this country, who found it necessary to make frequent trips to Europe, heard of this vehicle and believed that there was a possibility of selling such a vehicle on this side of the water, and he conceived the idea of manufacturing it in this country. He secured a license from the Saurer company, and, together with associates, established the Saurer Motor Co. at Plainfield, in which Saurer 5- and 6½- ton trucks were manufactured for American consumption. But those two capacities proved to be too small a line to be profitably manufactured and distributed by one organization.

The third cut-back is to 1905 when E. R. Hewitt, established the Hewitt Motor Co. in New York. He manufactured the heaviest motor truck ever marketed up to that time, the Hewitt 10-ton truck.

Hewitt's contribution to the industry was the principle of the economy of the big units. Hewitt saw that the greater the unit of load, the cheaper the cost of hauling that load was per unit. But Hewitt was an engineer: perhaps it is

better to say a scientist, rather than a business man.

Hewitt's chief interest was engineering development. Running a motor company was principally a means to that end. He had a number of valuable patents and what is more important still, a lot of ideas which he wished to see developed and he welcomed the notion of being relieved of the cares of running a shop, selling, accounting, finance and all the rest, so that he could profitably devote himself to the development of better and better motor trucks.

So in 1911, these three concerns, the old Mack, the American Saurer, and the Hewitt, decided to combine. By combining, they acquired a full line. Later, it appeared that the line was too full. They pooled their capital, and they pooled their distribution, which made the Mack company (the International Motor Co. it was named) a national concern.

In this consolidation, the Mack brothers contributed a strong chain of dealers and an aggressive selling organization. The Saurer contributed the facilities and know-how for high-precision manufacture. All three present factory managers and the Vice President in charge of Production are products of the Plainfield Plant -- originally the Saurer. Hewitt bequeathed engineering leadership and, luckily enough, more ready cash than the other two combined.

During the period between 1900 and 1912 two types of heavy trucks were produced: type 1, a conventional truck with engine in front of the cab; type 2, which was a cab-over-engine

model.

Unfortunately, the years 1911, 1912 and 1913 were rather poor years in the truck business. By that time, a number of concerns were in the business. Most of the competitors at that time were passenger car builders who had entered the truck business for the disposal of obsolete passenger car parts and as a means of keeping the shop busy, when the passenger car demand was low.

The directors of the International Motor Co. at that time about made up their minds that this thing of building a quality vehicle was unprofitable, that quality wasn't necessary in the great, big, rough thing that hauled freight, was never washed, never painted, driven by a flat-footed roughneck; but that the thing to do was to build an assembled truck.

Fortunately, however, in control of this company was a body of men who had a sound conception of the value of quality.

They objected to the proposal so strongly that a compromise was affected, as happens in most cases of that sort. The compromise was that the company was to be authorized to design a line of trucks, the first model of which was to have an engine completely designed and manufactured in their own factory, most of the balance of the parts to be standard assemblies purchased outside. That truck was to have a year's trial. At the end of that time, if it proved suc-

cessful, then the engineering department was to be given full power to design a heavier series of models to be completely manufactured.

Before that trial year was up, there was no longer any question of the success of the Model AB truck, and the Model AC "bull dog" went into production ahead of its schedule. That, as we know, was also a success; in fact, the greatest success of any vehicle in the motor truck business. Those two models were manufactured continously without change of model, without series, for 24 years--up to 1938. They hold the record as the longest established models in the truck industry. Thousands of them are still running.

The pneumatic tire era dawned and the six-cylinder engine superseded the four. Power brakes became general in all but the lightest chassis. Closed cabs came in. Multi-speed transmissions became popular. The chain, the worm and the internal gear drive fought it out and all succumbed to the universal single reduction bevel and the double reduction drive.

A redesigned AB series was introduced in 1929 to replace the Model AB introduced in 1912. In 1932 the B series (BM, BX) made its appearance, the B series was the forerunner of the present famous line of heavy trucks, the L series (LJ, LF etc.) which we shall study in some detail in a later section. In 1937, the model E series was introduced. The purpose of the E series was medium type duty or medium

weight work but the EQ model can be considered heavy duty. The light duty trucks which have been part of the Mack line are not discussed here for we are considering only heavy duty Mack truck design.

In the lifetime of the Mack company there have been two of the greatest wars in history. In both wars, the unparalleled ingenuity, experience and facilities for the development of monster motor transport vehicles and for extraordinary precision in manufacture was recognized by the Army. In World War I, huge anti-aircraft searchlight trucks, built in co-operation with the General Electric and Speery companies, in addition to 4470 Bull Dog trucks were built for the Army.

For the war just ended, Mack built a variety of things: There were 25,837 big six-wheeled trucks, 6-ton, 7½-ton, some for the British, but mostly for our own Army. Then there were 4500 5-tonners as well as smaller lots of 5 to 6-ton tractors, searchlight trucks and light cargo trucks for the Marines. Mack built 4600 power trains for Medium Tanks.

Throughout the years, the Mack organization has had a profound effect upon the technological progress of the industry. One of the most remarkable things about Mack engineering through five decades has been its prophetic nature. By this is meant the almost unerring choice of those principles of design which eventually were accepted by the entire industry. It almost seems as though Mack set the pace and the others

followed. Certainly Mack has been the great pioneer.

The very first Mack had a four-cylinder, four-cycle vertical engine with mechanically-operated valves, jump-spark high-tension ignition, a selective, individual-clutch constant-mesh transmission and semi-elliptic springs all around. While others experimented with steam power, two-cycle engines, friction drive, low-tension ignition and all manner of trick suspensions, Mack established the fundamentals eventually adopted by all its competitors.

This development along sound and permanent lines arose from Mack's devotion from the very outset to the ideal of real worth rather than transient novelty. Improvements were made only after thorough trial and proof of economic merit. Many of the features of construction which Mack pioneered were at first scoffed at, but were adhered to notwithstanding until the scoffers themselves were obliged to render that highest form of endorsement -- imitation.

Mack is not alone the great originator, it is also the most copied truck in America. Mack has used the Hotchkiss drive longer than any other builder. Likewise the full-floating axle, the reversed Elliot steering knuckle, ball-jointed steering connections and tapered-roller wheel bearings.

But Mack was the originator of many other constructions, now in such universal use that most people have forgotten where they started. Among these are lapped wristpins,

diamond-bored bearings and bushings, ground-back bearings and ground bearing boxes. Also chrome-nickel alloy iron for cylinder blocks and heads.

Mack was the first motor vehicle in America to use full generator-ground transmission gears, in which both sides of the teeth were ground. Mack was the first to adopt the vacuum brake booster, turbulency-type offset combustion chambers and nitrided steel water pump shafts.

The first multiple-spring dry-plate clutch was built by Mack, which also first used the non-metallic clutch plate. Mack was the first to use alloy cast iron brake drums and block type brake lining. Mack was the first to operate the shaft brake by the hand lever.

All-steel cab construction was originated by Mack, as well as nibbed type center-bolt holes on springs, engine temperature indicator as standard equipment, built-in front bumpers, fully-sproned front fenders and the non-spill, pressurized radiator.

Mack first used rubber-cushioned supports for the engine, radiator, cab and other components and was the first to use case-hardened crankshafts and the involute spline.

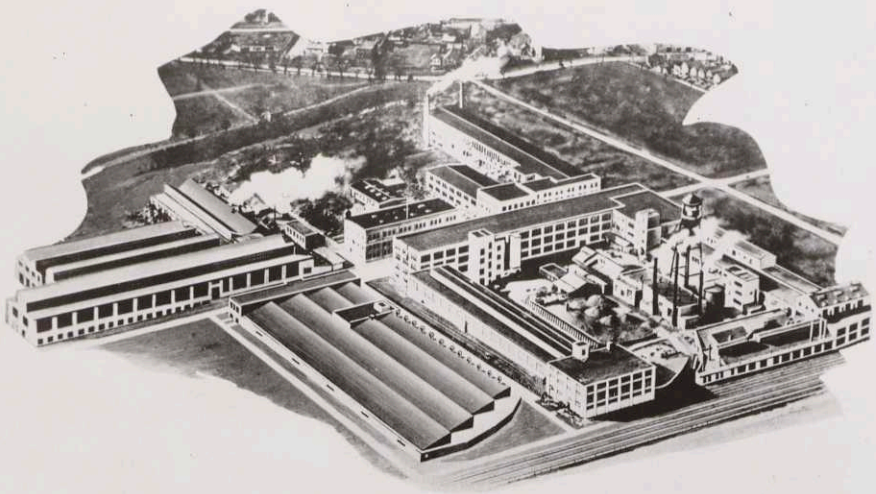
Mack's facilities have grown from a little shop on Atlantic Avenue in Brooklyn to today's four great factories, sixty-nine branch houses and an entire floor of the Empire State Building for the Home Office.

In Allentown, the present plant aggregates 1,457,000 square feet of floorspace, occupying a ground area of 33 acres. Here the complete chassis is erected, using parts produced in the Plainfield and New Brunswick factories, plus such things as frames, axles, brakes, wheels, drive-shafts and cabs, built in Allentown shops. Trucks, buses and fire apparatus chassis are turned out in the various shops, there being three separate erection lines, devoted respectively to medium trucks, heavy trucks and fire chassis and buses.

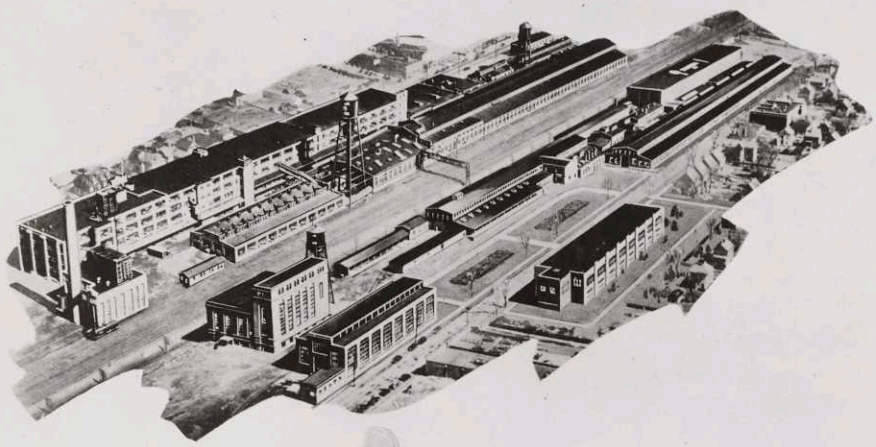
In Plainfield, the factory embraces 316,000 square feet, to which must be added 304,000 square feet for the General Service parts warehouse and 50,000 more for the office building, powerplant and the two laboratory buildings, making 670,000 square feet in all. At Plainfield engines and some clutches are built -- nothing more, these being in types and sizes for trucks, buses, fire engines and marine use, both gasoline and diesel.

At New Brunswick, 460,000 square feet of floorspace is devoted to the Mack foundry and gear shops. Here castings for all three plants are produced and transmissions, jack-shafts, rear axle carriers and steering gears for all types of Mack vehicles are produced.

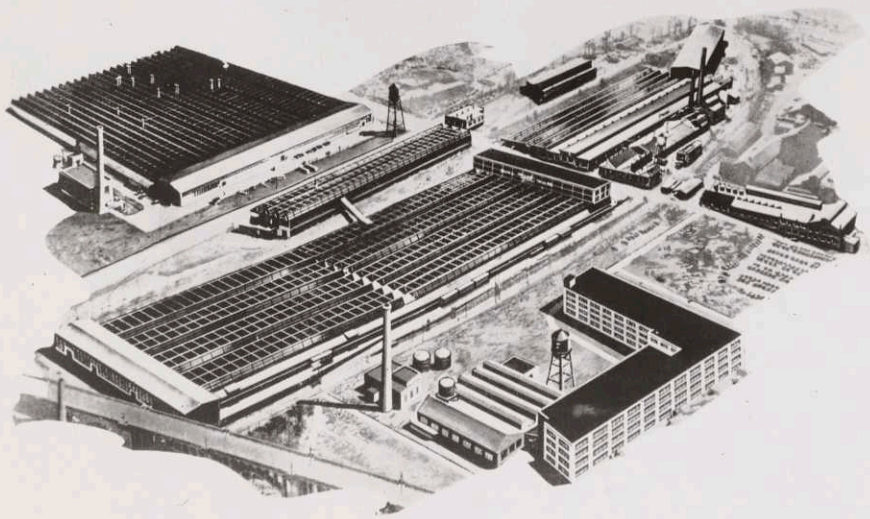
In Long Island City, 85,000 square feet of the 267,000 total in the Long Island Plant is devoted to the production of fire apparatus and an additional 40,000 to obsolete parts



New Brunswick, N. J. Plant



Plainfield, N. J. Plants



Allentown, Pa. Plants

manufacture.

Meanwhile, the sales organization expanded from six branches and a handful of dealers to sixty-nine branches and several hundred dealers.

In all, production facilities occupy 2,685,000 square feet, while the grand total of these plus office and branch house space total 4,955,000 square feet. Visitors are usually astonished at the magnitude of the factories, considering that some of the competitors with larger output have plants far smaller. The reason for this is found in two facts:

First, Mack vehicles are considerably more elaborate than those of the larger producers. The rear bogie of one of the six-wheelers, for example, weighs more than an entire 1-ton truck as produced by the quantity builders and contains more anti-friction bearings. The engine alone in many Mack models costs more to build than the delivered selling price of popular 1-½-ton chassis complete. Quality manufacture almost always involves more operations and more individual parts per assembly. It takes more space to house the huge machines necessary to produce larger parts.

The second reason is that Mack actually builds outright a far greater proportion of the components of its product than any other truck builder. Many makers who boast that they build their own axles, purchase differentials or complete carriers from parts specialists. Very few make their own cabs, wheels,

brake drums, driveshafts, cylinder blocks, etc. No other makes all of these parts.

This is not the complete story of Mack. It is a resume of the chapters to date. It is a "to be contined" story. In these continued chapters, the designer has the responsibility to produce real, true, superior designs worthy of the name Mack.

PRODUCTION

YEAR	NO. MOTOR VEHICLES	VARIETIES
1900	1	
1901	1	
1902	5	
1903	8	
1904		
1905	16	5
1906	32	5
1907	38	8
1908	46	10
1909	77	11
1910	197	12
1911	596	23
1912	888	20
1913	689	18
1914	353	16
1915	636	4
1916	1389	4
1917	2858	3
1918	3815	2
1919	5015	2
1920	8092	2
1921	3592	2
1922	5825	2
1923	8327	2
1924	8197	3
1925	12634	4
1926	11123	7
1927	7553	11
1928	8841	9
1929	8193	12
1930	6423	17
1931	2774	36
1932	1399	43
1933	1877	32
1934	2094	37
1935	2246	37
1936	4053	48
1937	5376	58
1938	6229	89
1939	9220	90
1940	10737	130
1941	15696	137
1942	10188	111
1943	10637	41
1944	14415	27
1945	13293	28
1946	4881	27
1947	20878	61
1948	12042	57
TOTAL	253,484.	

THIS RECORD IS COMPLETE AND OFFICIAL FROM JUNE 16, 1905. RECORD PRIOR TO THAT DATE IS UNVERIFIED.

MACK CHARACTER IN DESIGN

MACK CHARACTER IN DESIGN

Of all the trucks produced in the world perhaps none are quite as famous and as well known as the Mack truck. Mack has become over the past fifty years of production a symbol for a rugged, sturdy, powerful and handsome truck. The Mack truck is one of the most distinctive trucks on the American scene. From the beginning Mack has been devoted to production of the highest quality and down through the half century of Mack, the Mack designers have not been ashamed of this fact and have developed a series of truck designs which merit the historic expression the American public originated -- "Built like a Mack". Mack has always been famous for a handsome truck that looks the way it is build -- rugged, sturdy and powerful.

What makes a truck a Mack. In designing Mack trucks this is indeed an important property of design to establish. The public expects and the executives demand that when a new Mack design comes out, it look like a Mack. In design this property is called character. Character, in our case, is defined as the sum of distringuishing traits or characteristics which make a Mack an individual truck.

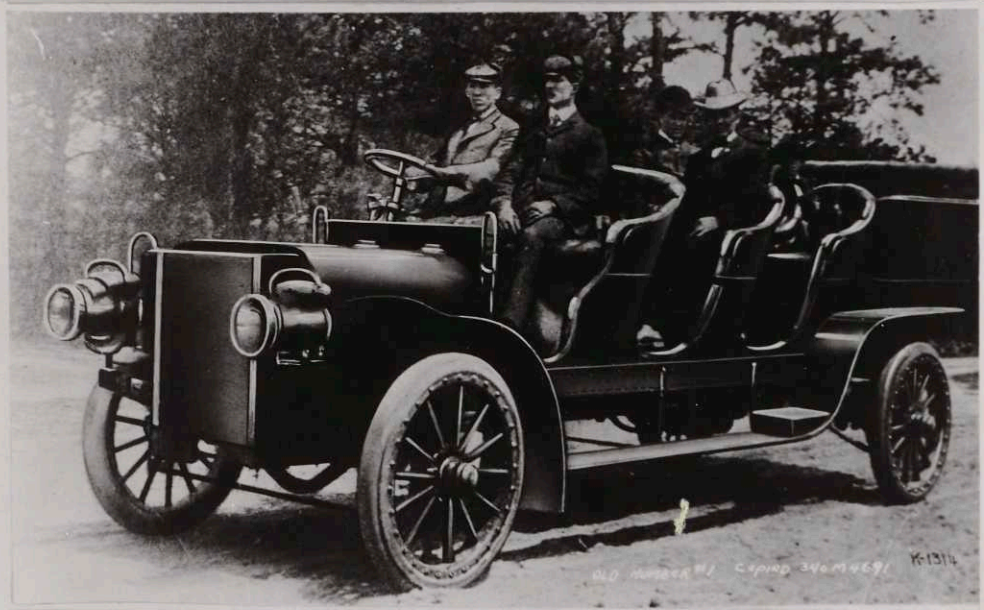
The Mack character is a very definite thing but something very difficult to express in words. The Mack character is a combination of visual elements and therefore can be best

seen -- not written down. This then, is the purpose of the following study of representative models of the Mack truck from the beginning -- to establish a close feeling for the Mack character and a definite basis for projecting that character into new designs.

TOP: BUILDERS OF THE FIRST MACK

CENTER: THE FIRST MACK -- A BUS

BOTTOM: THE NINTH MACK STILL
IN RUNNING ORDER
AFTER A MILLION MILES



M.B.M.O. Co.
THE "MACK"

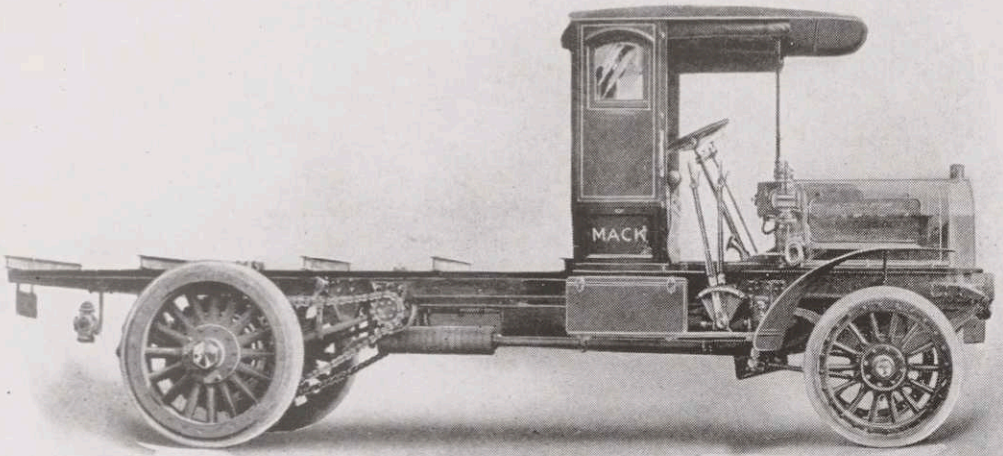
1900 - 1912

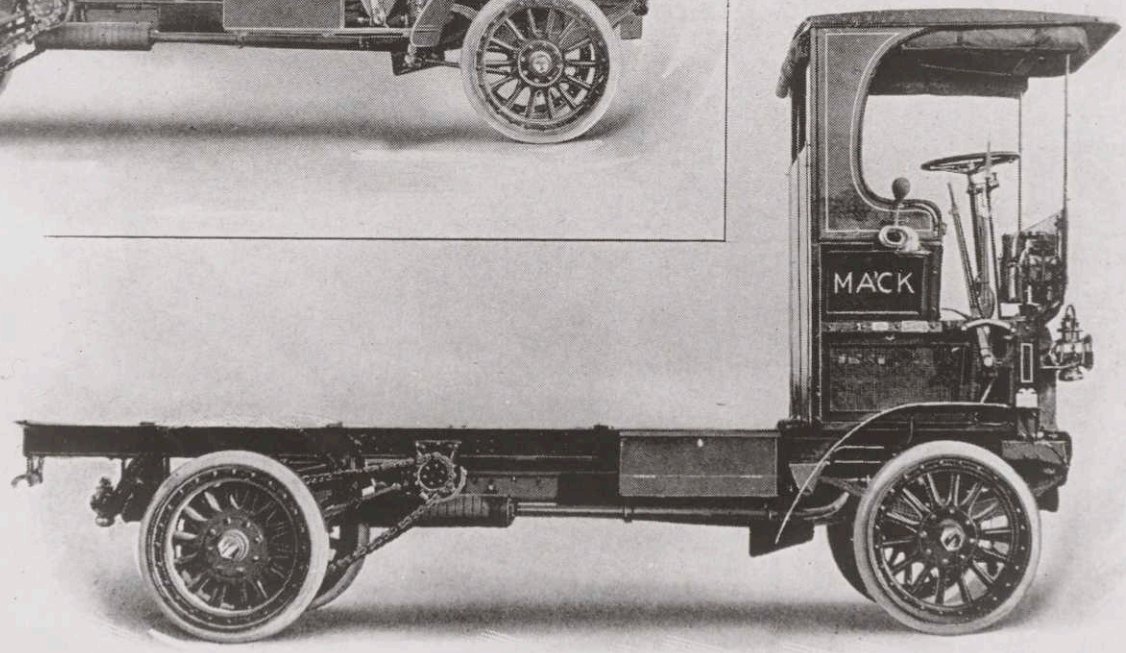
PRODUCTION MACK MODELS

TYPE 1: CONVENTIONAL MODEL
WITH CAB

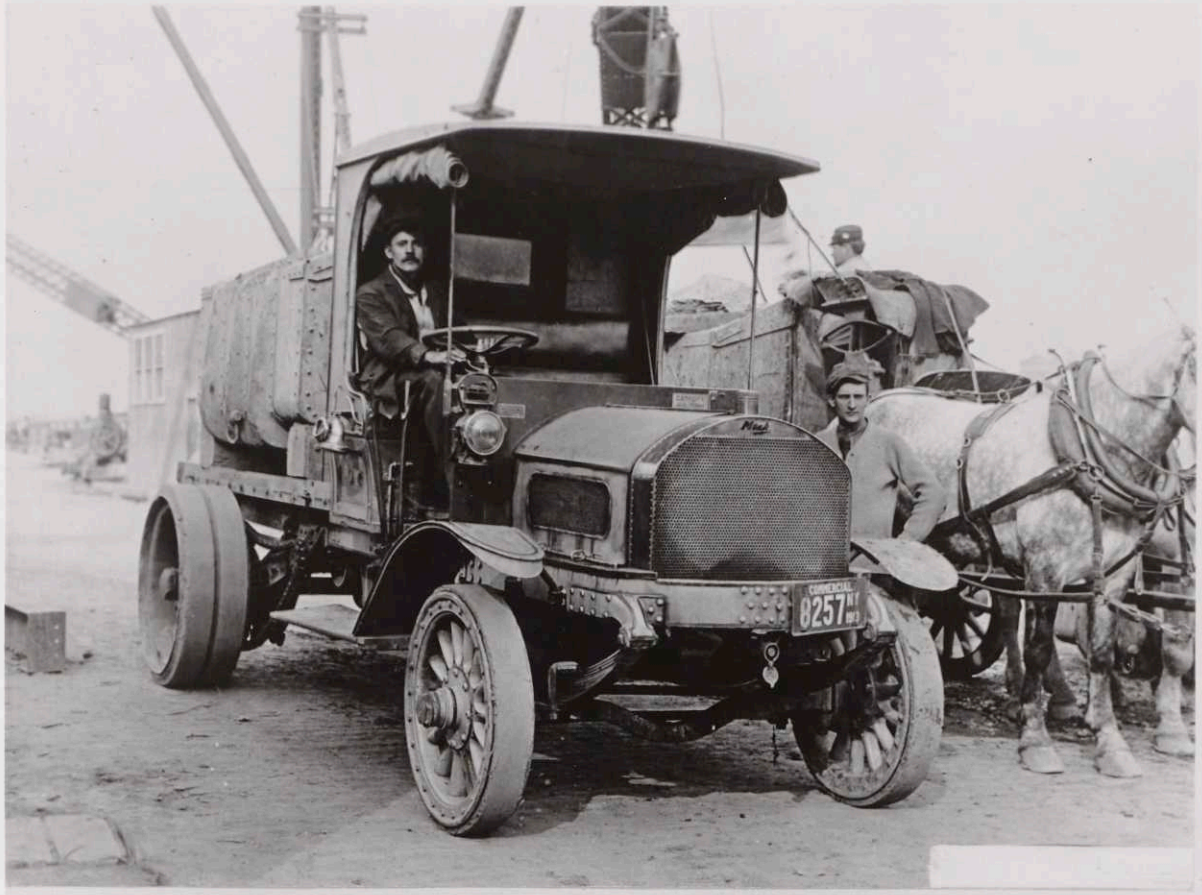
TYPE 2: CAB-OVER-ENGINE MODEL

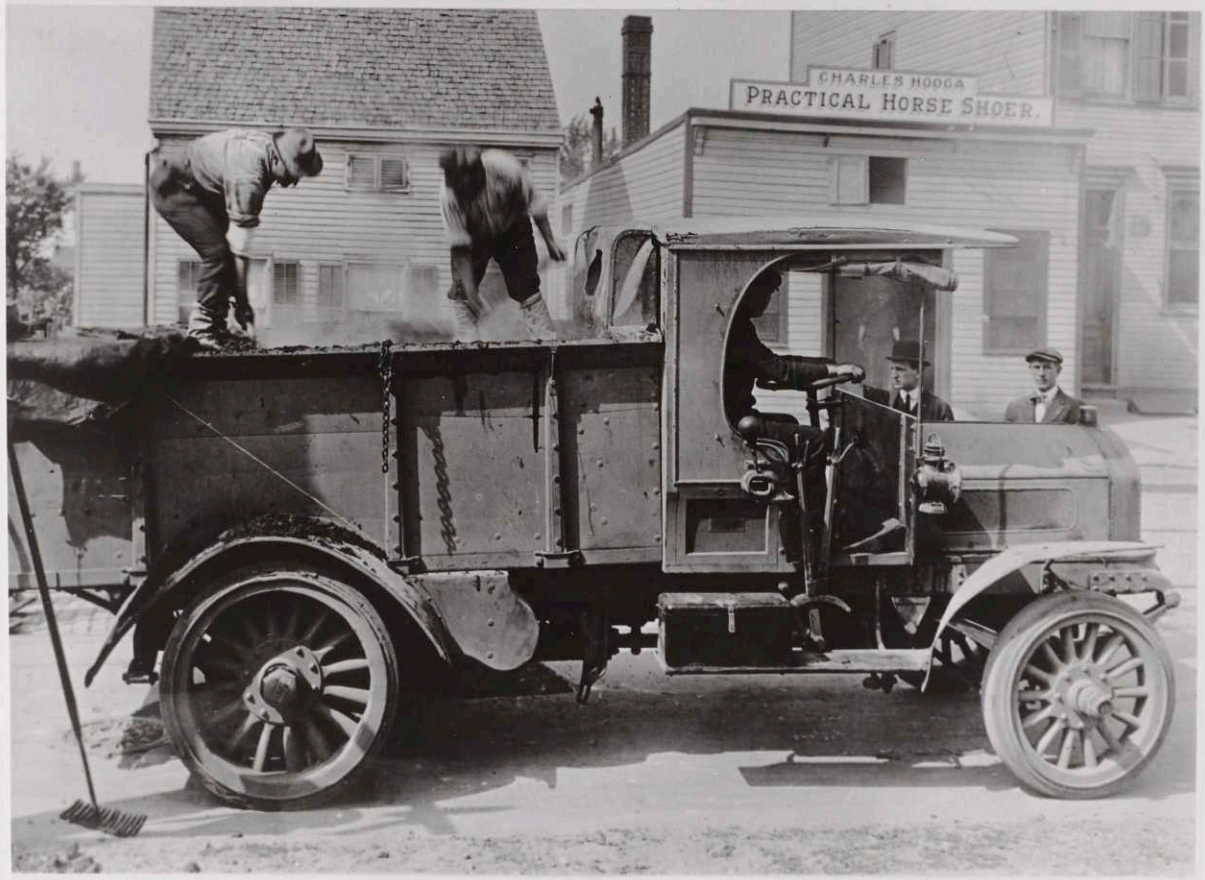
TYPE 1.





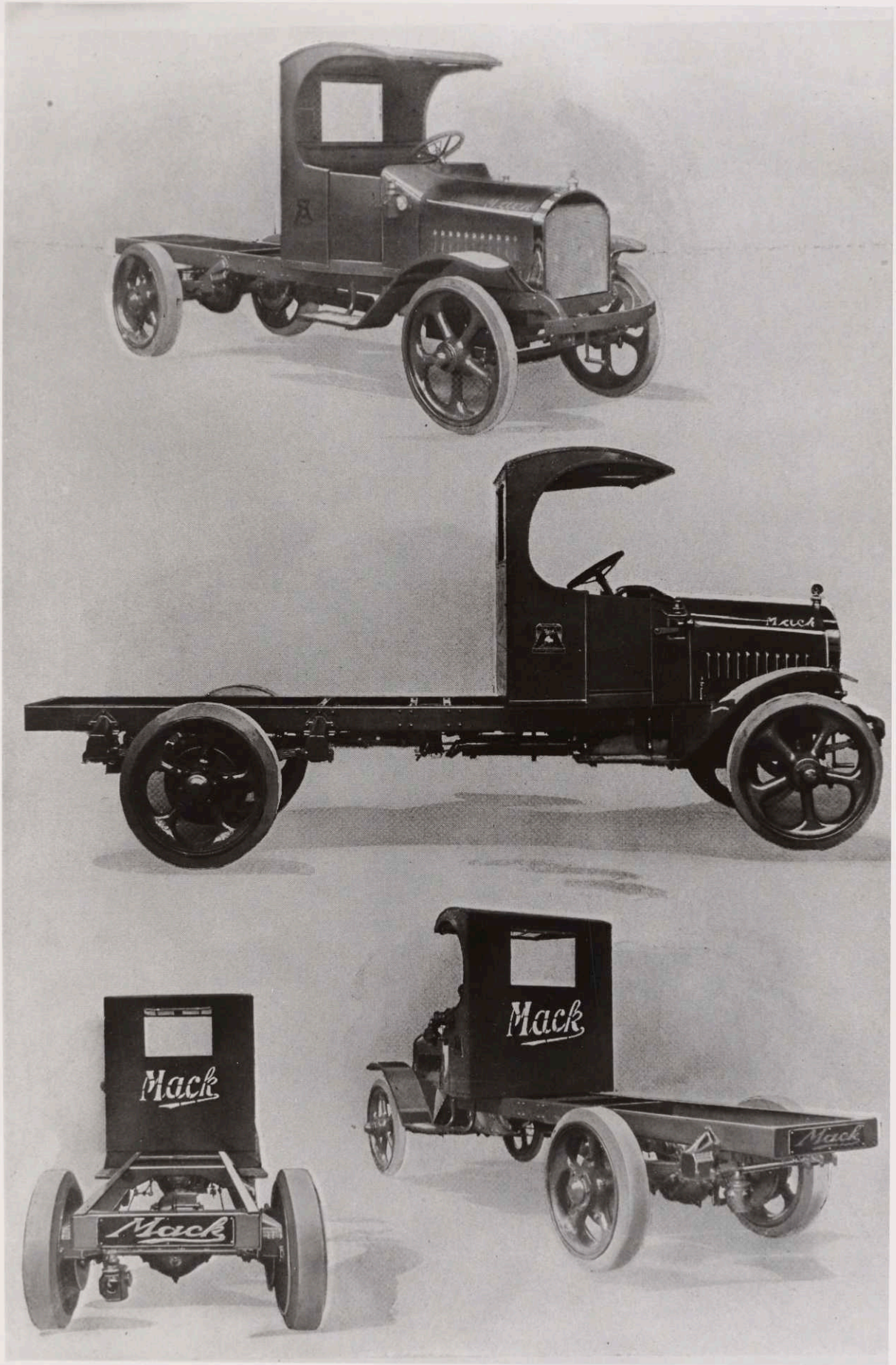
TYPE 2.




CHARLES HOOGA
PRACTICAL HORSE SHOER.


Pabst Blue Ribbon
PABST
MILWAUKEE
The Beer of Quality
PABST BREWING COMPANY 606 W 49TH ST. N.Y.

1912 : MODEL AB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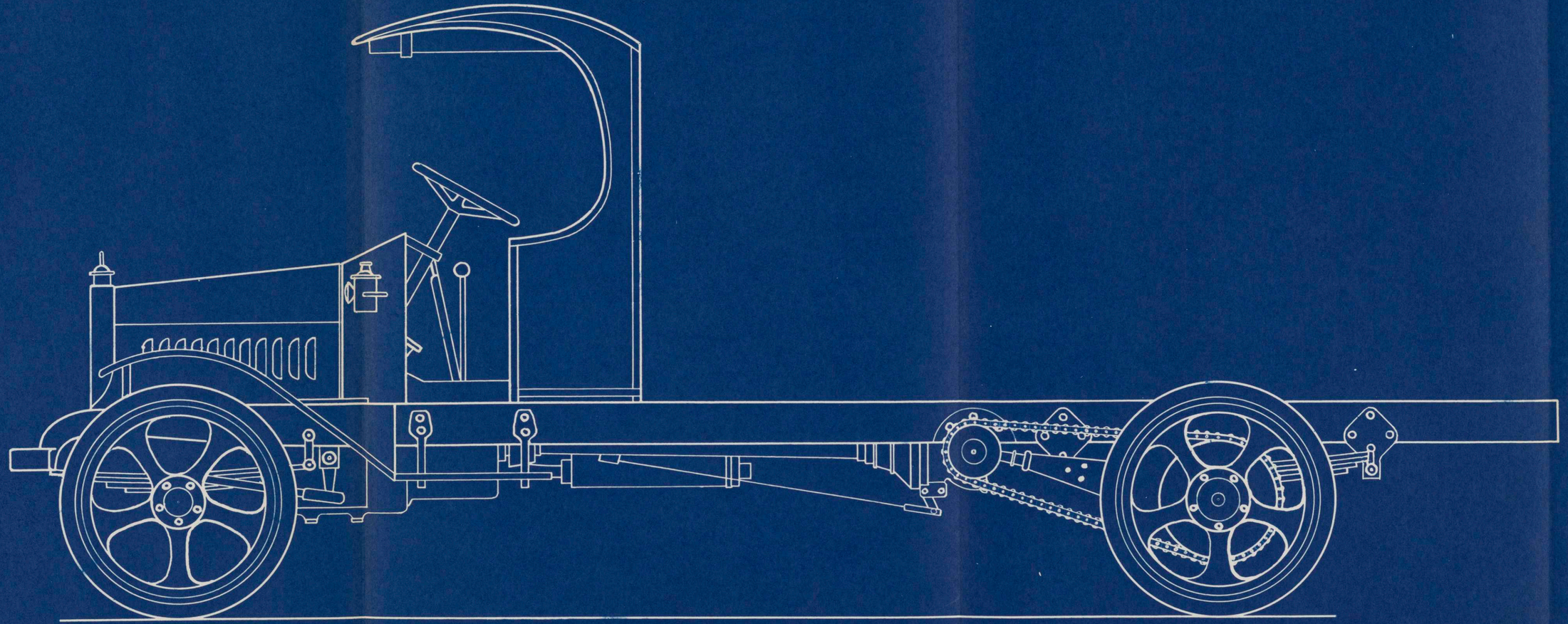
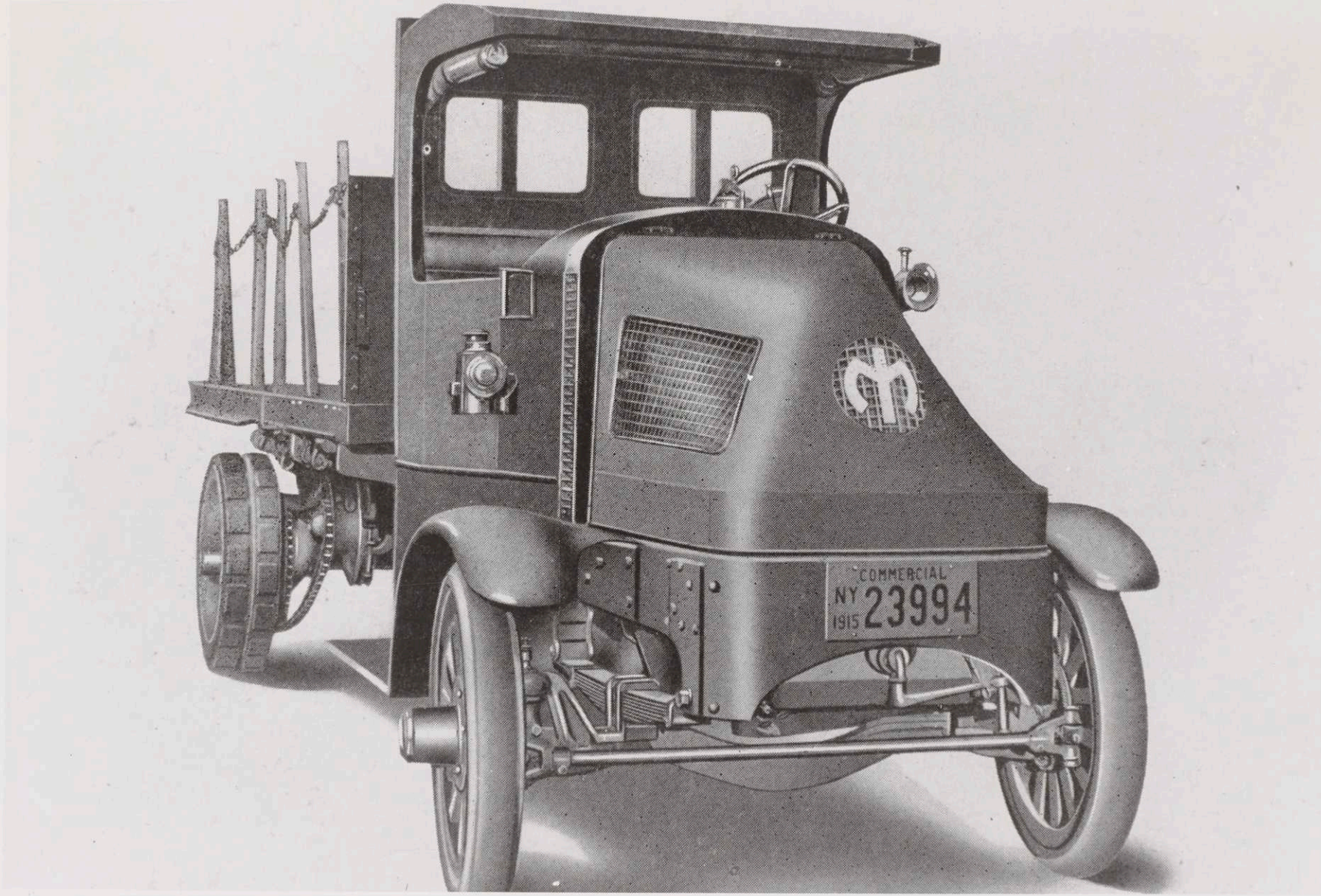
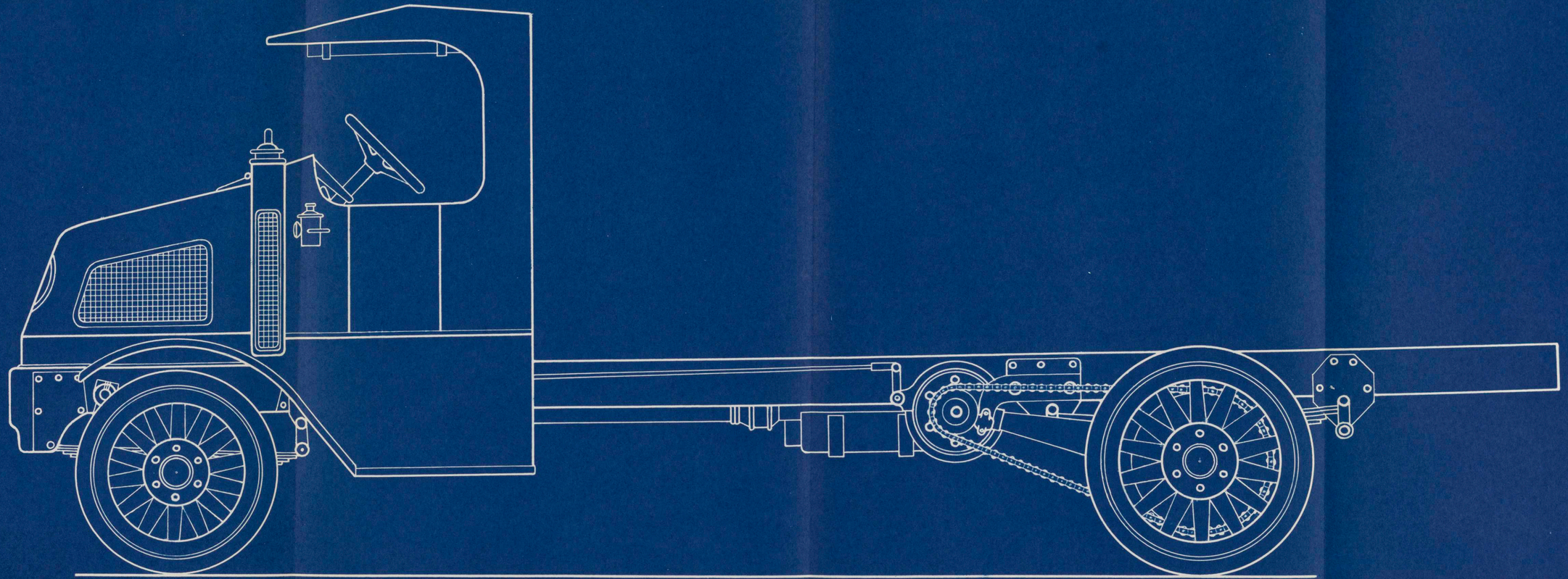
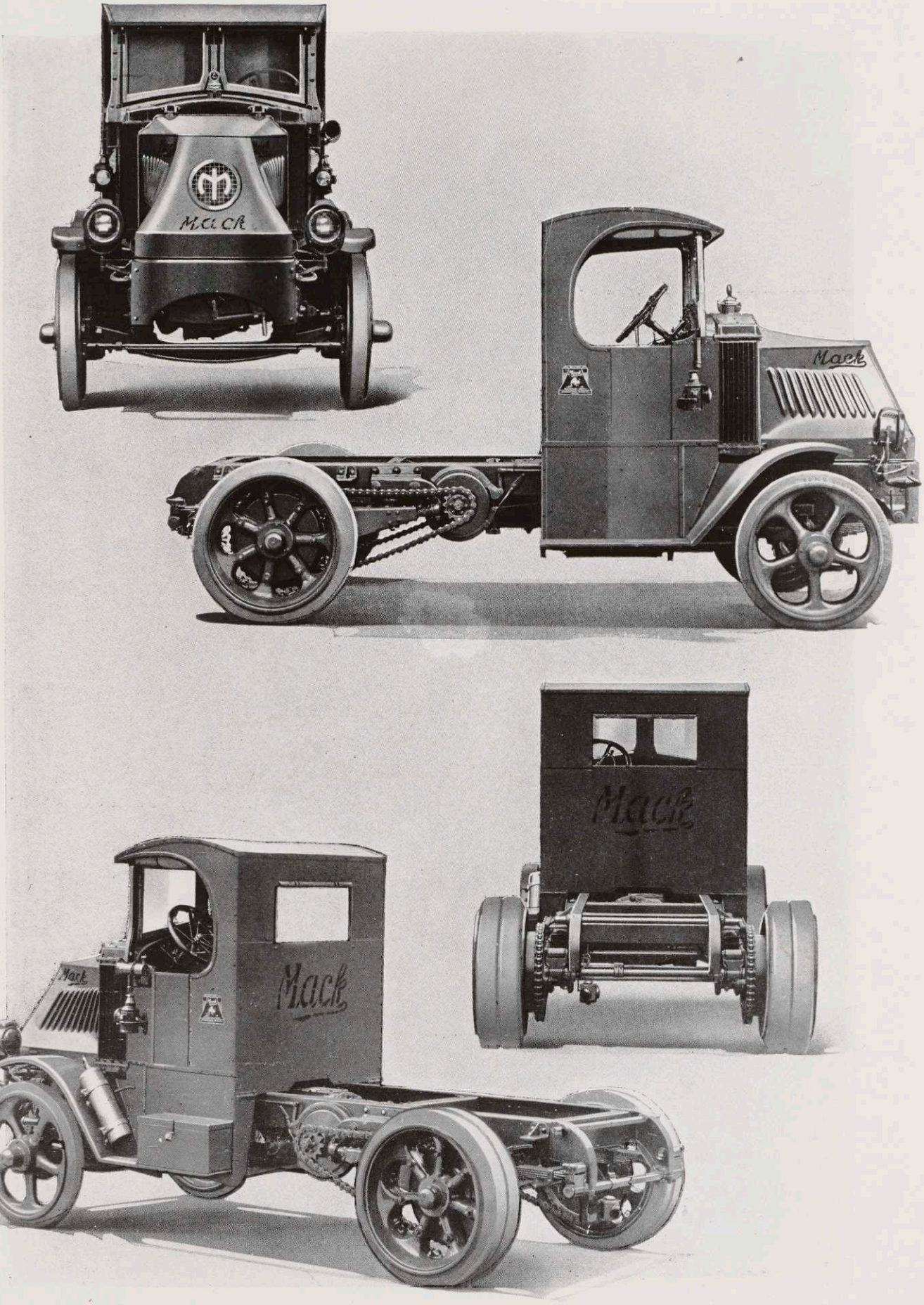


1912 : MODEL AC


COMMERCIAL
NY 1915 23994



1929 : MODEL AC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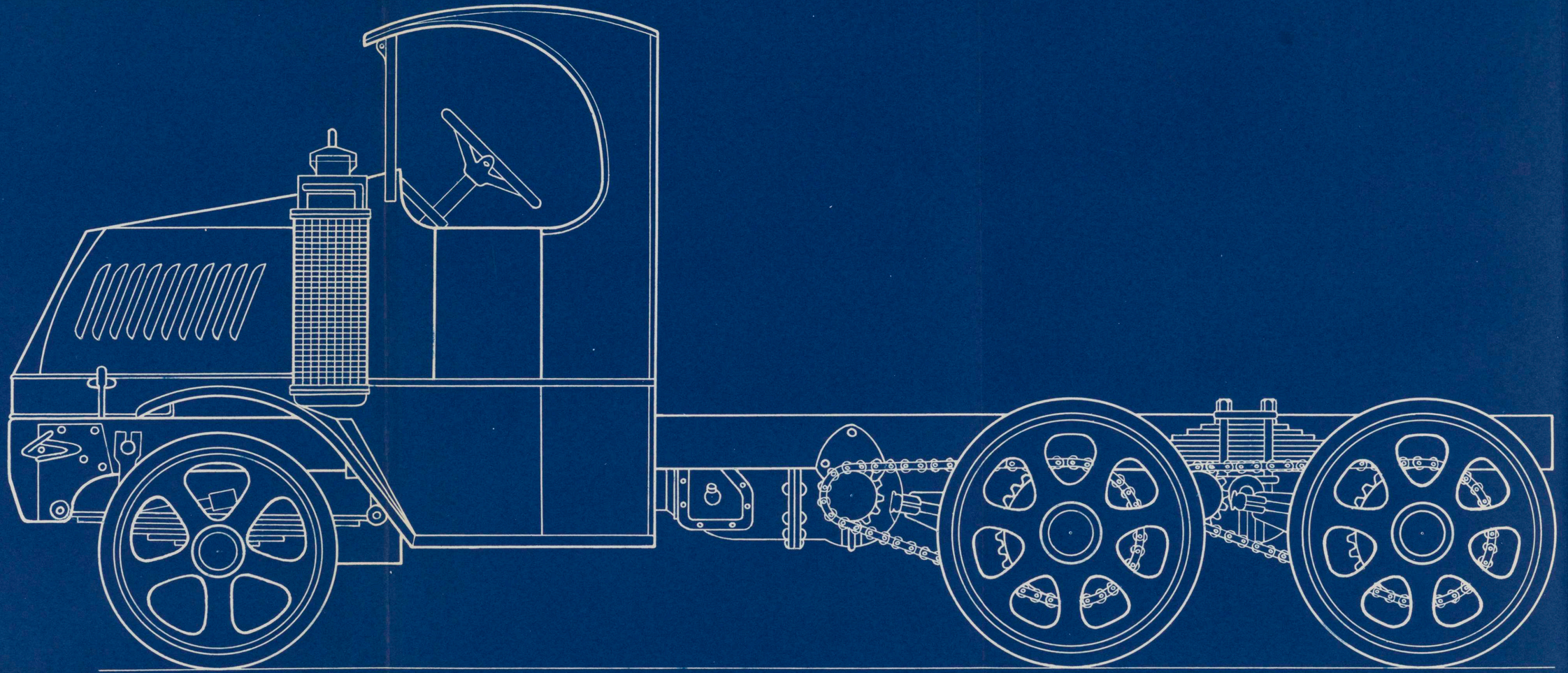
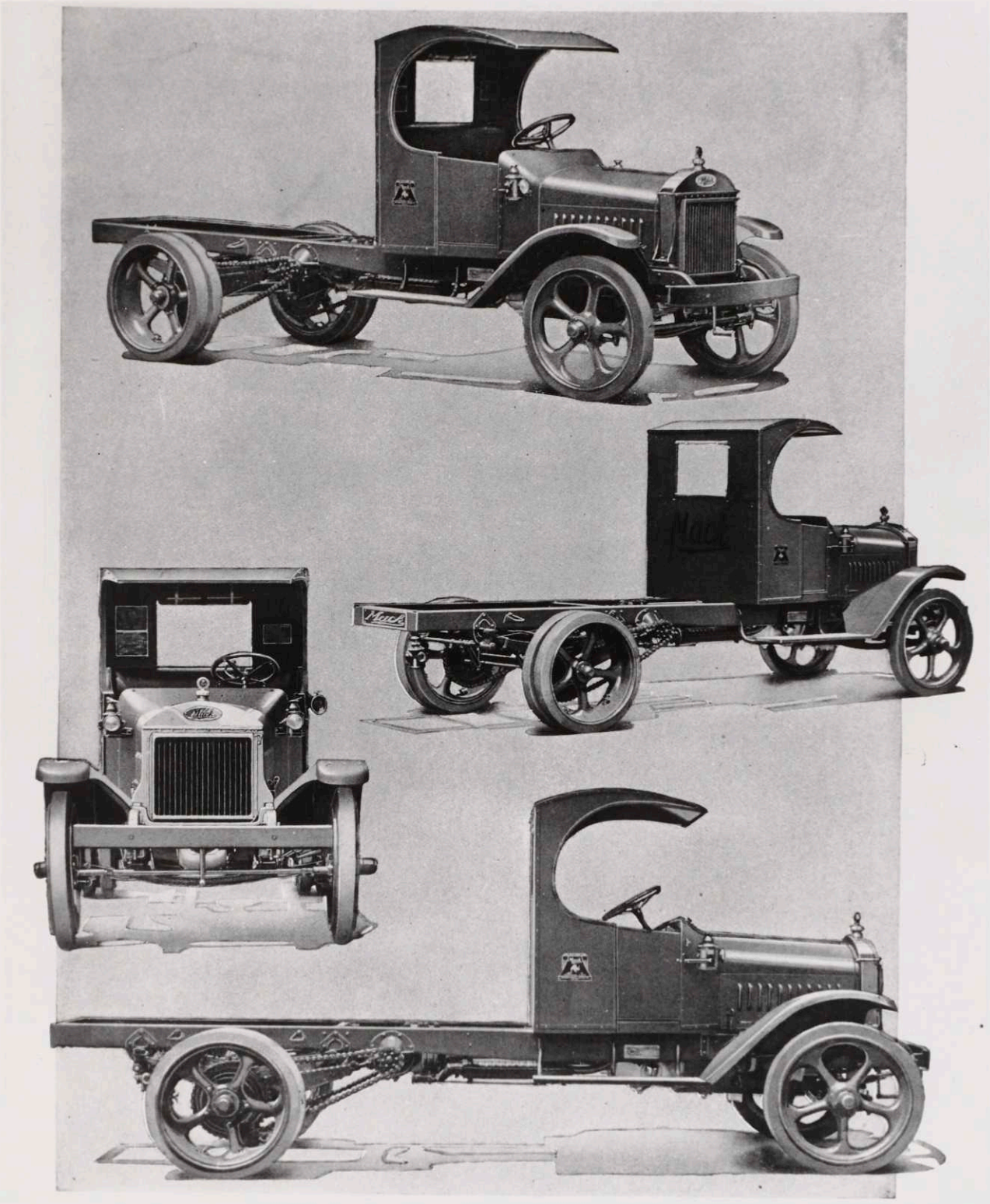


1925 : MODEL AB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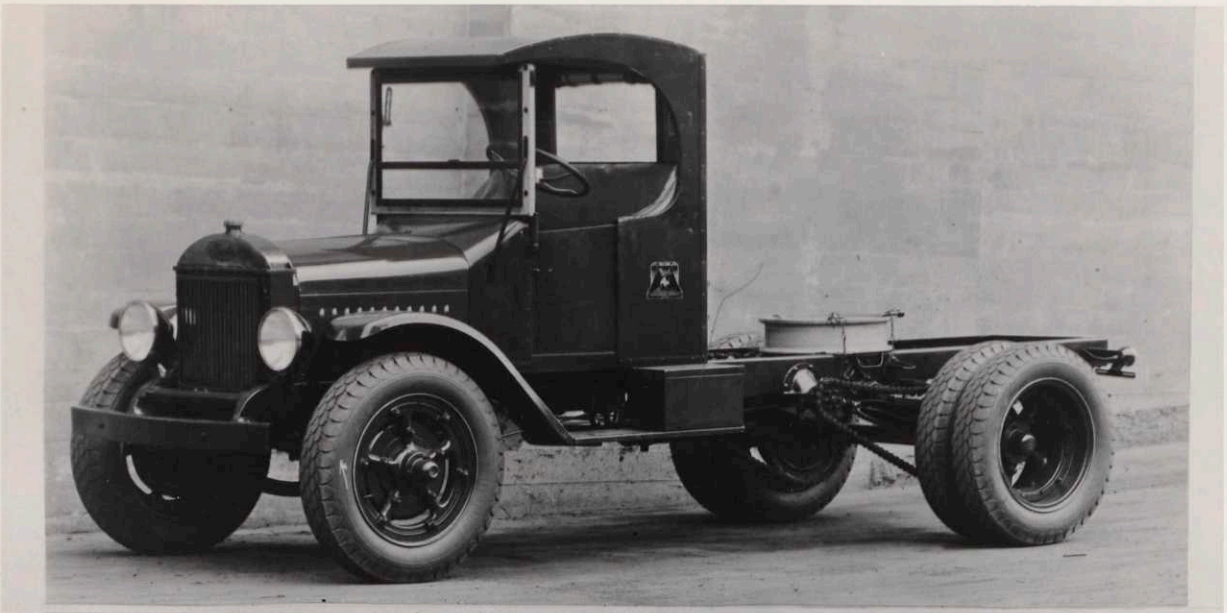
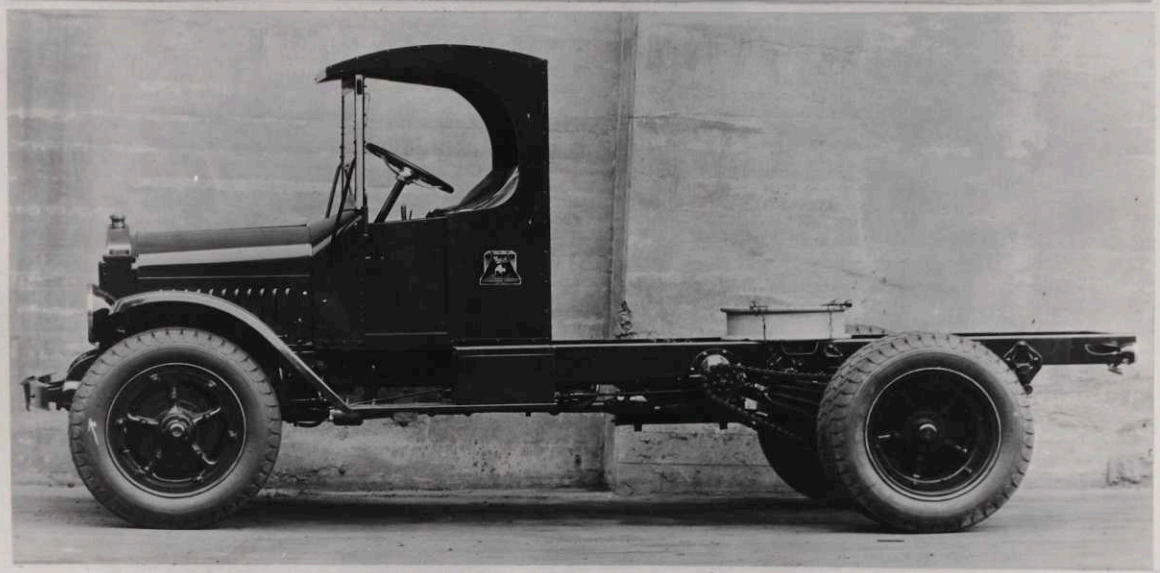
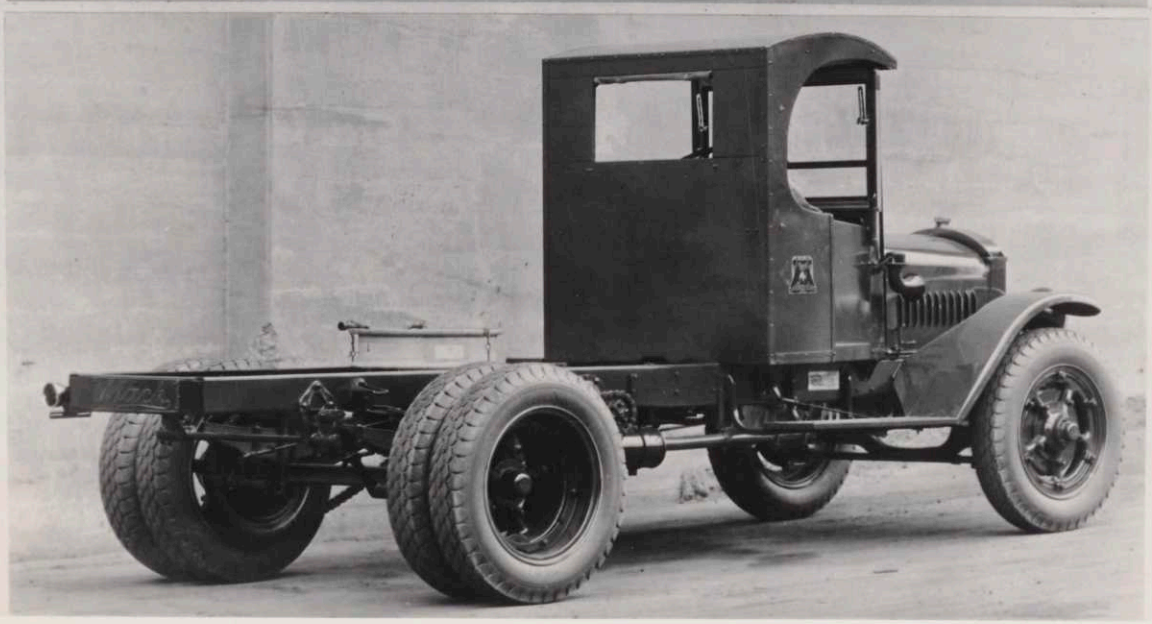
1929 : MODEL AB



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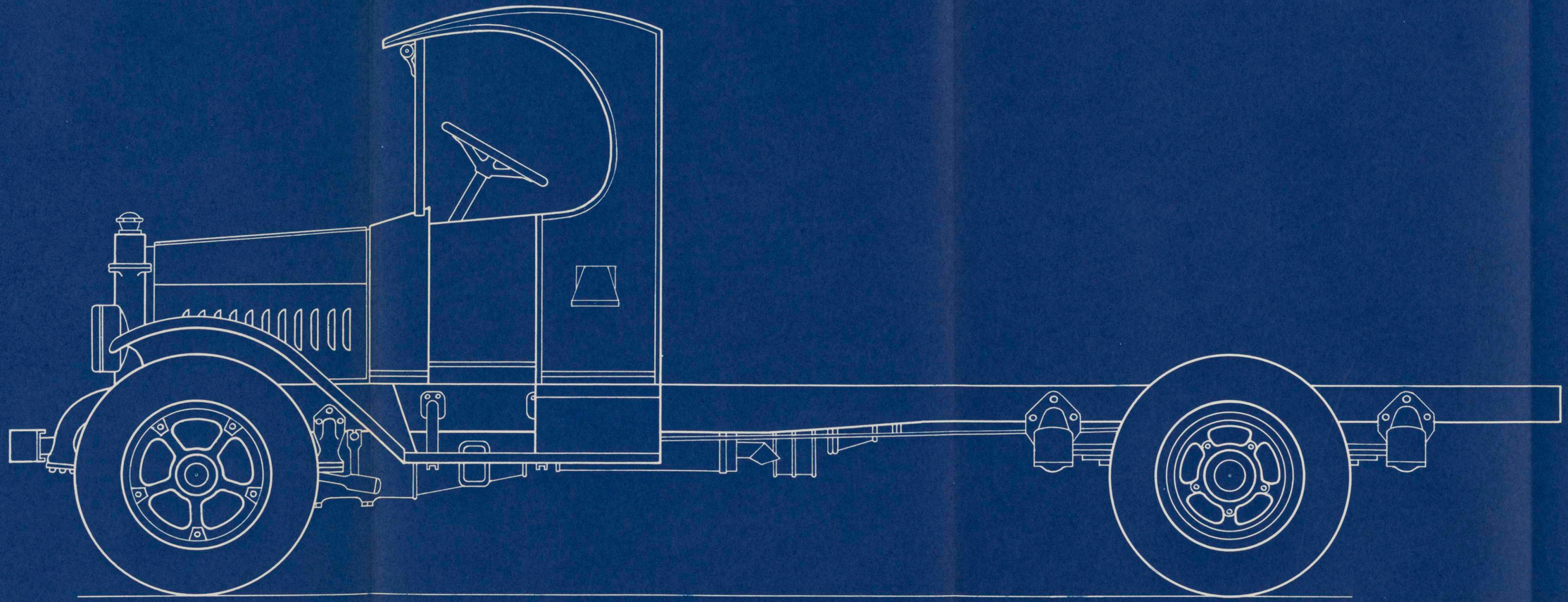
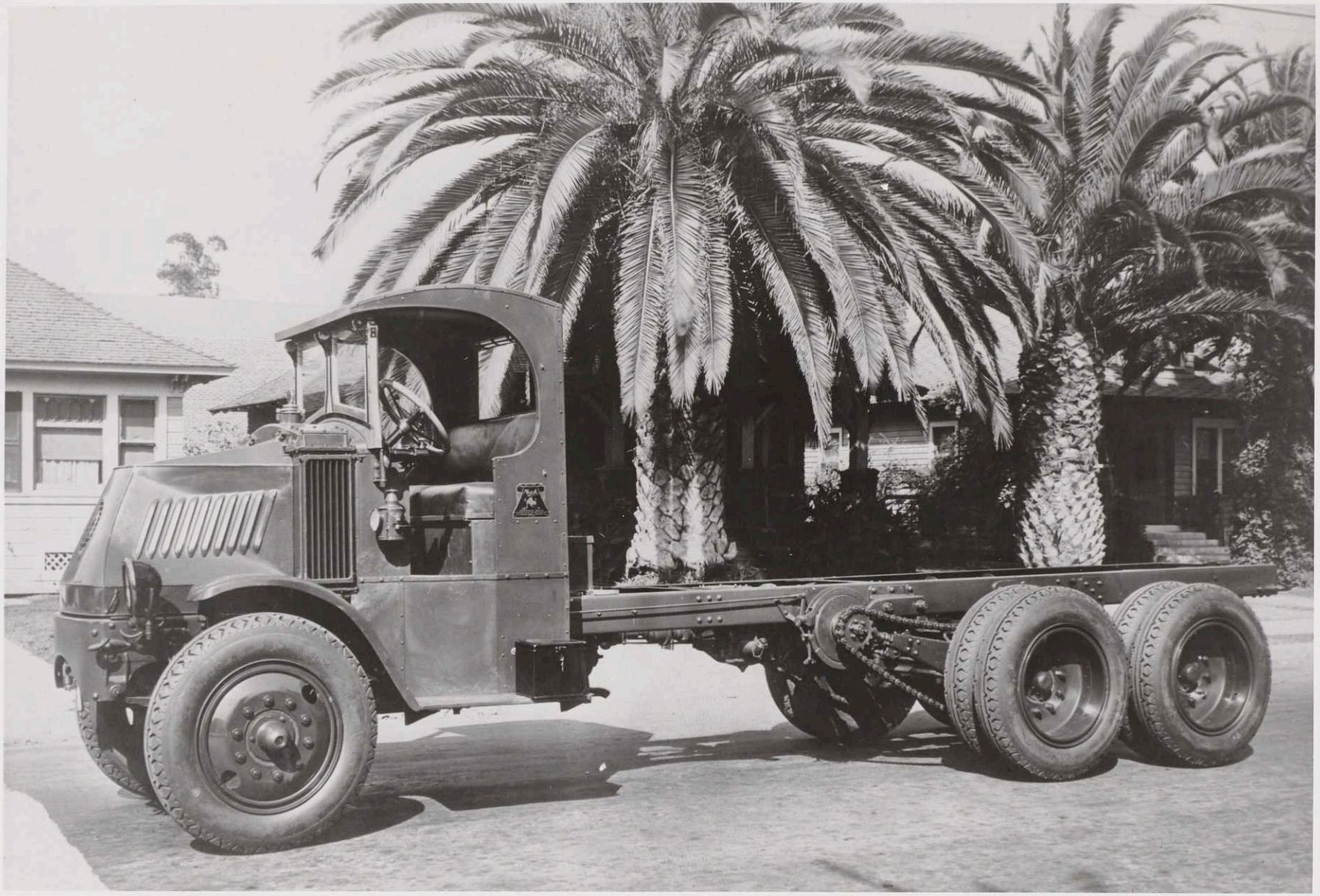
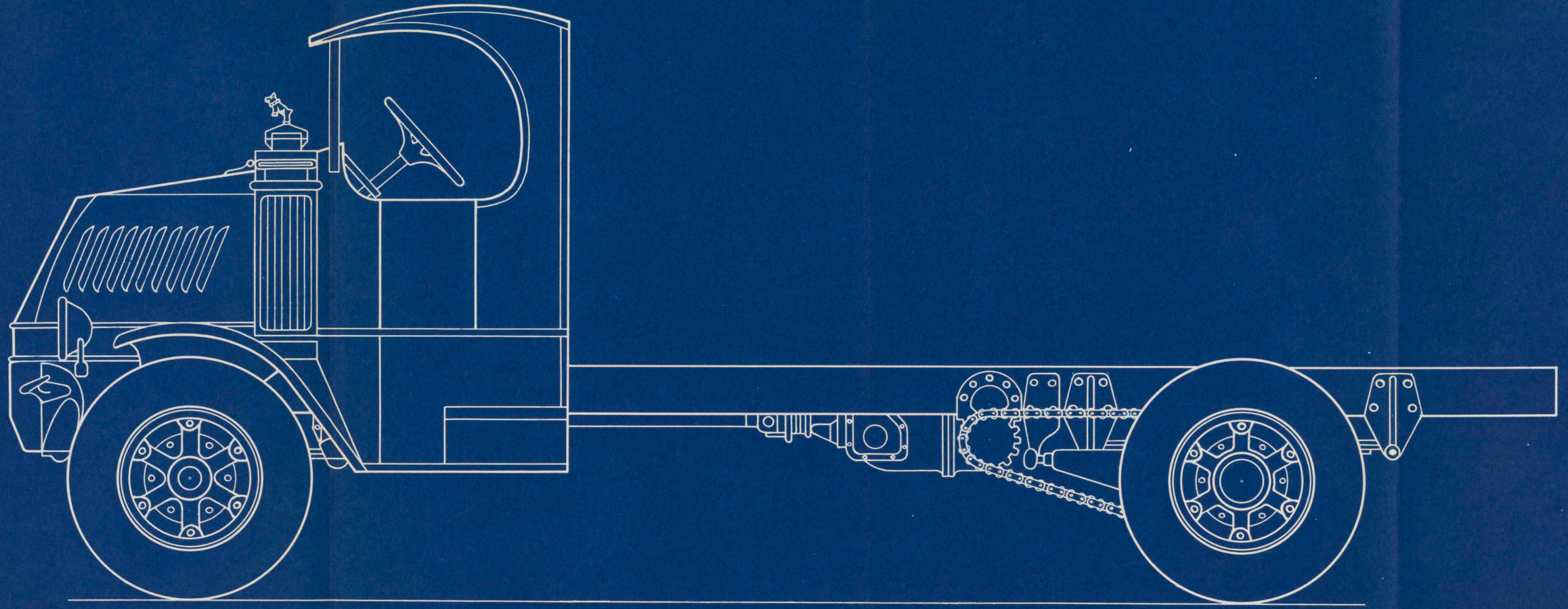
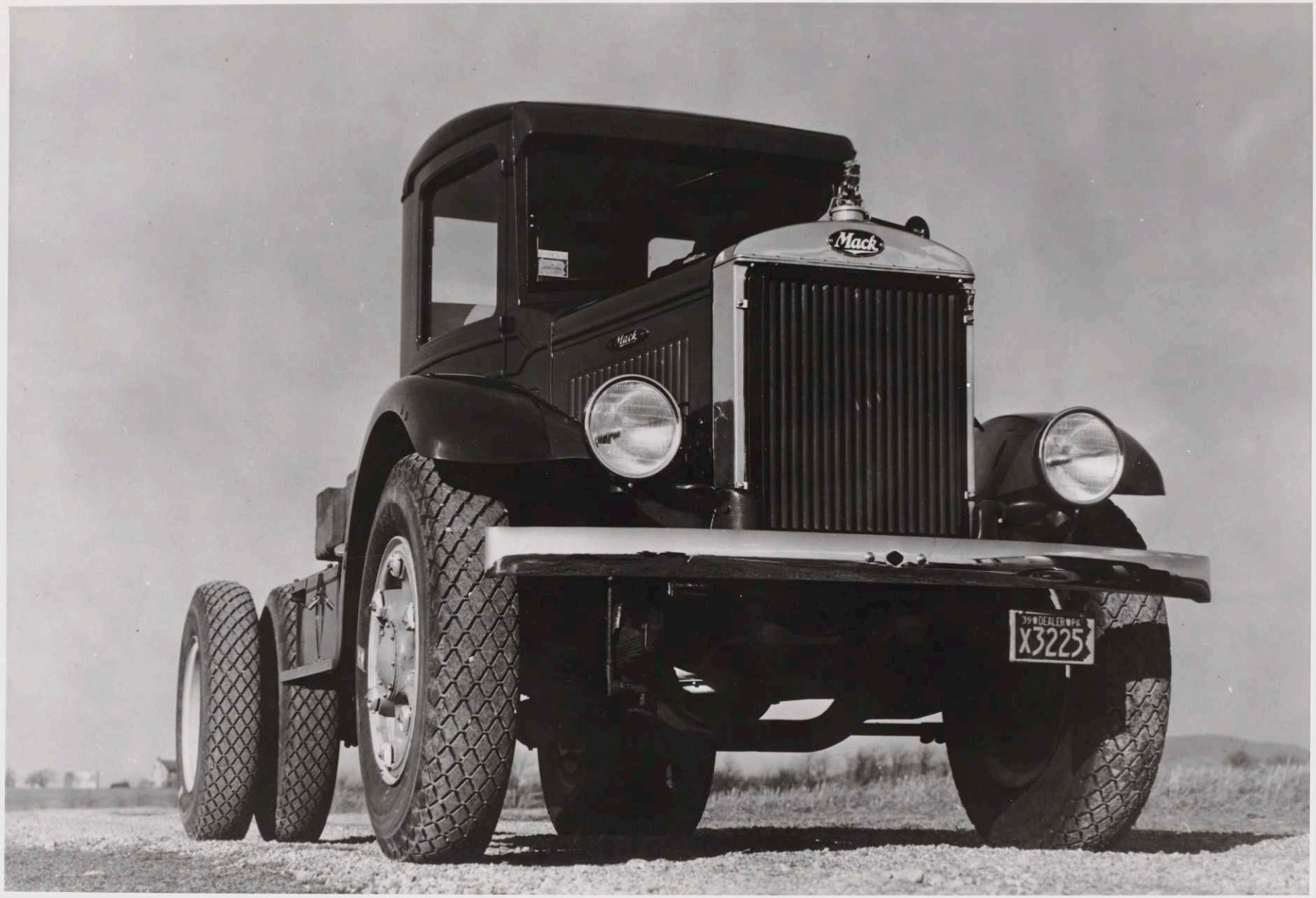


1935 : MODEL AC





1932 : B SERIES MODEL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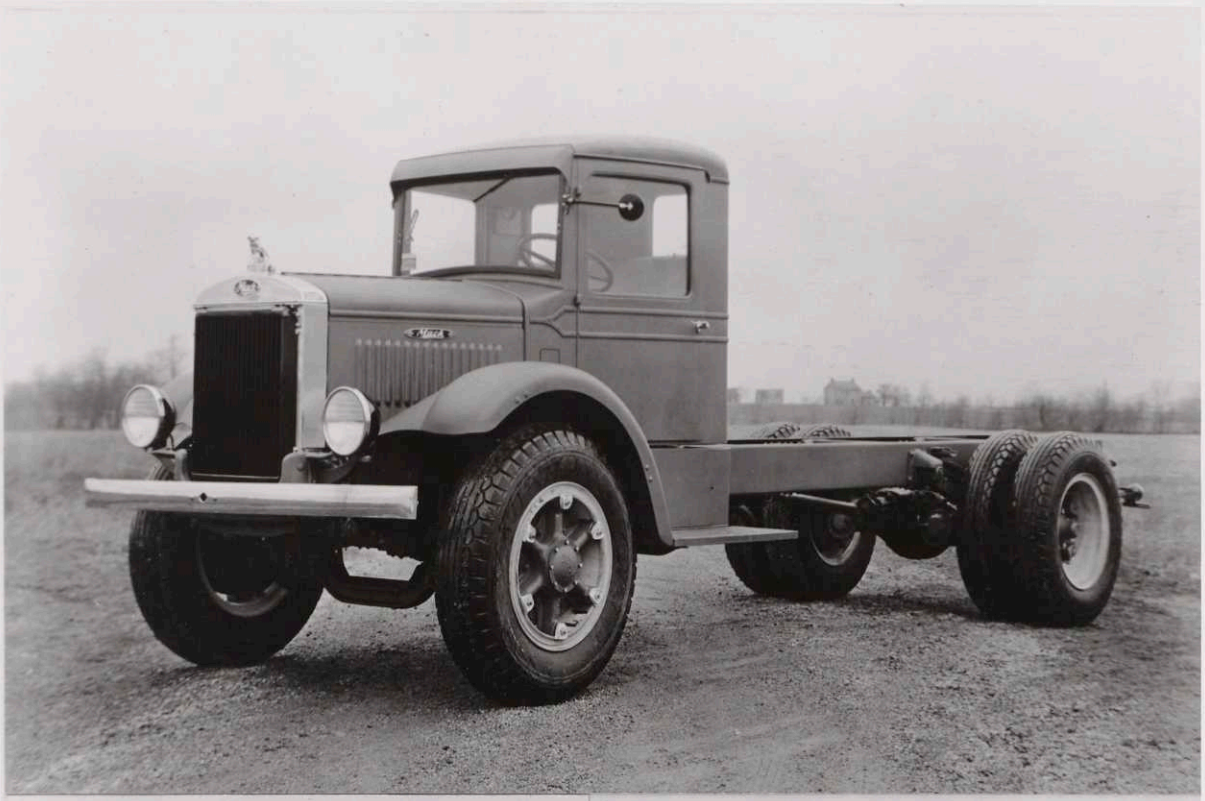
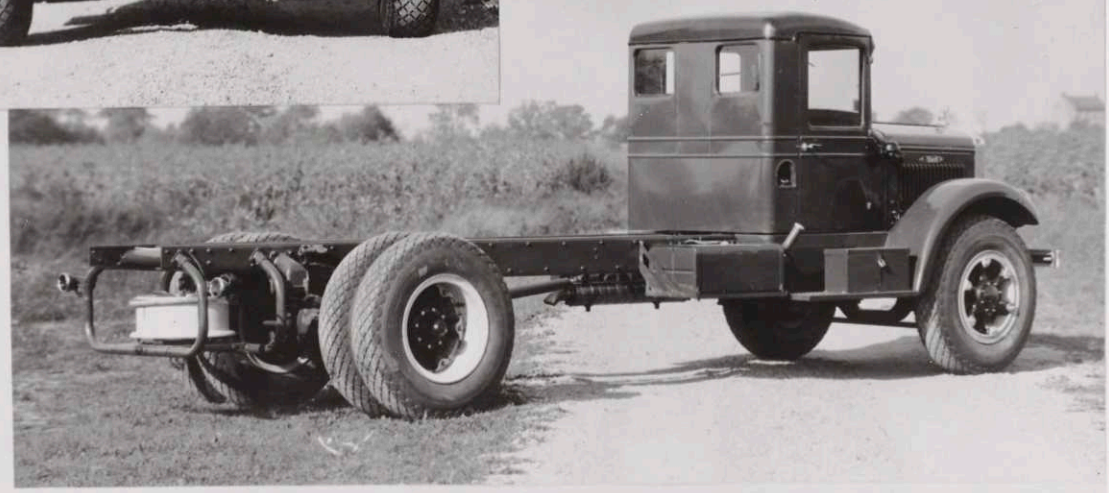
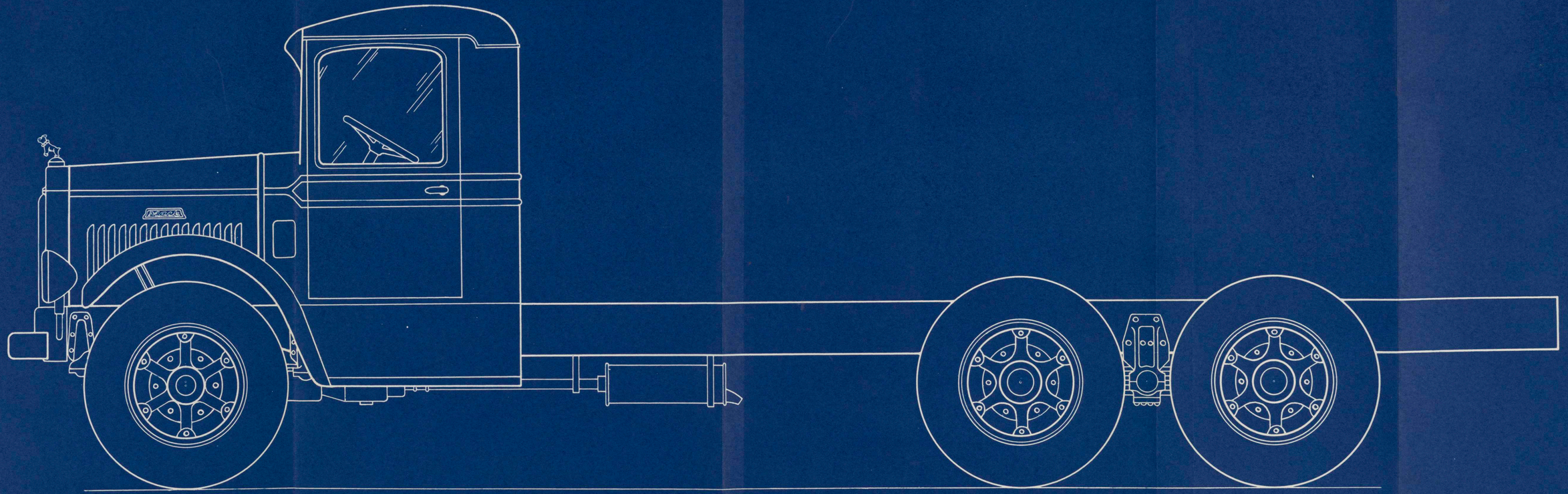
39 DEALER DPA
X3225



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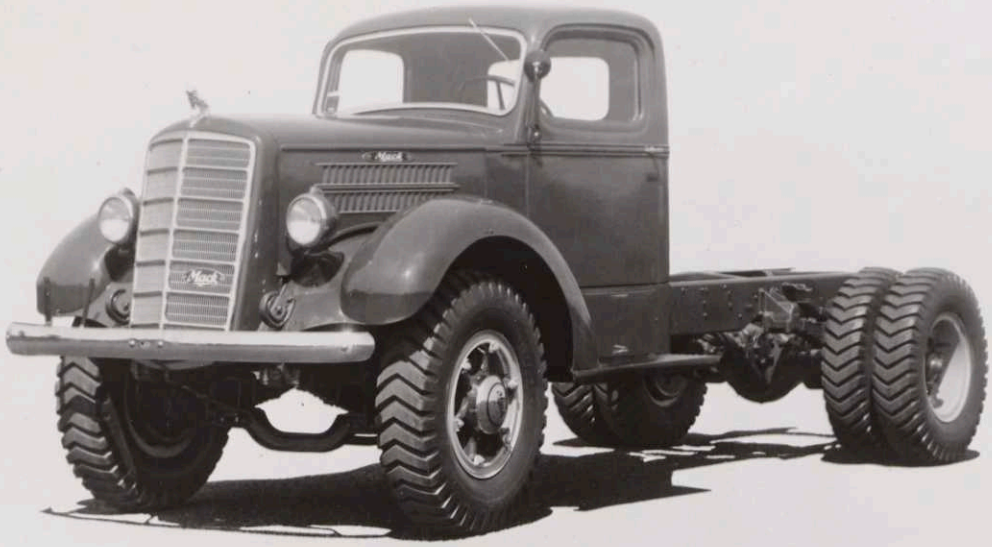
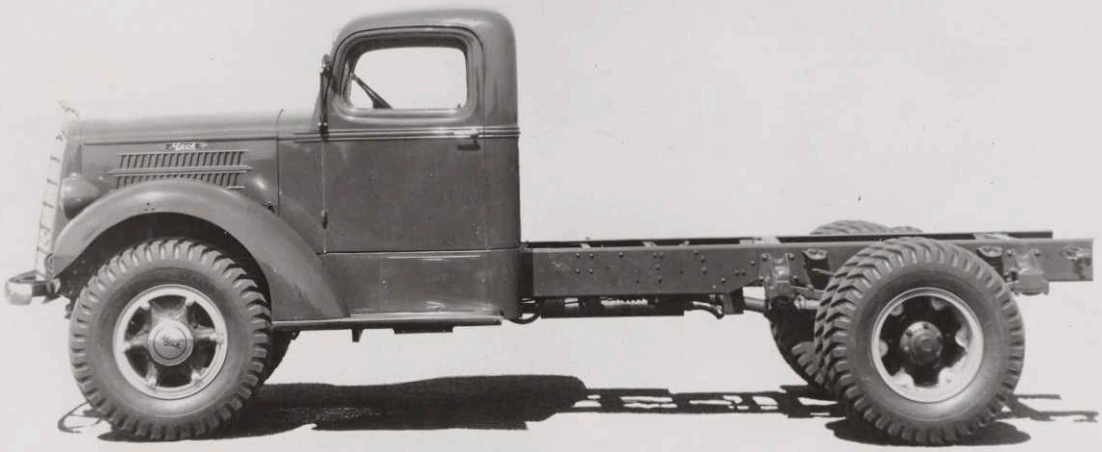
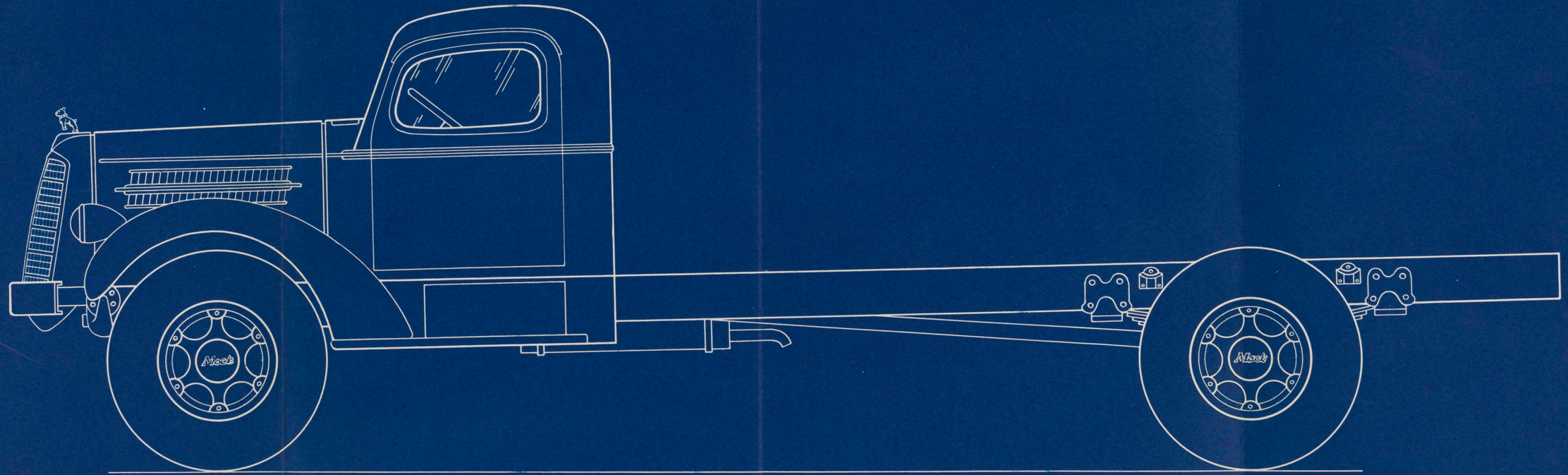
1937 : MODEL EQ



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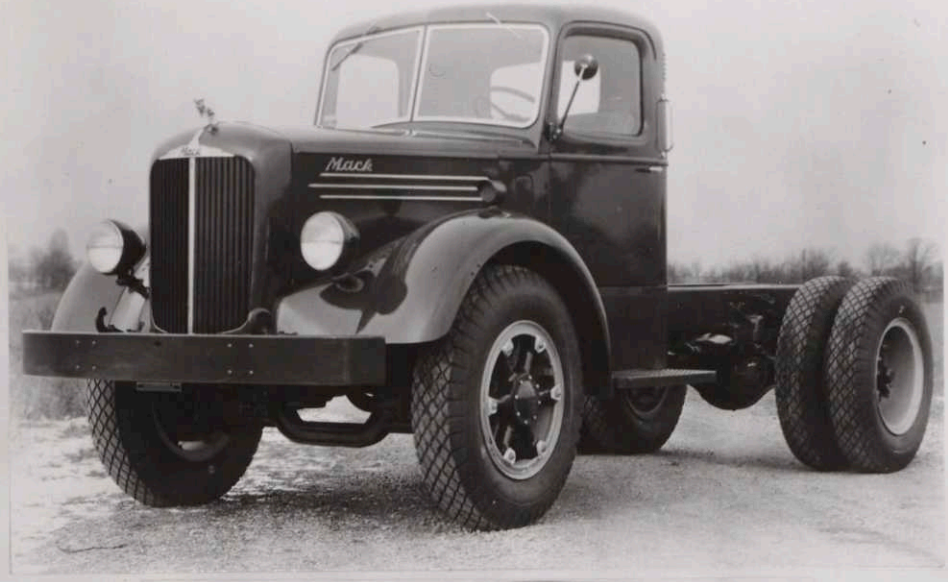
1940 : L SERIES MODEL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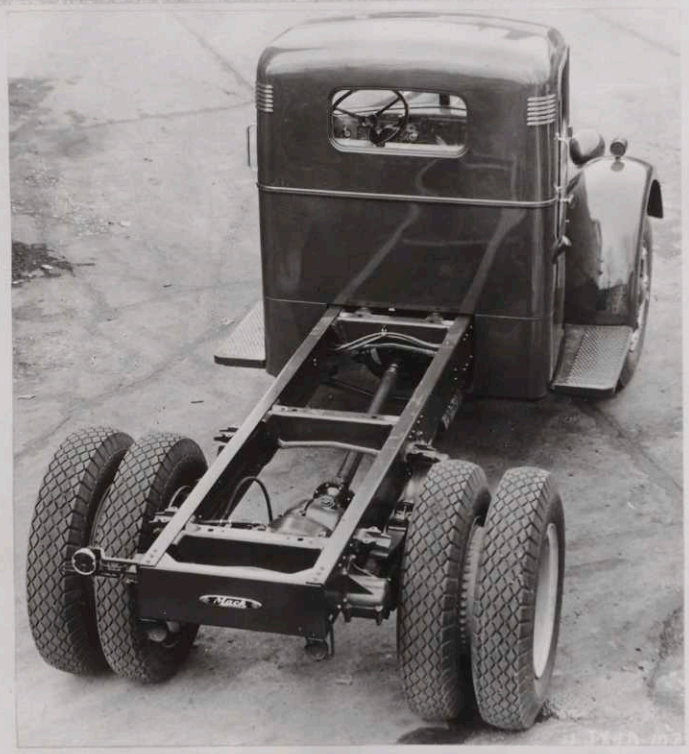

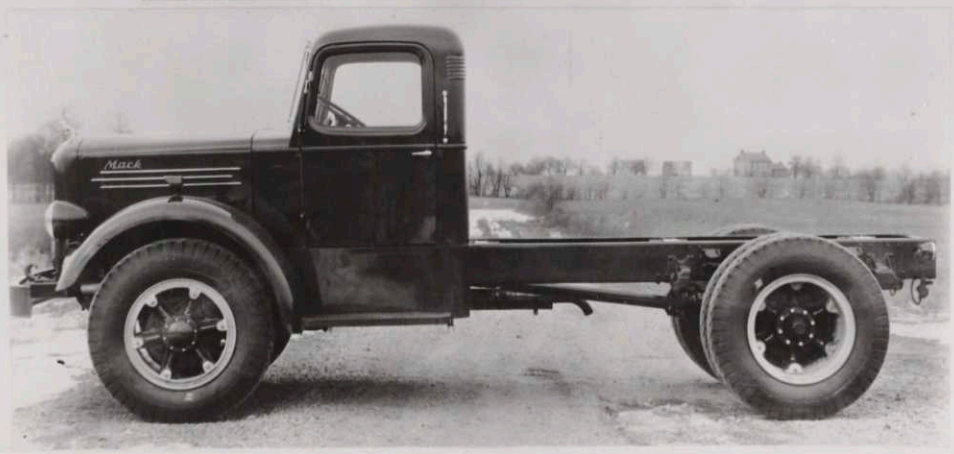
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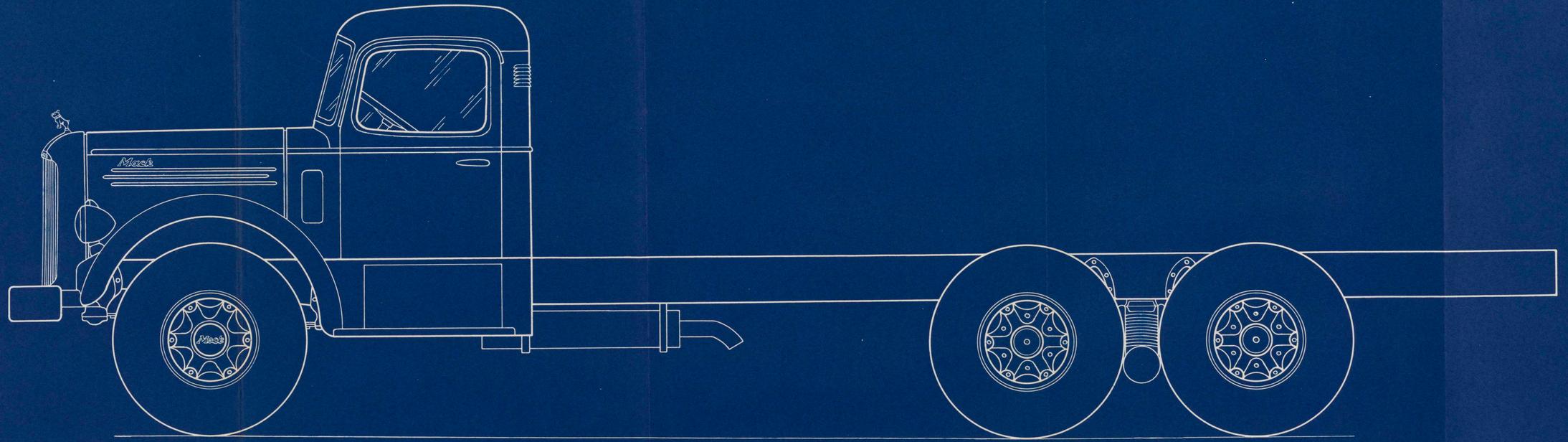
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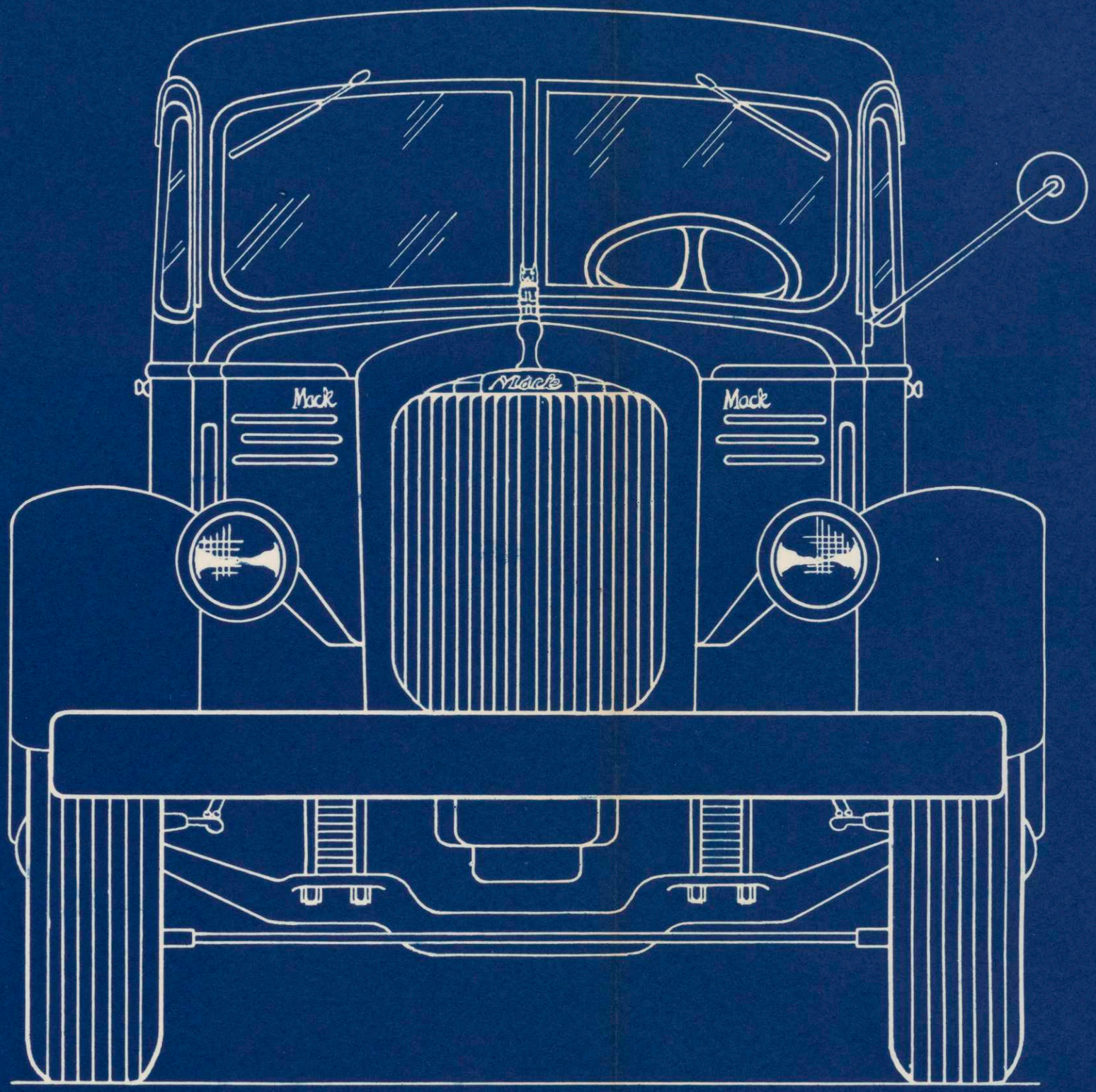
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PRESENT HEAVY DUTY MACK TRUCKS

PRESENT HEAVY DUTY MACK TRUCKS

The name Mack is synonymous with rugged, powerful, heavy duty trucks. Mack specializes in heavy duty truck production. The L series in the Mack line of trucks is the Mack Truck Company's present bid in the heavy duty truck field. It is important that we study the present L series design and understand the various peculiar design requirements of this series because this is the "jumping off point" for future heavy duty Mack truck design.

The following, then, is a design study of the complete L series including fire apparatus and the extra heavy duty "off highway" units on which portions of the L series cab and front end sheet metal are used.

The smallest model series in the Mack line of heavy duty trucks is the LF which is rated at 28500 pounds gross vehicle weight. Included in the LF series is the LFT which is a tractor and the LFSW which is a six wheeler.

The most popular Mack truck built today is the model series LJ - 36000 gross vehicle weight. The model LJ series includes the LJT (tractor) and the LJSW (six wheeler). The cab and front end sheet metal is identical with the LF but the LJ features a more rugged chassis, a more powerful engine, larger tires plus other small refinements.

The LTSW is a super powered six wheeler designed particularly for heavy load transportation over long distances

with economy and dependability under the rigorous conditions and limitations imposed by most far western states. In these far western states the allowable load is based on the "bridge formula"

$$\text{Load } C_1(C_2+L)$$

where L is the wheelbase of the truck. In the standard LJ design, for reasons of weight distribution and handling, the front axle is set 46 1/8 inches to the rear of the front bumper. The front axle of the LTSW (often called the "west coast model") has been moved as far front as possible to obtain maximum wheelbase and therefore maximum legal load as computed from the "bridge formula". The styling of the LTSW is more rugged than the LJ. The older type rectangular radiator is used. The LJ cab is mounted high on the chassis and all unnecessary sheet metal, such as the aprons below the doors do not appear. Because of the larger engine for high load and long cross country hauling, the hood has been lengthened. A large air cleaner and tool box have been mounted on the exterior of the truck in plain view. In considering a new heavy duty Mack truck design, the requirements of the "west coast model" must be met.

In extra heavy "off highway" trucks, Mack has always been outstanding as a leader. The model LR and LRSW use the L series cab mounted high on a rugged I beam chassis. In considering a new heavy duty Mack truck design, it should be remembered that the cab must be adaptable for use on such

units.

For specialized heavy duty applications Mack produces several special vehicles whose styling and design is basically the LJ series withmodifications to meet the specialized applications.

The FT is a heavy dumper. In this model the two doors have been replaced by half doors. Special fender and a high bumper are included.

The LMSW used in oil fields, timberland, mines and quarries is basically a LJSW with a high heavy bumper, heavy gage fenders and an off set cab (a cab which is set off center to the left hand side of the chassis). New cab and front end sheet metal design must be versatile enough for use on these special vehicles.

Mack fire apparatus is widely used throughout the country. The type 85, type 19 and type 95 are heavy fire apparatus using portions of the L series cab and front sheet metal. On many of the units the cab is cut off above the windshield and part way up the door. Other units retain the complete enclosed cab. Any new styling and design must be acceptable to fire apparatus requirements.

In heavy duty truck design it must be remembered that the volume of production is relatively low and a new design must always be versatile enough to be used in these various heavy duty truck applications without high additional die cost of production costs.

A photograph is included in this section showing interior styling and a close up of the dash board. Mack trucks are popular with the driver because he sits high with good vision. Instruments are clearly in front of him. His leather seat is adjustable and comfortable and the controls are in easy reach. The cab is furnished nicely and finished in a pleasing color scheme.

The styling of the present series of heavy duty trucks is conservative but consistent with these sturdy, rugged, powerful units. The series of photographs of the basic model LJ shows clearly the shape, design and styling details of these vehicles. Other photographs and prints are included to show the variations on this basic design which have been discussed in this section.


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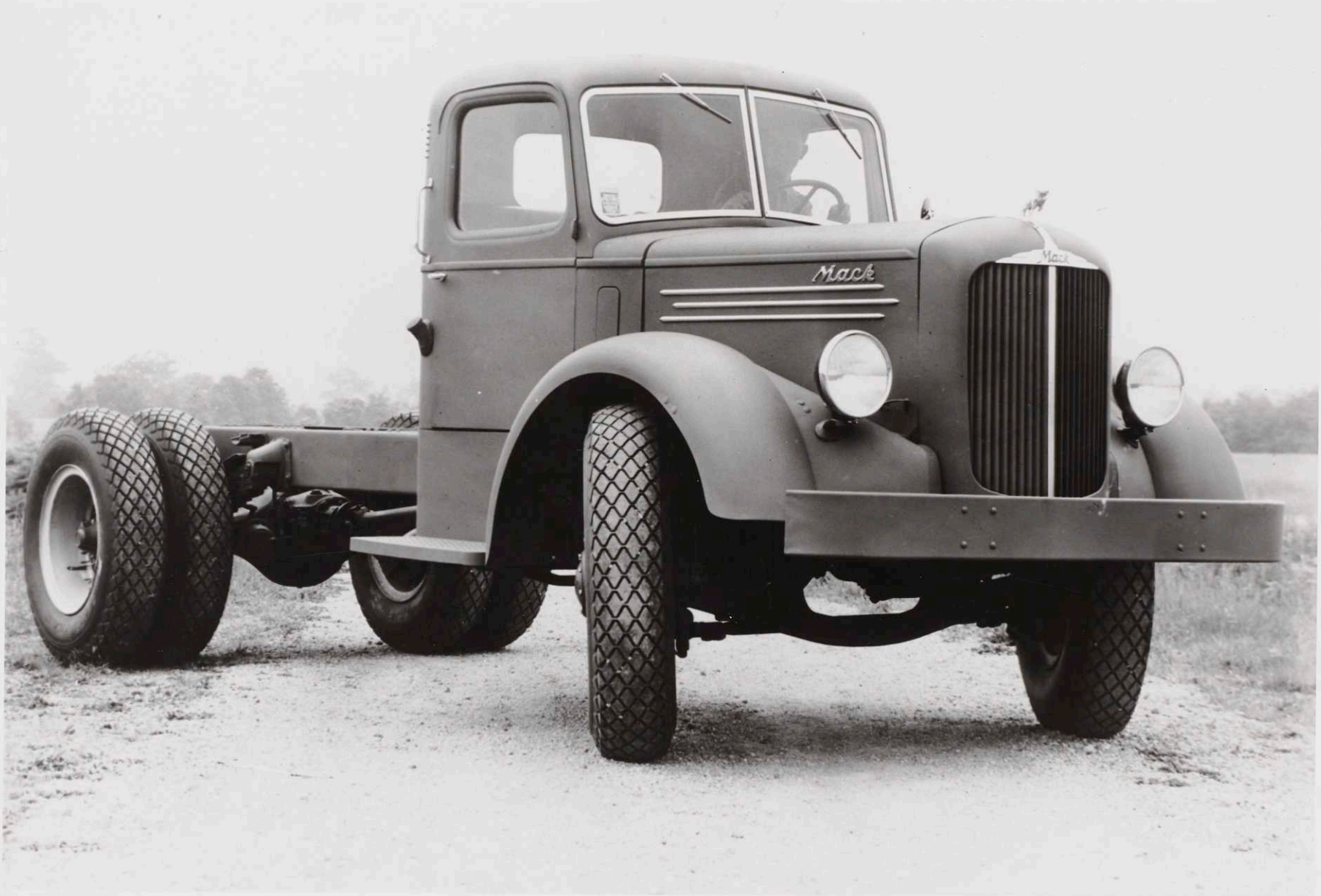
Mack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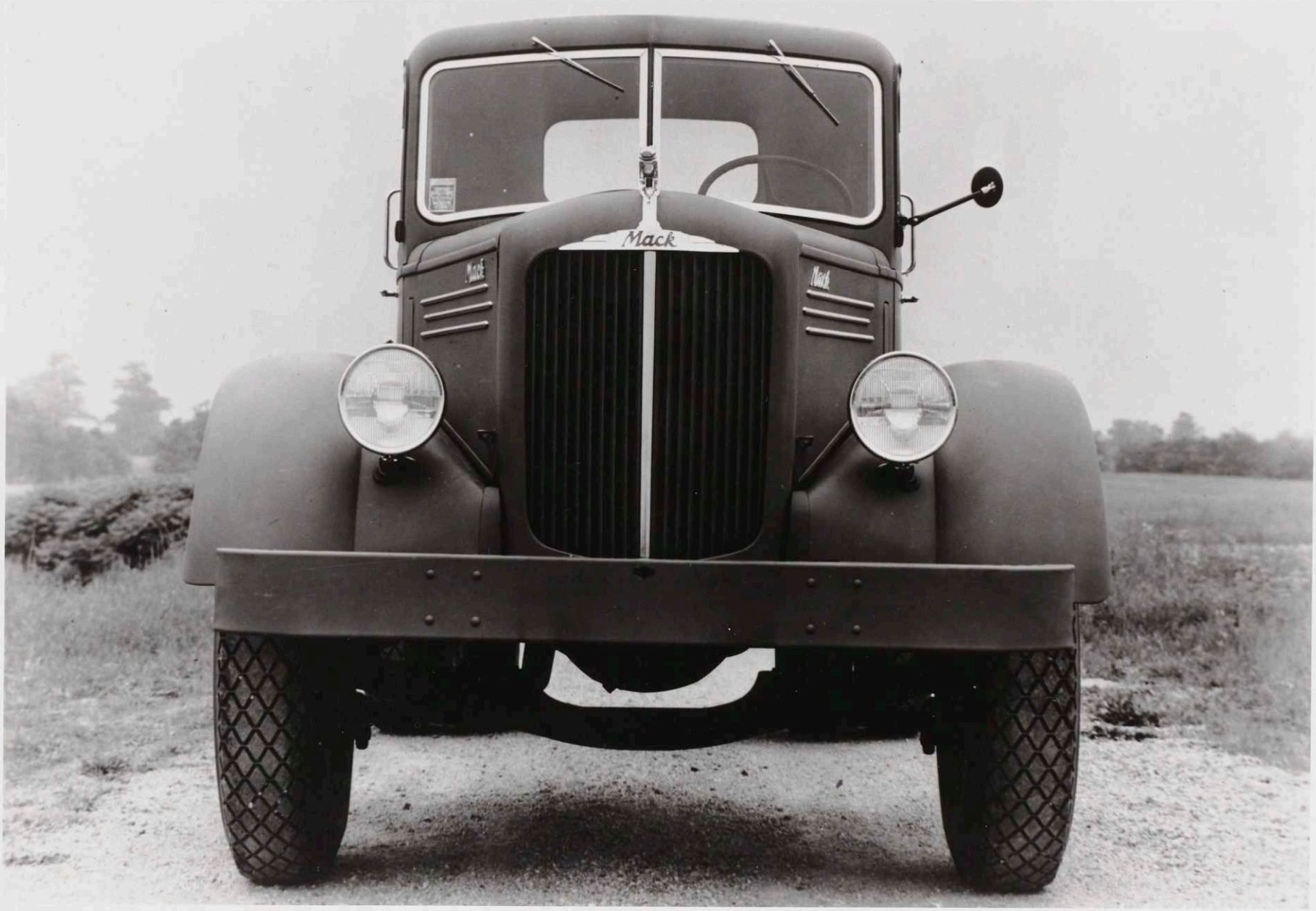
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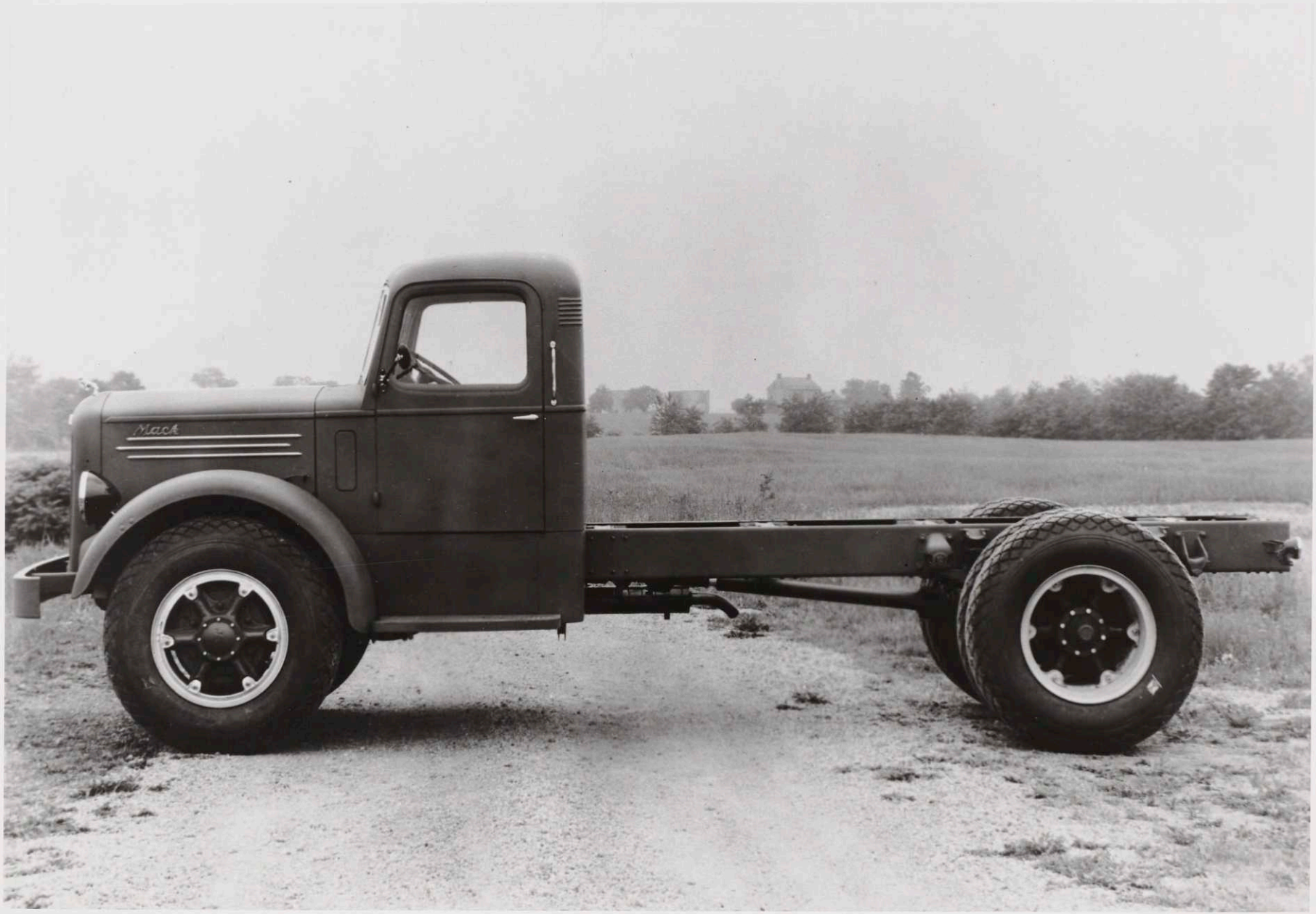
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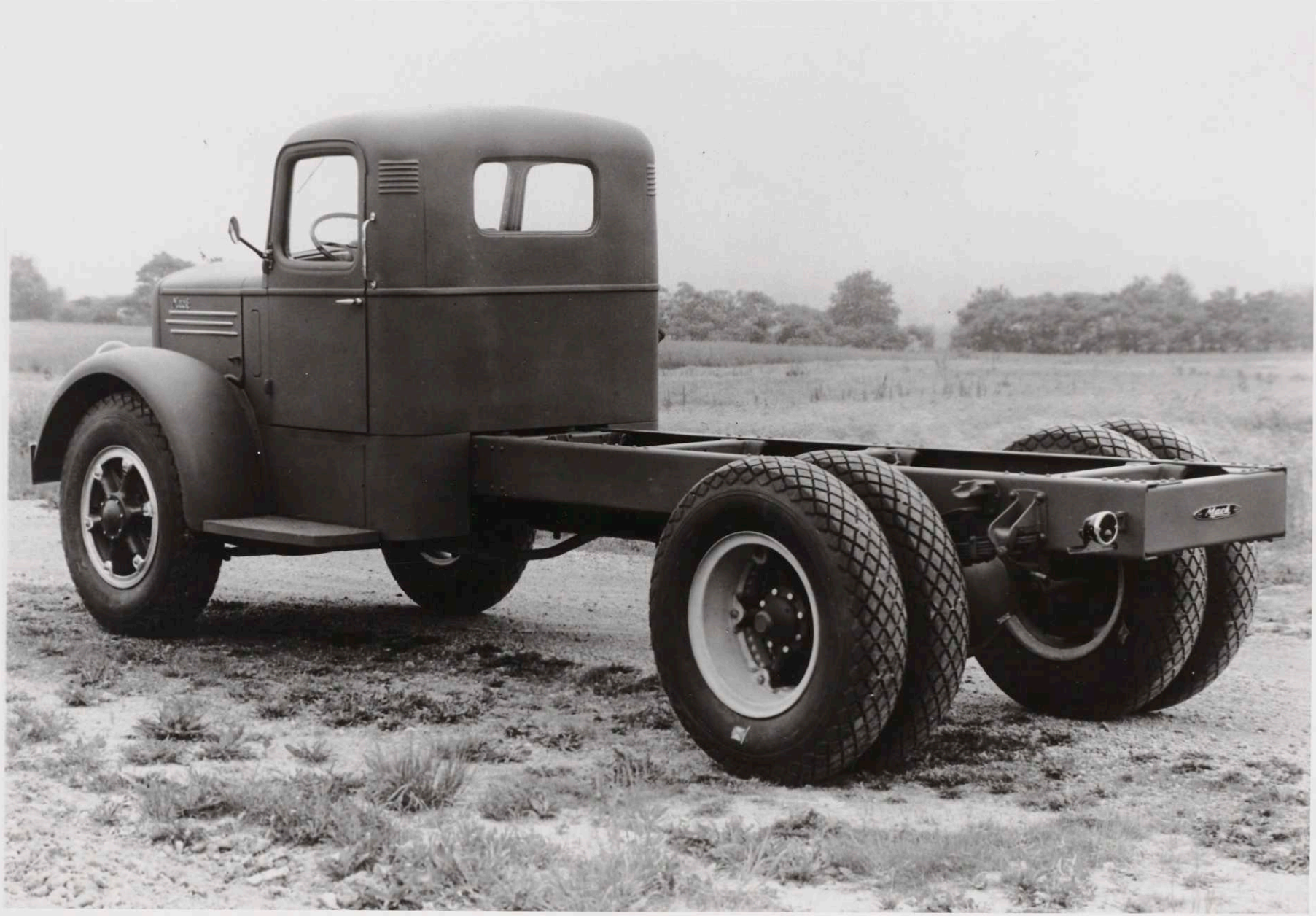


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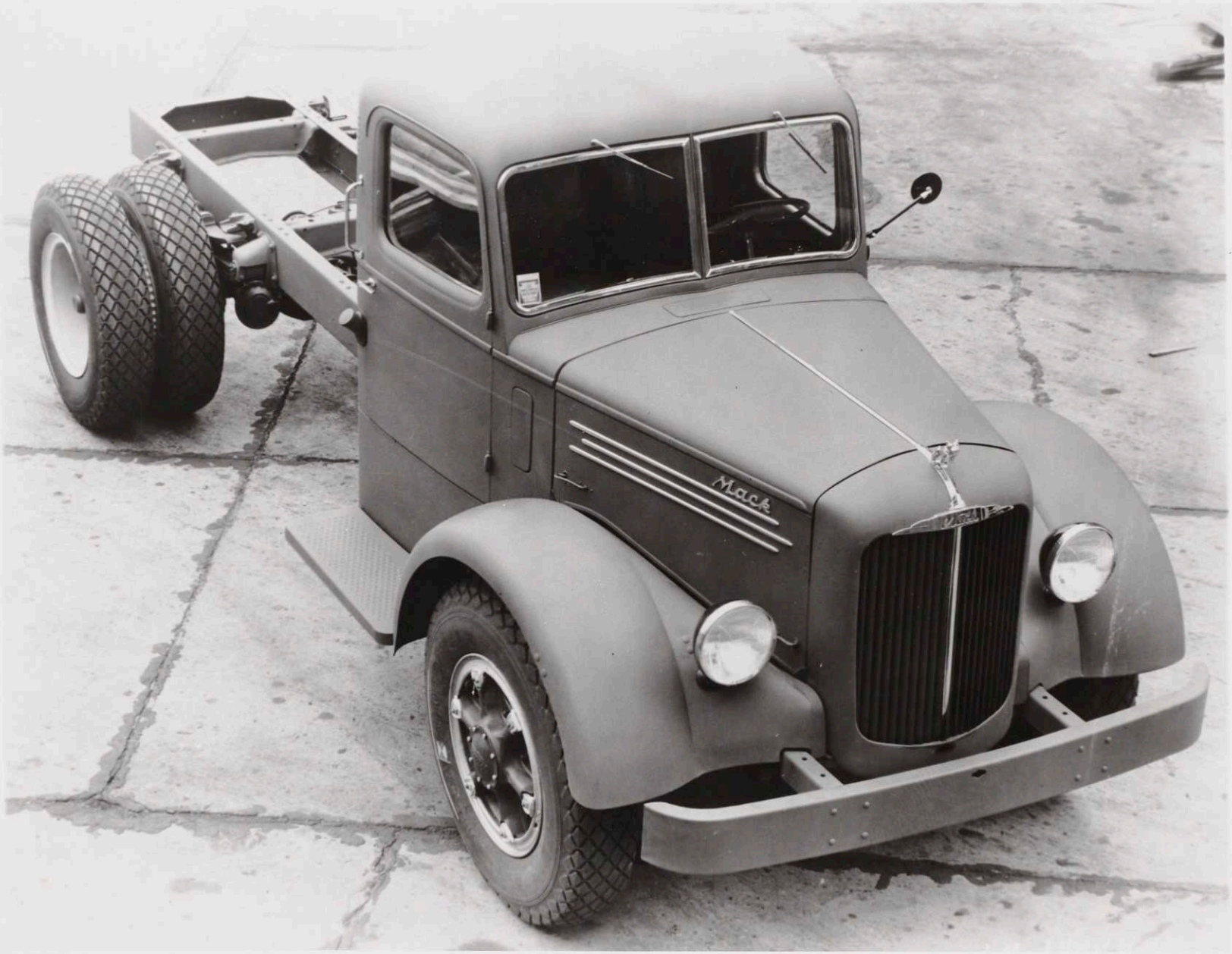
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7RTA492

NEGATIVE 7RTA486

W.B.	ENGINES	OL	LP	CA	AF	A	B	C	D	E	F	G	H
230	CUMMINS-NHB6	363-1/16	240	156	84	33-1/2	15-9/16	51-1/2	107-1/2	49-1/16	43-1/4	—	14-3/8
230	EN510A-EN707A-HB6	360-1/8	240	156	84	32-1/8	14	45-7/8	106-1/8	46-1/8	43-1/4	—	14-3/8
212	CUMMINS-NHB6	333-1/16	210	138	72	33-1/2	15-9/16	51-1/2	107-1/2	49-1/16	35-1/2	—	—
212	EN510A-EN707A-HB6	330-1/8	210	138	72	32-1/8	14	45-7/8	106-1/8	46-1/8	35-1/4	—	—
194	CUMMINS-NHB6	303-1/16	180	120	60	33-1/2	15-9/16	51-1/2	107-1/2	49-1/16	—	—	—
194	EN510A-EN707A-HB6	300-1/8	180	120	60	32-1/8	14	45-7/8	106-1/8	46-1/8	—	—	—
176	CUMMINS-NHB6	273-1/16	150	102	48	33-1/2	15-9/16	51-1/2	107-1/2	49-1/16	—	16-7/8	—
176	EN510A-EN707A-HB6	270-1/8	150	102	48	32-1/4	14	45-7/8	106-1/8	46-1/8	—	16-7/8	—

RIM	RT (STEEL SPOKE WHEEL)	OT (STEEL SPOKE WHEEL)	WS (STEEL SPOKE WHEEL)	FT (STEEL SPOKE WHEEL)	RT (DISC WHEEL)	OT (DISC WHEEL)	WS (DISC WHEEL)	FT (DISC WHEEL)
11	72-1/8	98-7/16	13-13/16	79-5/8	—	—	—	—
9-10	71-3/8	97	13-9/16	79-1/2	71-1/4	96-11/16	13-3/8	79-3/4

ENGINE	FF	HF	OH
CUMMINS HB6-NHB6	18-7/8	41-5/8	103-3/8
EN510A-EN707A	17-5/8	40-1/2	102-7/8

W.B.	TK (STEEL WHEELS)	AT (STEEL WHEELS)	TK (DISC WHEELS)	AT (DISC WHEELS)
230 212	23-1/2	48	25-1/2	48
194	26-1/2	36-3/8	28-1/2	36-3/8

CHG.	ZONE	CHANGES	NO.	DATE	BY	PREVIOUS CHANGES
F						
E						
D						
C						
B	Y2	13 5/8 DIM. ADDED	1-585	12-26-46	GW	
A		ISSUED	L14-71	7-17-46	ALR	

1 REMOVE ALL BURRS AND SHARP CORNERS FOR SAFE HANDLING, PROPER ASSEMBLY AND OPERATION AND GOOD APPEARANCE.
2. TOLERANCES ON FRACTIONAL DIMENSIONS FOR MACHINING OPERATIONS ARE + OR — .010 UNLESS OTHERWISE SPECIFIED
3. DO NOT SCALE DRAWING.

SUPERSEDES

REFERENCE LAYOUT

MAT. —

MACK MANUFACTURING CORPORATION
ALLENTOWN, PA.

CHASSIS ASSEMBLY

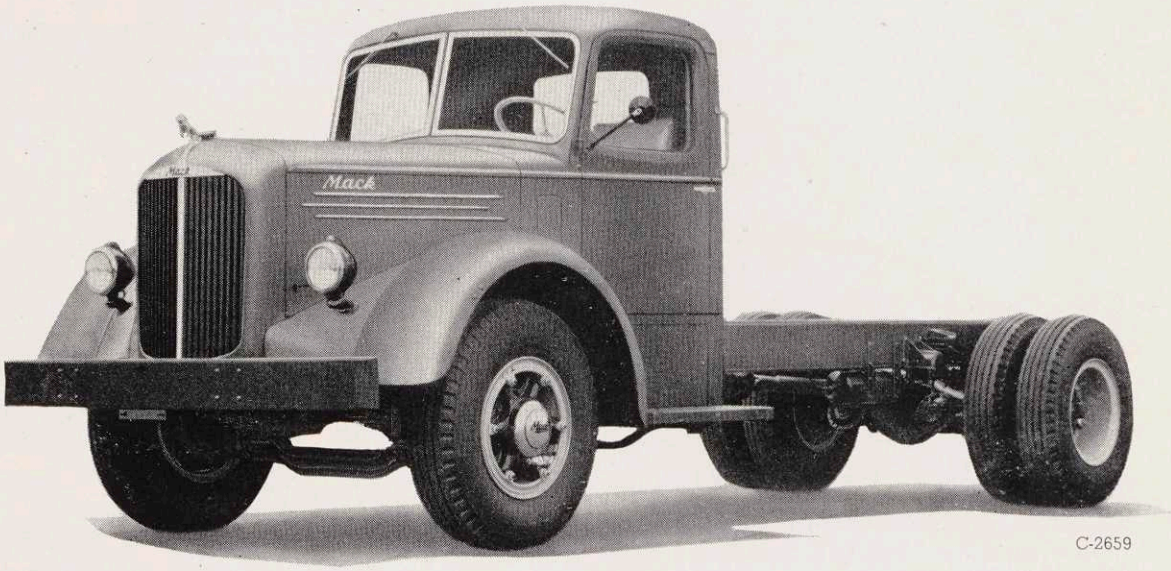
DR. BY R.D. BAUS | TR. BY | CH. BY A.L. REED | APP. BY

TYPING BY | RE-CH. BY | DATE 7-17-46 | SCALE 1"=12" | NO. REQ. 1

7RTA492

Mack

model LF chassis



C-2659

ADAPTABLE to a wide range of heavy trucking services, the Mack Model LF chassis is of advanced design and built to the highest standards of quality.

Enviable performance is imparted by either the Mack Thermodyne engine of 471 or 510 cubic inch displacement, the latter producing 158 horsepower. The entire chassis is designed with a degree of staunchness which insures durability, dependability and long life.

Power and nice balance of all components assure distinguished performance with extraordinary economy of operation. By careful provision of options in ratios and equipment, a degree of versatility has been provided which adapts this chassis to many varied applications.

MACK MANUFACTURING CORP.

New York, N. Y.

MODEL LF SPECIFICATIONS

MAXIMUM GVW: 28,500 lbs.

WHEELBASES: 176", 194" or 212"

TIRES: 11.00-22, dual rear, maximum

WHEELS: Open spider type, steel castings, six spokes or steel disk

ENGINE: Six-cylinder, overhead valves
Bore and Stroke, 4-5/16 by 5⅜ or 4-7/16 by 5½ inches
Piston displacement, 471 or 510 cubic inches
Horsepower, 133 or 158 @ 2400 r.p.m.
Torque, 380 @ 1200 or 400 pound-feet @ 1000 r.p.m.
Cylinders, cast in block with two-piece detachable heads
Valves, intake, 30-deg. face, 1-13/16"
Exhaust, 45-deg. face, 1-9/16"
Exhaust seat inserts, Permafit of Niferrite, Stellited
Piston, H-slot, aluminum, tin-plated
Crankshaft, seven-bearing, Tocco case-hardened, with twelve counterbalance weights
Connecting rods, I-beam, drop-forged, 35° cap angle
Air cleaner, oil bath type
Water pump, centrifugal at front of engine
Thermostat, hot by-pass type
Fan, 24", pressed steel, two 1-3/32" V-belts
Radiator, continuous-finned, flat-tube
Water capacity, 14¼ gals.
Fuel capacity, 30 gals.

CLUTCH: Single-plate, dry
Area of engagement, 220 square inches

TRANSMISSION: Five-speed or ten-speed Mono-shift; selective, constant-mesh
Ratios, five-speed, 1.00 in fifth; 1.29 in fourth; 2.30 in third; 4.35 in second; 8.05 in first; 8.13 in reverse
Ratios, ten-speed, 1.00 in tenth; 1.30 in ninth; 1.63 in eighth; 2.12 in seventh; 2.61 in sixth; 3.39 in fifth; 4.35 in fourth; 5.66 in third; 8.05 in second; 10.47 in first; 8.13 in fast reverse; 10.57 in slow reverse

UNIVERSAL JOINTS: Three, Spicer, needle-bearing type

REAR AXLE: Dual Reduction, full floating
Housing, pressed steel, banjo type
Final ratio, 5.89, 6.79, 6.96, 7.36, 7.54 or 8.64 to 1
Axle shafts, graduated heat-treated; involute splines

BRAKES: Air
Front, size, 16" by 3"
Rear, size, 16¾" or 17¼" by 5"
Area, four wheels, 545 or 556 sq. in.
Hand, 11¼" by 3¼", contracting, rear of transmission

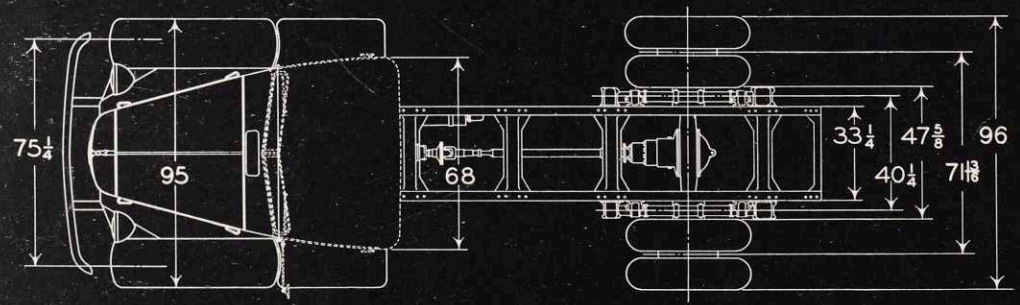
FRAME: High carbon steel, heat-treated
Side-members, size, 10½" by 3¼" by ¼"
Cross-members, five, four box-girder, one channel

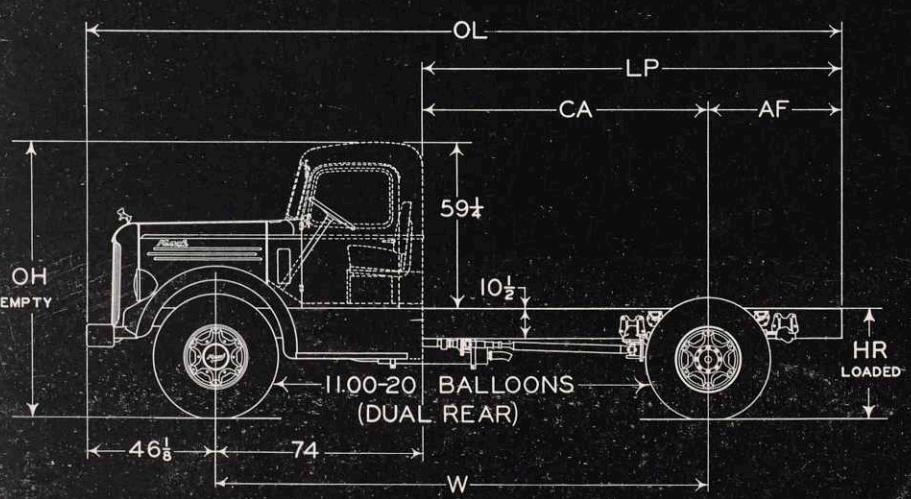
STEERING GEAR: Worm and roller, 24.4 to 1 ratio

SPRINGS: Front, 50" by 2½"
Rear, 52-11/16" by 3½"
Helper, 38" by 3½"
Suspension, Mack rubber Shock Insulators

STANDARD EQUIPMENT: Painting in synthetic enamel; electric starting and lighting system; sealed-beam headlights; parking lights; combination stop and tail light; electric horn; front bumper; tool kit; hydraulic shock absorbers on front; radiator shutters

EXTRAS: Cab; engine (one of above oblig.); Mono-shift transmission; auxiliary fuel tanks; disk wheels; special windshield wipers; Dual Reduction rear axle (oblig.); marker lights; tow hooks; air horn; turning signals



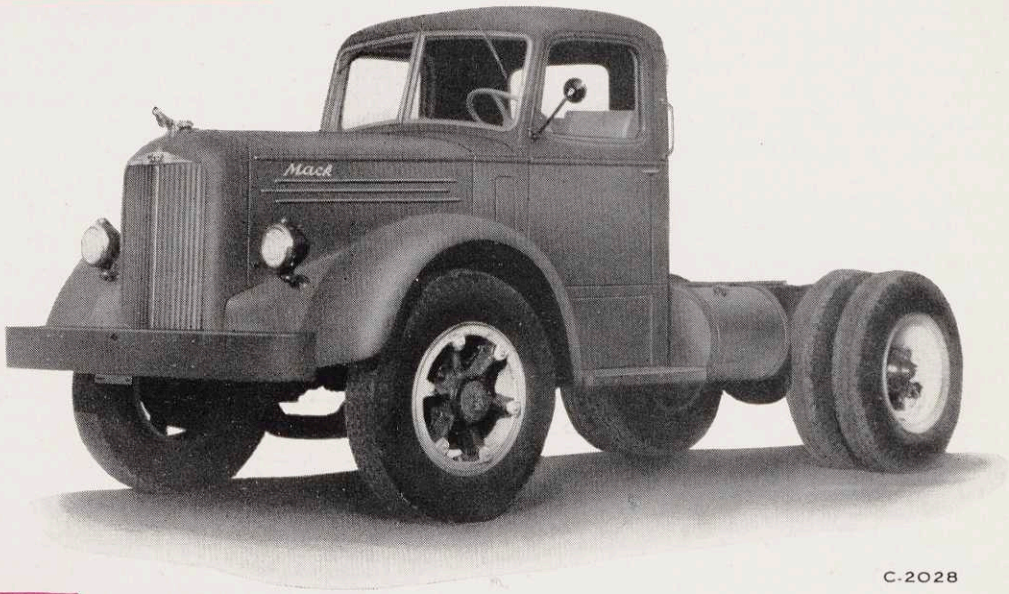


W	176	194	212
OL	270⅛	300⅛	330⅛
LP	150	180	210
CA	102	120	138
AF	48	60	72

	OH	HR
11.00-20	98½	36-5/16
11.00-22	100	38-5/8

Printed in U.S.A.

Mack model LFT tractor

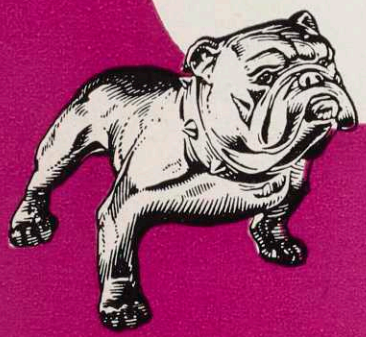


C-2028

QUALIFIED haulers hail the thrifty, yet agile-performing Mack LFT tractor for its proven utility value in severe tractor-trailer service. Engineered outright as a tractor, this model is endowed with exceptional performance ability by reason of its powerful Thermodyne engine, its highly-developed transmission and rear axle.

Effective operation is promoted by the carefully-arranged controls, easy steering and roomy, comfortable cab appointments. Riding ease has been particularly stressed in recognition of the peculiar exactions of heavy tractor duty.

Compact and maneuverable, the unusual staunchness of its construction throughout provides the stamina essential to sustained earning power.



MACK MANUFACTURING CORP.

New York, N. Y.

MODEL LFT SPECIFICATIONS

MAXIMUM GVW: 50,000 lbs.

WHEELBASE: 146" or 164"

TIRES: 11.00-24, dual rear, maximum

WHEELS: Open spider type, steel castings, six spokes

ENGINE: Six-cylinder, overhead valves
Bore and Stroke, 4-7/16" by 5½"
Piston displacement, 510 cu. in.
Horsepower, 158 @ 2400 r.p.m.
Torque, 400 pound-feet @ 1000 r.p.m.
Cylinders, cast in block with two-piece detachable heads
Valves, intake, 30-deg. face, 1-13/16"
Exhaust, 45-deg. face, 1-9/16"
Exhaust seat inserts, Permafit of Niferrite, Stellited
Pistons, H-slot, aluminum, tin-plated
Crankshaft, seven-bearing, Tocco case-hardened, with twelve counterbalance weights
Connecting rods, I-beam, drop-forged, 35° cap angle
Air cleaner, oil bath type
Water pump, centrifugal, at front of engine
Thermostat, hot by-pass type
Fan, 24", pressed steel, two 1-3/32" V-belts
Radiator, continuous-finned, flat-tube
Water capacity, 14¼ gals.
Fuel capacity, 30 gals.

CLUTCH: Single-plate, dry
Area of engagement, 220 square inches

TRANSMISSION: Five-speed or ten-speed Mono-shift; selective, constant mesh
Ratios, five-speed, 1.00 in fifth; 1.29 in fourth; 2:30 in third; 4.35 in second; 8.05 in first; 8.13 in reverse
Ratios, ten-speed, 1.00 in tenth; 1.30 in ninth; 1.63 in eighth; 2.12 in seventh; 2.61 in sixth; 3.39 in fifth; 4.35 in fourth; 5.66 in third; 8.05 in second; 10.47 in first; 8.13 in fast reverse; 10.57 in slow reverse

UNIVERSAL JOINTS: Two or three Spicer, needle-bearing type, according to wheelbase

REAR AXLE: Dual Reduction, full floating
Housing, pressed steel, banjo type
Final ratio, 5.06 or 5.89, 7.36 to 1
Axle shafts, graduated heat-treated; involute splines

BRAKES: Air
Front, size, 16" by 3"
Rear, size, 16¾" by 5"—20" wheel
17¼" by 5"—22" wheel
Area, four wheels, 545 or 556 square inches
Hand, 11¼" by 3¼", contracting, rear of transmission

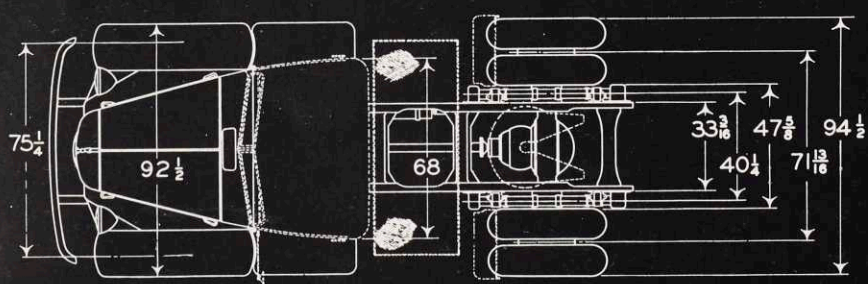
FRAME: High carbon steel, heat-treated
Side-members, size, 10½" by 3¼" by ¼"
Cross-members, four, three box girder, one channel

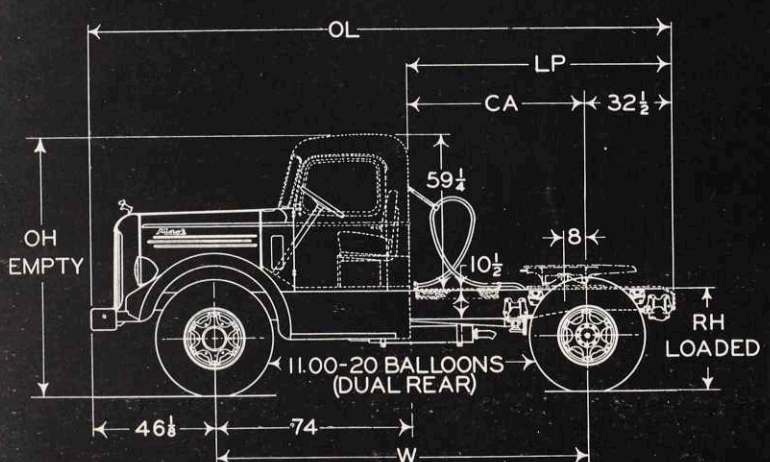
STEERING GEAR: Worm and roller, 24.4 to 1 ratio

SPRINGS: Front, 50" by 2½"
Rear, 52-11/16" by 3½"
Helper, 38" by 3½"
Suspension, Mack rubber Shock Insulators

STANDARD EQUIPMENT: Painting in synthetic enamel; electric starting and lighting system; sealed-beam headlights; parking lights; combination stop and tail light; electric horn; radiator shutters; spare rim; front bumper; brake and electrical trailer connections; hydraulic shock absorbers at front; 7¼ cu. ft. compressor

OPTIONAL EXTRAS: Deluxe or sleeper cab; Mono-shift transmission; oversize tires; disk wheels; auxiliary fuel tanks; marker lights; hand control valve; front wheel limiting valve; air separator; 12 cu. ft. compressor; tow hooks; air horn; diamondette plate; quarter rear fenders





W	146	164
OL	225	243
LP	104¼	98½*
CA	72	66 *

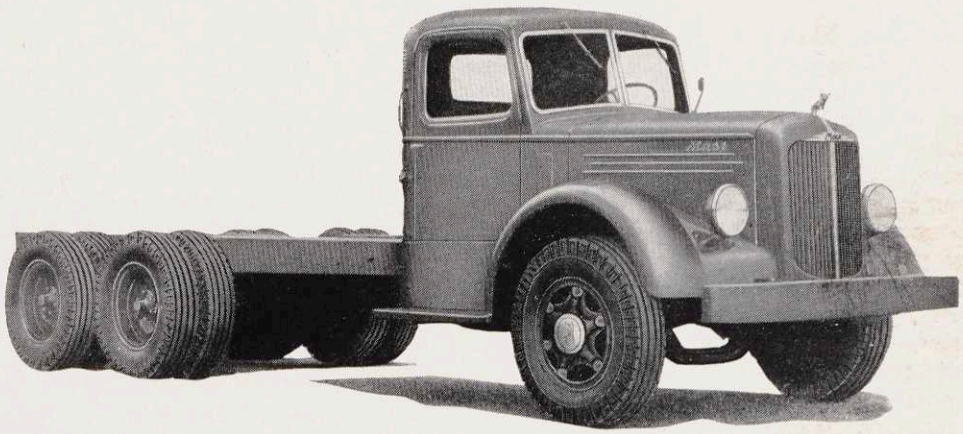
*Given for sleeper cab which is 24" longer than standard cab.

PRINTED IN U.S.A.

6-48C 8

Mack

model LFSW
SIX-WHEELED chassis



V1990

MEETING the growing demand for six-wheeled trucks in the larger capacities, Model LFSW has been developed and refined upon sound fundamentals.

Powered by the celebrated Thermodyne engine of 510 cu. in. displacement, driving through an advanced transmission with scientifically-graduated ratios and the Mack Balanced Bogie, the vehicle produces performance of a high order, adaptable to widely varying conditions of operation.

Traction on slipperiest footing is assured by the third differential of the Power Divider type, which at the same time protects the driving parts from undue strain and the tires from excessive wear. Chassis structure, braking and steering complete the picture of rugged stamina.

MACK MANUFACTURING CORP.

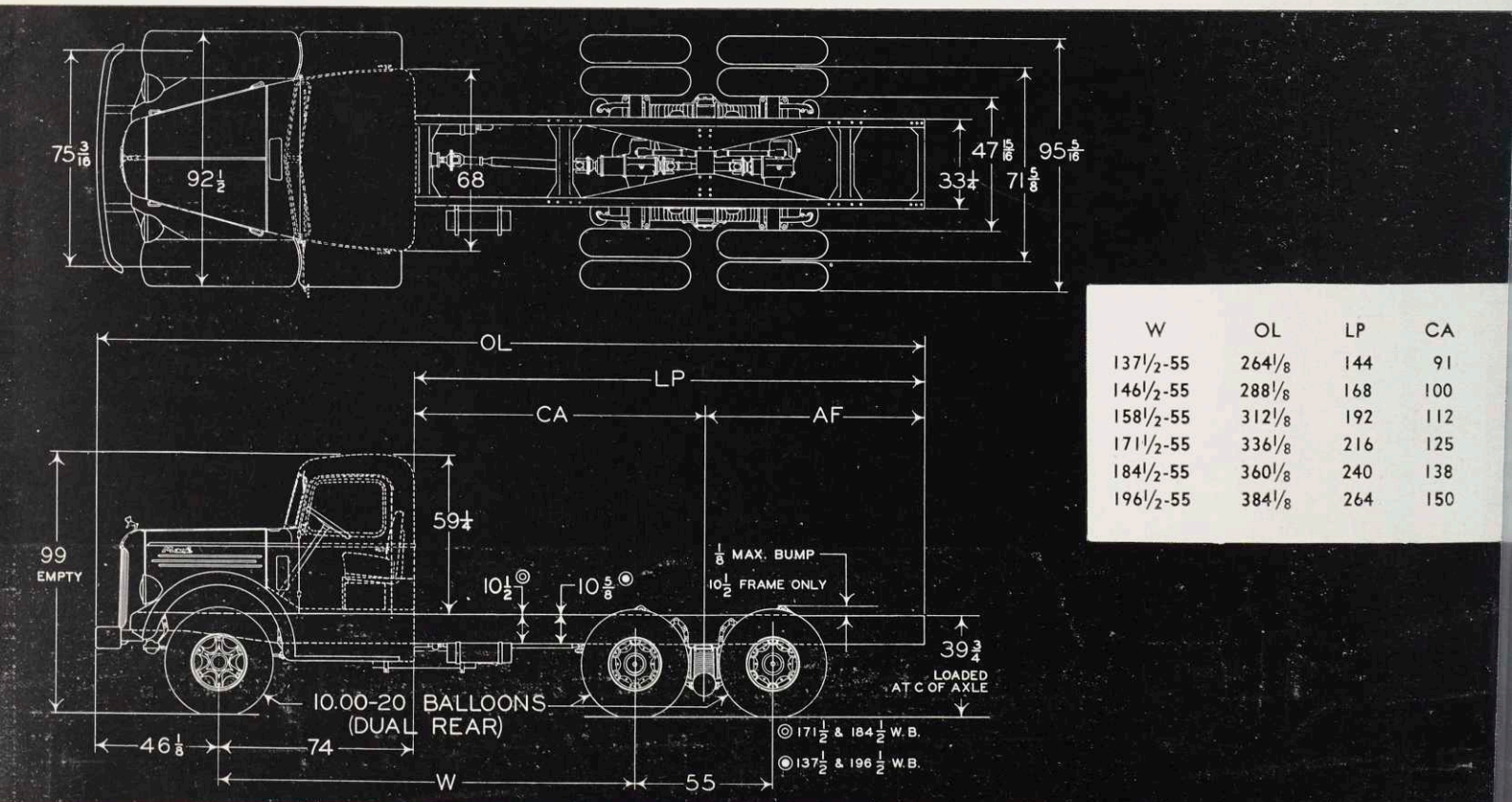
New York, N. Y.

MODEL LFSW SPECIFICATIONS

MAXIMUM GVW: 45,000 lbs.
WHEELBASES: 137½"-55", 146½"-55", 158½"-55", 171½"-55", 184½"-55", or 196½"-55"
TIRES: 10.00-22 dual rear, maximum
ENGINE: Six-cylinder, overhead valves
Bore and Stroke, 4-7/16 by 5½ inches
Piston displacement, 510 cubic inches
Horsepower, 158 @ 2400 r.p.m.
Torque, 400 pound-feet @ 1000 r.p.m.
Cylinders, cast in block with two-piece detachable heads
Valves, intake, 30-deg. face, 1-13/16"
Exhaust, 45-deg. face, 1-9/16"
Exhaust seat inserts, Permafit of Niferrite, Stellited
Pistons, H-slot, aluminum, tin-plated
Crankshaft, seven-bearing, Tocco case-hardened, with twelve counterbalance weights
Connecting rods, I-beam, drop-forged, 35° cap angle
Air cleaner, oil bath type
Water pump, centrifugal at front of engine
Thermostat, hot by-pass bellows type
Fan, 24", pressed steel, two 1-3/32" V-belts
Radiator, continuous-finned, flat-tube, equipped with shutters
Water capacity, 14 gals.
Fuel capacity, 30 gals.
CLUTCH: Single-plate, dry
Area of engagement, 220 square inches
TRANSMISSION: Five-speed or ten-speed Mono-shift Duplex; selective, constant mesh

		Mono-shift Splitter		Duplex Wide-Range	
Shift	5-Speed	Fast Range	Slow Range	Fast Range	Slow Range
5th	1.00	1.00	1.30	1.00	2.34
4th	1.29	1.63	2.12	1.63	3.81
3rd	2.30	2.61	3.39	2.61	6.11
2nd	4.35	4.35	5.66	4.35	10.18
1st	8.05	8.05	10.47	8.05	18.84
Rev.	8.13	8.13	10.57	8.13	19.02

UNIVERSAL JOINTS: Spicer, needle-bearing type, four or five, according to wheelbase
REAR BOGIE: Four-wheel, straight-through type with inter-axle differential
Mack concentric cam-and-plunger-type Power Divider
Rear axles, drive; Spiral-bevel, Dual Reduction, full floating
Housings, one-piece, cast steel banjo
Ratios, 5.77; 6.46; 7.32; 8.15 to 1
Axle shafts, graduated heat-treated; involute splines
BRAKES: Air
Front, size 16¼" by 4"
Rear, size 16½" by 6"
Area, six wheels, 1066 sq. in.
Hand, 11¼" by 3¼", contracting, rear of transmission
FRAME: Pressed high carbon steel, heat-treated
Side-members, size 10½" by 3¼" by ¼" or 10⅝" by 3¼" by 5/16" — plus ¼" inside channel, according to wheelbase
Cross-members, six to eight; two to four box-girder, one channel, one pressed I-beam, two casting, according to wheelbase
WHEELS: Open spider type, steel castings, six spokes
STEERING GEAR: Worm and roller, 24.4 to 1
SPRINGS: Front, 50" by 3½"
Rear, 55" by 4"; tension side of first three leaves shot peened
Suspension, Mack rubber Shock Insulators
STANDARD EQUIPMENT: Painting in synthetic enamel; electric starting and lighting system; sealed-beam headlights; combination stop and tail light; electric horn; speedometer; front bumper; tool kit; Houdaille hydraulic shock absorbers on front; radiator shutters
OPTIONAL EXTRAS: De Luxe cab; Mono-shift Duplex or Duplex wide range transmission; disk wheels; front wheel limiting valve; spare tire carrier; auxiliary fuel tanks

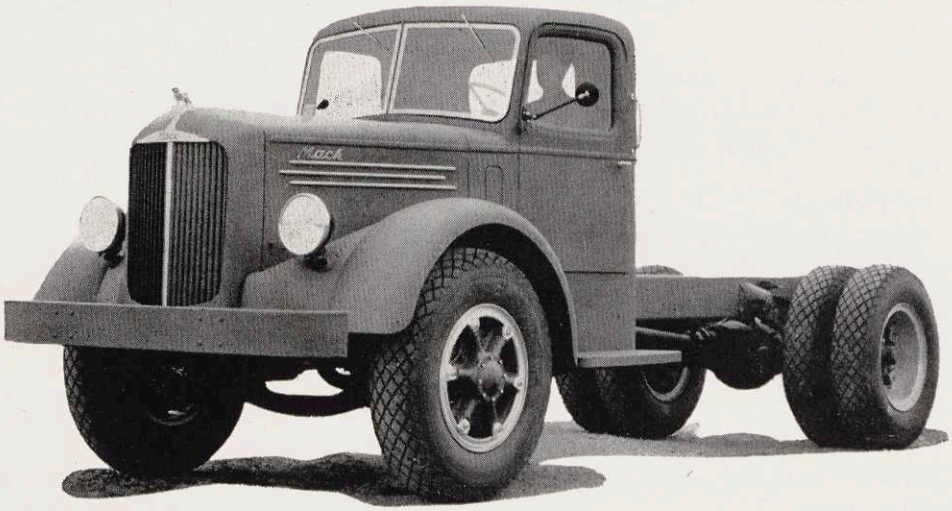


W	OL	LP	CA
137½-55	264⅛	144	91
146½-55	288⅛	168	100
158½-55	312⅛	192	112
171½-55	336⅛	216	125
184½-55	360⅛	240	138
196½-55	384⅛	264	150

PRINTED IN U.S.A.
748C 8M

Mack

model LJ chassis



SETTING completely new standards of performance and economy as well as intensifying the matchless stamina, long life and reliability traditional with Macks, Model LJ offers a choice of two mighty Thermadyne gasoline engines with an option for diesel.

Drive is transmitted to the rugged Dual Reduction rear axle by either a five-speed transmission, a ten-speed Duplex, direct in high or, where needed, the Duplex overgear type.

Built for operations which make the severest demands upon equipment, its frame is of heat-treated chrome-manganese steel braced by exclusive box-girder type cross-members and suspended by Mack rubber Shock Insulators.

Ease of riding and comfortable accommodations for the driver have received particular attention, as have the convenience and positiveness of controls. Brakes are masterful, turning radius surprisingly small and accessibility to parts for servicing strongly emphasized.

MACK MANUFACTURING CORP.

New York, N. Y.

MODEL LJ SPECIFICATIONS

MAXIMUM GVW: 36,000 lbs.

WHEELBASE: 176", 194", 212" or 230"

TIRES: 12.00-24 dual rear, maximum

WHEELS: Open spider type, steel castings, six spokes

ENGINE, STANDARD: Mack Thermodyne, six cylinder, overhead valves, gasoline
Bore and stroke, 4-7/16" x 5½" or 5" x 6"
Piston displacement, 510 or 707 cu. in.
Horsepower, 158 @ 2400 or 196 @ 2000 r.p.m.
Torque, 400 lb.-ft. @ 1000 r.p.m. or 570 lb.-ft. @ 1100 r.p.m.

ENGINES, OPTIONAL:
Cummins diesel, HB-600; 4⅞" x 6", 672 cu. in. disp.
Horsepower, 150 @ 1800 r.p.m.
Torque, 500 lb.-ft. @ 600 r.p.m.
Cummins diesel, NHB-600; 5⅛" x 6", 743 cu. in. disp.
Horsepower, 200 @ 2100 r.p.m.
Torque, 537 lb.-ft. @ 1200 r.p.m.

CLUTCH: Single-plate, dry
Area of engagement, 220 sq. in. or 253 sq. in.

TRANSMISSION: Five-speed or ten-speed Duplex; selective, constant mesh

Shift	5-Speed Direct	10 Speed Direct		10-Speed Overgear	
		High	Low	High	Low
5th	1.00	1.00	1.38	.77	1.06
4th	1.29	1.45	2.00	1.00	1.38
3rd	2.30	2.61	3.60	1.75	2.42
2nd	4.57	4.57	6.30	3.11	4.29
1st	8.05	8.05	11.11	5.48	7.56
Rev	8.13	8.13	11.22	5.53	7.63

UNIVERSAL JOINTS: Three, Spicer, needle-bearing type

REAR AXLE: Dual Reduction, full floating
Housing, pressed steel, banjo type
Final ratio, 5.51, 6.46, 6.96, 7.54, 8.22 or 9.05 to 1
Axle shafts, graduated heat-treated; involute splines

BRAKES: Air (oblig.)
Front, size, 17¼" by 4" or 5"
Rear, size, 17¼" by 6"
Area, four wheels, 710 or 781 sq. in.
Hand, 11¼" by 3¼", contracting, rear of transmission

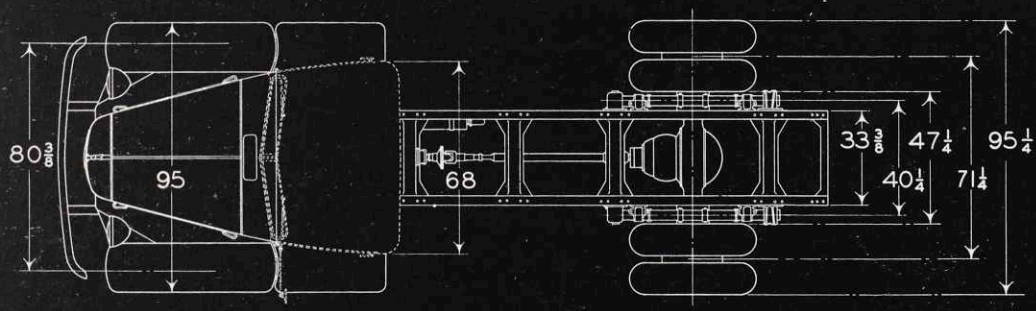
FRAME: Pressed chrome-manganese steel, heat-treated
Side-members, size, 10⅝" by 3¼" by 5/16"
Cross-members, five, four box-girder, one channel

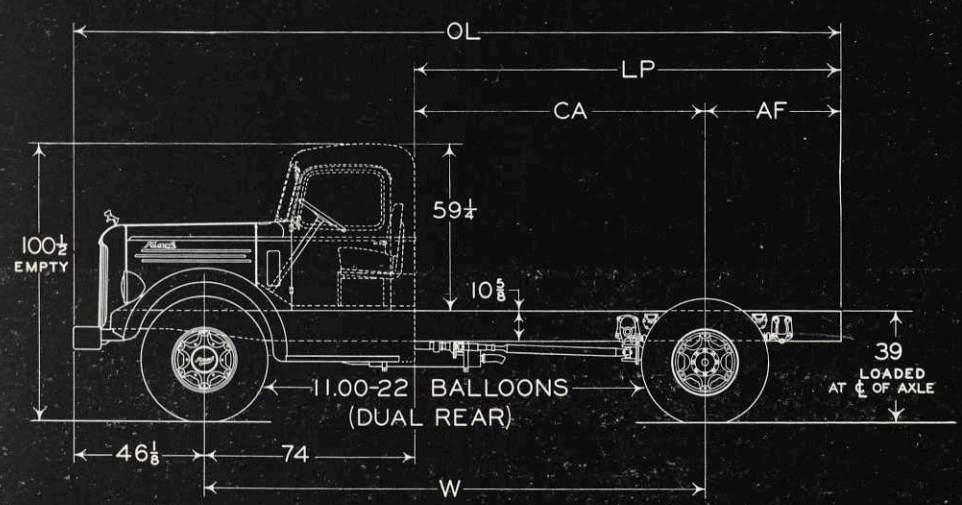
STEERING GEAR: Worm and roller, 28.4 to 1 ratio

SPRINGS: Front, 50" by 3½"
Rear, 52¾" or 54" by 3½"
Helper, 38" by 3½"
Suspension, Mack rubber Shock Insulators

STANDARD EQUIPMENT: Painting in synthetic enamel; electric starting and lighting system; sealed beam headlights; parking lights; combination stop and tail light; electric horn; radiator shutters; hydraulic shock absorbers in front; spare rim; front bumper

OPTIONAL EXTRAS: Cab; larger engine or Cummins diesel engine; oversize tires; disk wheels, front wheel limiting valve; hand control valve; spare tire carrier; special windshield wipers; auxiliary fuel tanks; tachometer; tow hooks; air horn; marker lights; turning signals





W	176	194	212	230
OL	270	300	330	360 1/8
LP	150	180	210	240
CA	102	120	138	156
AF	48	60	72	84

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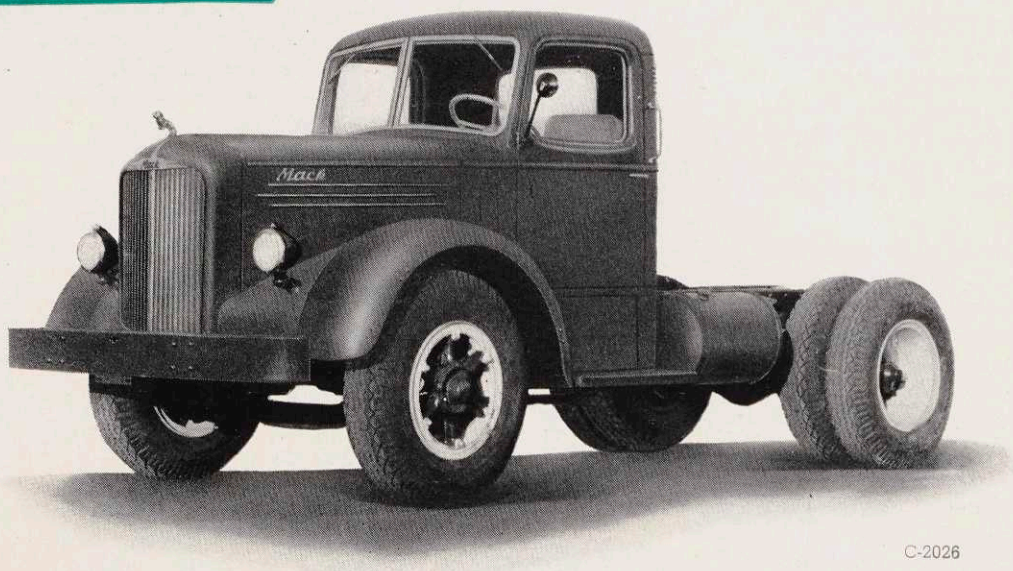
6-48C 8M

Mack

model LJT tractor



C-2026

FOR the heaviest loads, Mack Model LJT is a tractor in which performance ability and economy beyond anything heretofore achieved is realized. The moving of prodigious ton-mileages at the lowest unit expenditure is accomplished by the use of the mighty Thermodyne engine, driving through units of masterly size and strength.

Stamina to withstand the rigors of the severest operating conditions is imparted by the massive pressed carbon, heat-treated frame, the robust axles and husky structure throughout, while the all-important human factor is recognized in the convenient, easy-acting and positive controls, the extraordinary ease of riding and the comfort and roominess of the cab.

No foreshortened truck, is this model, but a chassis designed outright as a tractor.

MACK MANUFACTURING CORP.

New York, N. Y.

MODEL LJT SPECIFICATIONS

MAXIMUM GTW: 60,000 lbs.

WHEELBASE: 146 or 164 inches

TIRES: 12.00-24, dual rear, maximum

WHEELS: Open spider type, steel castings, six spokes or steel disk

ENGINE, STANDARD: Mack Thermodyne, six cylinder, overhead valves, gasoline
- Bore and stroke, 5" x 6"
- Piston displacement, 707 cu. in.
- Horsepower, 196 @ 2000 r.p.m.
- Torque, 570 pound-feet @ 1100 r.p.m.
- Cylinders, cast in block with two-piece detachable heads
- Valves, intake, 30-deg. face, 2-1/16"
  Exhaust, 45-deg. face, 1¾"
- Exhaust seat inserts, Permafit of Niferrite, Stellited
- Pistons, T-slot, aluminum, tin-plated
- Crankshaft, seven-bearing, Tocco case-hardened, with twelve counterbalance weights
- Connecting rods, I-beam, drop forged, 35° cap angle

ENGINES, OPTIONAL:
- Cummins diesel, HB-600; 4⅞" x 6", 672 cu. in. disp.
  Horsepower, 150 @ 1800 r.p.m.
  Torque, 500 lb.-ft. @ 600 r.p.m.
- Cummins diesel, NHB-600; 5⅛" x 6", 743 cu. in. disp.
  Horsepower, 200 @ 2100 r.p.m.
  Torque, 537 lb.-ft. @ 1200 r.p.m.

CLUTCH: Single-plate, dry
- Area of engagement, 253 sq. in.

TRANSMISSION: Five-speed or ten-speed Duplex selective, constant mesh
- Ratios, five-speed, 1.00 in fifth; 1.29 in fourth; 2.30 in third; 4.57 in second; 8.05 in first; 8.13 in reverse
- Ratios, ten-speed, 0.77 in tenth; 1.06 in ninth; 1.00 in eighth; 1.38 in seventh; 1.75 in sixth; 2.42 in fifth; 3.11 in fourth; 4.29 in third; 5.48 in second; 7.56 in first; 5.53 in fast reverse; 7.63; in slow reverse

UNIVERSAL JOINTS: Two, Spicer, needle-bearing type

REAR AXLE: Dual Reduction, full floating
- Housing, pressed steel, banjo type
- Final ratio, 6.46, 6.67, 7.54 or 9.05 to 1
- Axle shafts, graduated heat-treated; involute splines

BRAKES: Air
- Front, 17¼" by 4"
- Rear, 17¼" by 6"
- Area, four wheels, 710 sq. in.
- Hand, 11¼" by 3¼", contracting band, rear of transmission

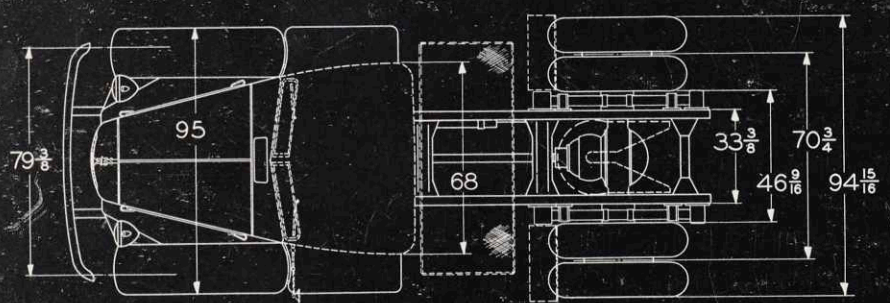
FRAME: Pressed carbon steel, heat-treated
- Side-members, size, 10⅝" by 3¼" by 5/16"
- Cross-members, three, two box-girder, one channel

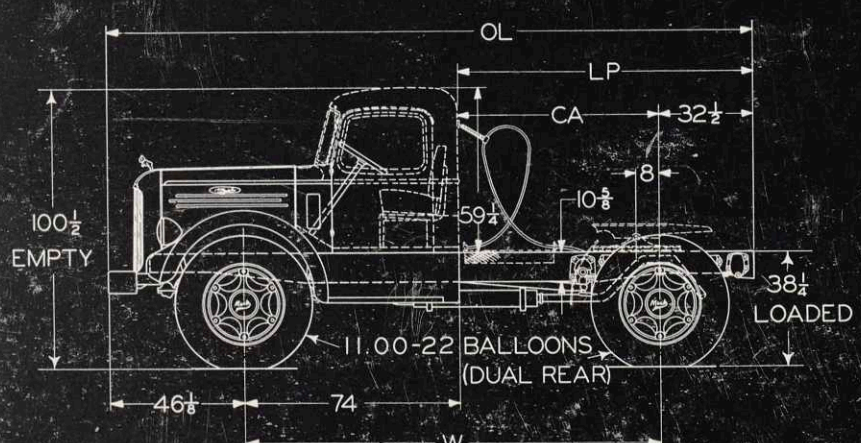
STEERING GEAR: Worm and roller, 28.4 to 1 ratio

SPRINGS: Front, 50" by 3½"
- Rear, 52¾" by 3½"
- Helper, 38" by 3½"
- Suspension, Mack rubber Shock Insulators

STANDARD EQUIPMENT: Painting in synthetic enamel; electric starting and lighting system; sealed-beam headlights; parking lights; combination stop and tail light; electric horn; speedometer; radiator shutters; hydraulic shock absorbers in front; spare rim; front bumper; brake and electrical trailer connections; 7¼ cu. ft. compressor

OPTIONAL EXTRAS: Deluxe or sleeper cab; Cummins diesel engine; oversize synthetic tires; auxiliary fuel tank; disk wheels; hand control valve; front wheel limiting valve; air separator; marker lights; special windshield wiper; tachometer; 12 cu. ft. air compressor; air horn; Diamondette plate; quarter rear fenders; tow hooks





W	146	164
OL	224⅝	242⅝
LP	104½	100⅝*
CA	72	68⅛*

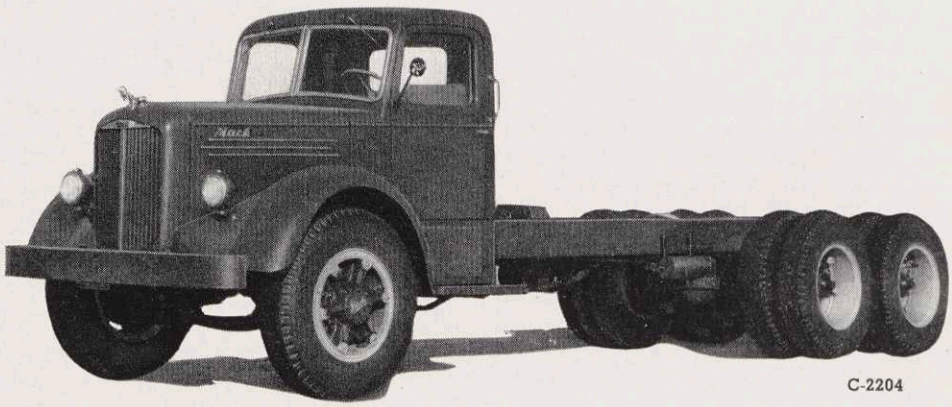
*Given for sleeper cab which is 24" longer than standard cab.

PRINTED IN U.S.A.

6-48C-8M

Mack

model LJSW
SIX-WHEELED chassis



C-2204

HEAVY highway hauling is finding an increasing need for large-capacity six-wheeled chassis and the Mack Model LJSW is the answer. It offers capacity up to legal limits and performance ability consonant with modern demands. Stamina and reliability traditional with Mack are combined with economy, riding ease, simplicity of handling and driver comfort beyond contemporary standards.

Combining the tremendous power of the Thermodyne 707-cu. in. engine and a clutch of matching capacity with masterful five- and ten-speed Duplex transmissions and the Mack Balanced Bogie, the active elements are associated with a massive frame structure, Shock Insulated suspension, brakes, steering and front axle in a completely co-ordinated design, attainable only through complete control of design and outright manufacture.

MACK MANUFACTURING CORP.

New York, N. Y.

MODEL LJSW SPECIFICATIONS

MAXIMUM GVW: 50,000 lbs.

WHEELBASES: 137½"-55", 146½"-55", 158½"-55", 171½"-55", 184½"-55", 196½"-55", 226½"-55" (oil field)

ENGINE: Six-cylinder, overhead valves
- Bore and stroke, 5" by 6"
- Piston displacement, 707 cu. in.
- Horsepower, 196 @ 2000 r.p.m.
- Torque, 571 pound-feet @ 1000 r.p.m.
- Cylinders, cast in block with two-piece detachable heads
- Valves, intake, 30-deg. face 2-3/64"
  Exhaust, 45-deg. face, 1-49/64"
- Exhaust seat inserts, Permafit of Niferrite, Stellited
- Pistons, T-slot, aluminum, tin-plated
- Crankshaft, seven-bearing, Tocco case-hardened, with twelve counterbalance weights
- Connecting rods, I-beam, drop-forged, 35° cap angle
- Air cleaner, oil bath type
- Water pump, centrifugal, at front of engine
- Thermostat, hot by-pass bellows type
- Fan, 24", pressed steel, two 1-3/32" V-belts
- Radiator, continuous-finned, flat-tube, equipped with shutters
- Water capacity, 12¾ gals.
- Fuel capacity, 30 gals.

CLUTCH: Single-plate, dry
- Area of engagement, 253 sq. in.

TRANSMISSION: Five-speed or ten-speed Duplex; selective, constant mesh

		Duplex Splitter		Duplex Wide-Range	
Shift	5-Speed	Fast Range	Slow Range	Fast Range	Slow Range
5th	0.77	0.77	1.06	0.77	1.79
4th	1.00	1.00	1.38	1.00	2.33
3rd	1.75	1.75	2.42	1.75	4.08
2nd	3.11	3.11	4.29	3.11	7.24
1st	5.48	5.48	7.56	5.48	12.76
Rev.	5.53	5.53	7.63	5.53	12.88

UNIVERSAL JOINTS: Spicer, needle-bearing type four to six according to wheelbase

REAR BOGIE: Four-wheel drive, Dual Reduction, full floating
- Drive, straight-through type
- Housings, one-piece banjo type
- Inter-axle differential, Mack Power Divider
- Final ratios, 5.77, 6.46, 7.32, 8.15 or 9.02 to 1
- Axle shafts, graduated heat-treated; involute splines

TIRES: 11.00-24 dual rear, maximum

WHEELS: Open spider type, steel castings, six spokes or steel disk

BRAKES: Air
- Front, size, 17¼" by 4" or 5"
- Rear size, 16½" by 6"
- Area, six wheels, 1112 or 1183 sq. in.
- Hand, 11¼" by 3¼", contracting, rear of transmission

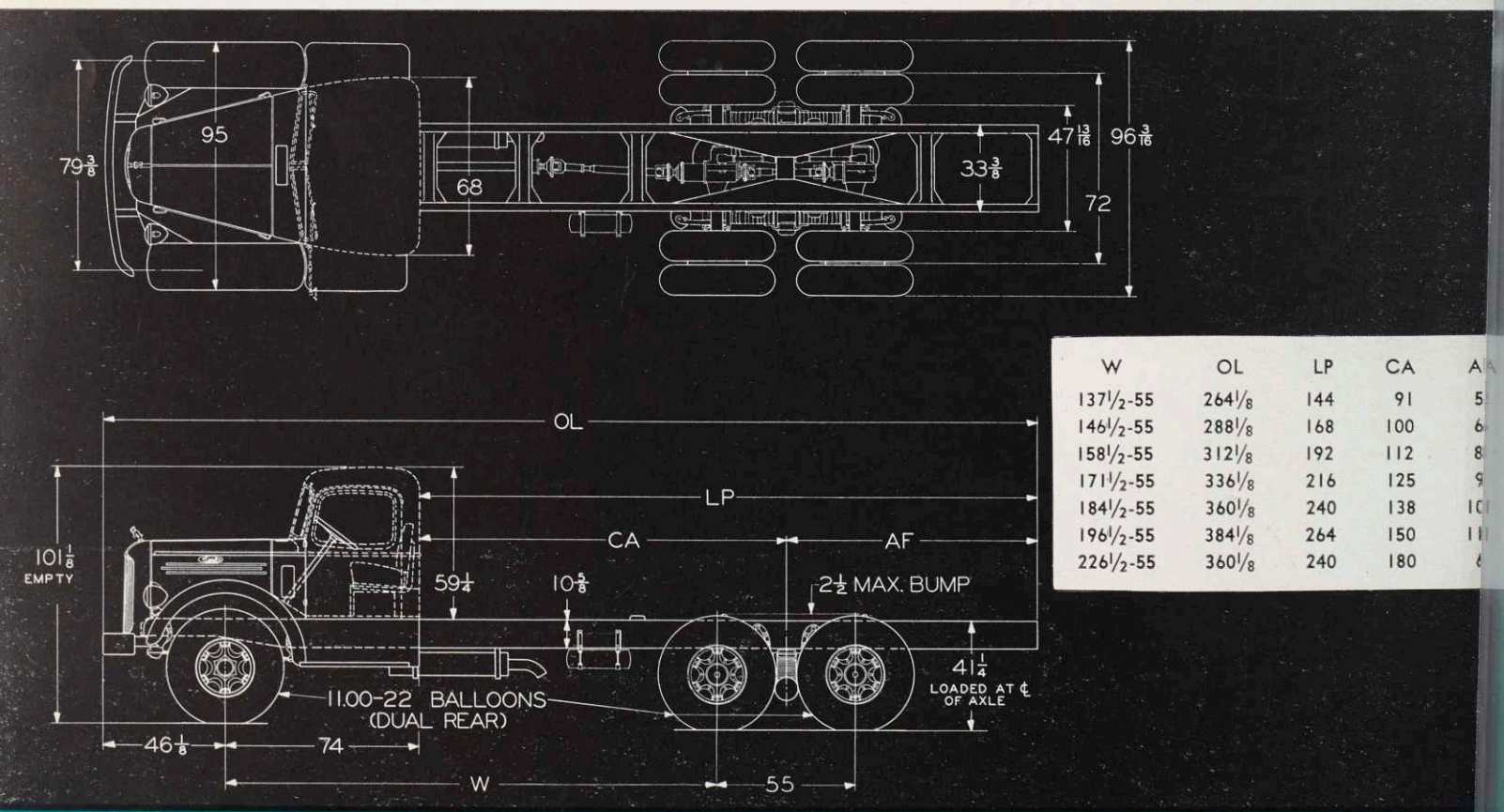
FRAME: Pressed chrome-manganese steel, heat-treated
- Side-members, size, 10⅝" by 3¼" by 5/16", plus ¼" inside channel according to wheelbase
- Cross-members, six to eight; two or four box-girder, one channel, one pressed I-beam, two casting, according to wheelbase

STEERING GEAR: Worm and roller, 28.4 to 1 ratio

SPRINGS: Front, 50" by 3½"
- Rear, 55" by 5"
- Suspension, Mack Rubber Shock Insulators

STANDARD EQUIPMENT: Painting in synthetic enamel; electric starting and lighting system; sealed-beam headlights; combination stop and tail light; electric horn; speedometer; radiator shutters; Houdaille hydraulic shock absorbers in front; spare rim; front bumper

OPTIONAL EXTRAS: DeLuxe cab; Cummins diesel engine; Duplex transmission; disk wheels; front wheel limiting valve; spare tire carrier; auxiliary fuel tanks, auxiliary transmission; power tower



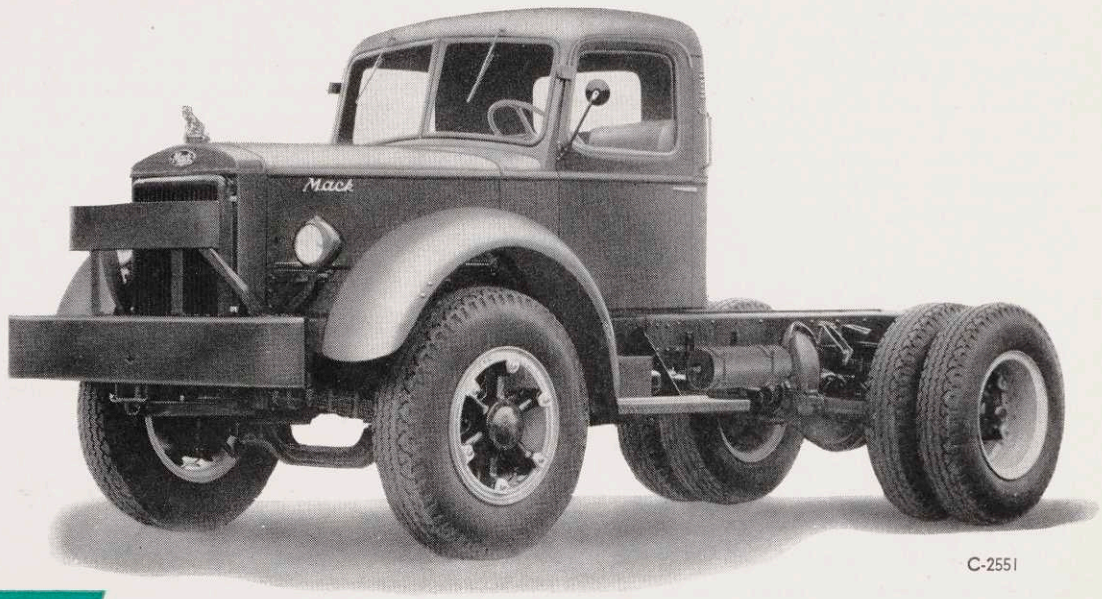
W	OL	LP	CA	A
137½-55	264⅛	144	91	5
146½-55	288⅛	168	100	6
158½-55	312⅛	192	112	8
171½-55	336⅛	216	125	9
184½-55	360⅛	240	138	10
196½-55	384⅛	264	150	11
226½-55	360⅛	240	180	6

PRINTED IN U.S.A.

7-48C

Mack

model LJX dumper



C-2551

RESPONDING to demands of the general contracting field for a large capacity dumper, Mack offers the Model LJX as the answer to large-scale material hauling, excavating and filling problems.

Ruggedly constructed to withstand the rigors of dumper operations, its frame is of heat-treated chrome-manganese steel reinforced with inside channels. Optimum performance is attained by a distinguished Mack Thermodyne engine of 510 cubic inch piston displacement, a ten-speed Duplex transmission providing a comprehensive range of ratios and an extremely capable Dual Reduction drive system. Particular emphasis has been given to cab design affording convenience and positiveness of controls as well as driver comfort.

In addition to its uncontested dependability as a heavy-duty dumper, this model is versatile to the extent that it is an approved carrier for 4½-yard concrete mixers.

MACK MANUFACTURING CORP.

New York, N. Y.

MODEL LJX SPECIFICATIONS

MAXIMUM GVW: 35,000 lbs.

WHEELBASES: 158" or 176"

ENGINE, STANDARD: Mack Thermodyne, six-cylinder, overhead valves, gasoline
Bore and stroke, 4-7/16" by 5½"
Piston displacement, 510 cu. in.
Horsepower, 158 @ 2400 r.p.m.
Torque, 400 pound-feet @ 1000 r.p.m.

ENGINES, OPTIONAL: Mack Thermodyne, six-cylinder, overhead valves, gasoline
Bore and stroke, 5" by 6"
Piston displacement, 707 cu. in.
Horsepower, 196 @ 2000 r.p.m.
Torque, 570 pound-feet @ 1000 r.p.m.
Mack Diesel, six-cylinder, overhead valves, single-lobe
Bore and stroke, 4⅞" by 6"
Piston displacement, 672 cu. in.
Horsepower, 150 @ 2000 r.p.m.
Torque, 440 pound-feet @ 1200 r.p.m.
Cummins Diesel, HB-600, six-cylinder, valve-in-head
Bore and stroke, 4⅞" by 6"
Piston displacement, 672 cu. in.
Horsepower, 150 @ 1800 r.p.m.
Torque, 500 pound-feet @ 600 r.p.m.

CLUTCH: Single-plate, dry
Area of engagement, 220 sq. in.

TRANSMISSION: Ten-speed Duplex, selective, constant mesh

	RATIOS			
	TRDX 322		TRDX 15 O/G	
Shift	Fast Range	Slow Range	Fast Range	Slow Range
5th	1.00	2.34	0.77	1.79
4th	1.63	3.81	1.00	2.33
3rd	2.61	6.11	1.75	4.08
2nd	4.35	10.18	3.11	7.25
1st	8.05	18.84	5.48	12.77
Rev.	8.13	19.02	5.53	12.88

TIRES: 12.00-24, dual rear, maximum

WHEELS: Open spider type, steel casting, six spokes

UNIVERSAL JOINTS: Two or three, Spicer, needle-bearing type

REAR AXLE: Dual Reduction, full-floating
Housing, pressed steel, banjo type
Final ratio, 7.54, 8.22 and 9.05 to 1
Axle shafts, graduated heat-treated; involute splines
Radius rods, tubular, ball-jointed

BRAKES: Air
Front, size, 17 ¼" by 4" by ¾"
Rear, size, 17 ¼" by 6" by ¾"
Area, four wheels, 710 sq. in.
Hand, 11 ¼" by 3 ¼" by ⅜", contracting, rear of transmission, air assisted

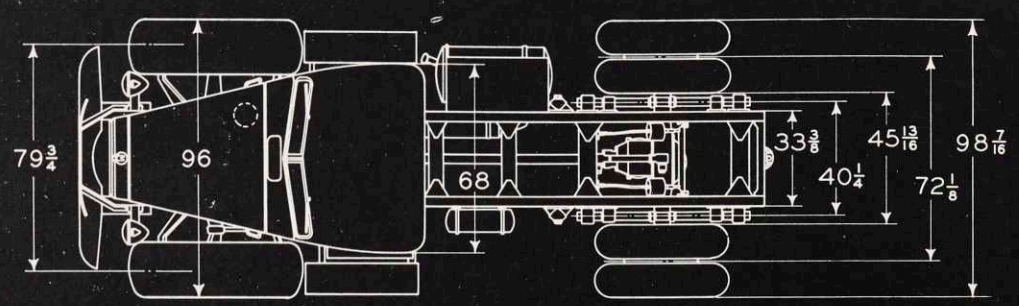
FRAME: Pressed chrome-manganese steel, heat-treated
Side-members, size, 10 ⅝" by 3 ¼" by 5/16" plus 3/16" inside channel
Cross-members, four or five; three or four I-section, one channel

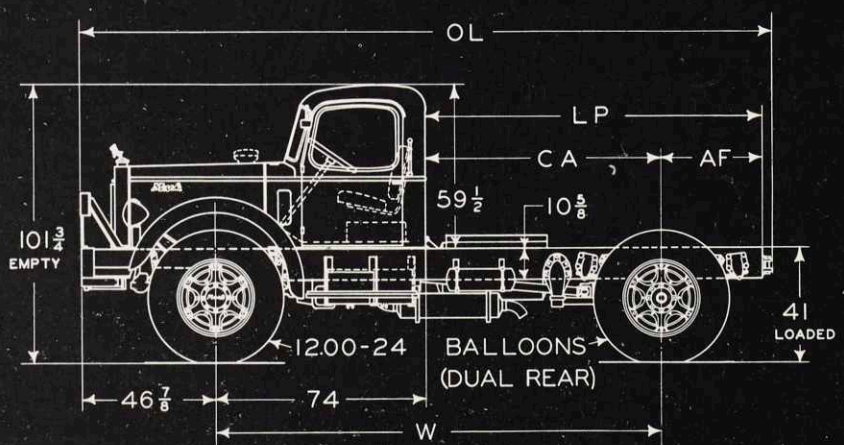
STEERING GEAR: Worm and roller; 28.4 to 1 ratio

SPRINGS: Front, 50" by 3½"
Rear, 54" by 3½"
Helper, 38" by 3½"
Suspension, Slipper both ends

STANDARD EQUIPMENT: Painting in synthetic enamel; electric lighting and starting system; sealed-beam headlights; combination stop and tail light; electric horn; speedometer; plate type radiator guard; front bumper; tool kit; front shock absorbers; radiator shutters; front and rear tow pins; cast spoke wheels; low pressure indicator; front wheel limiting valve; fuel tank.

OPTIONAL EXTRAS: Deluxe cab; 707 cu. in. gas engine; diesel engines; auxiliary fuel tank; air horn; ten-speed, overgear transmission; turning signals; lug tread tires.

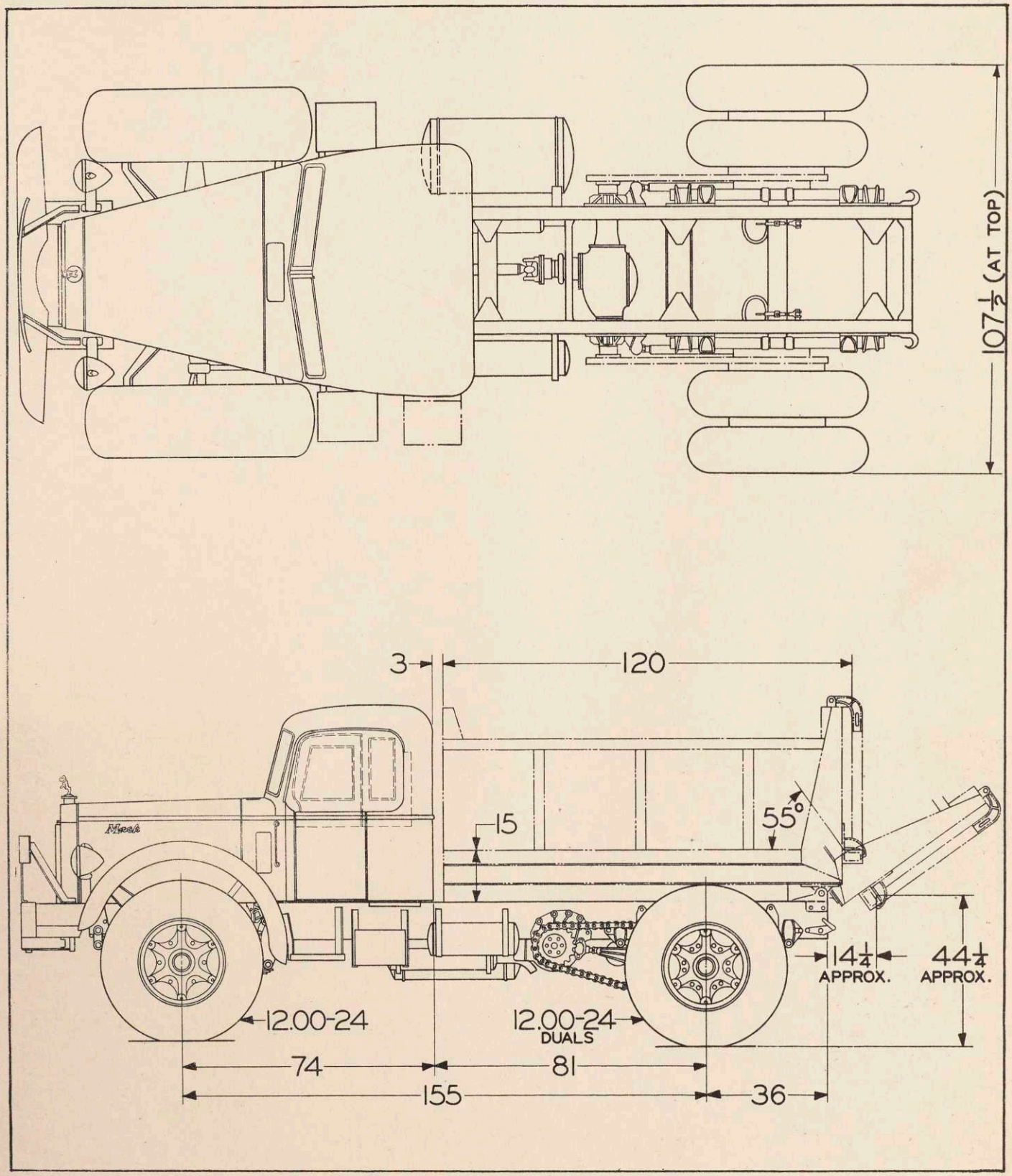




W	158	176
OL	244¼	274¼
LP	120	150
CA	34	102
AF	36	48

PRINTED IN U.S.A.

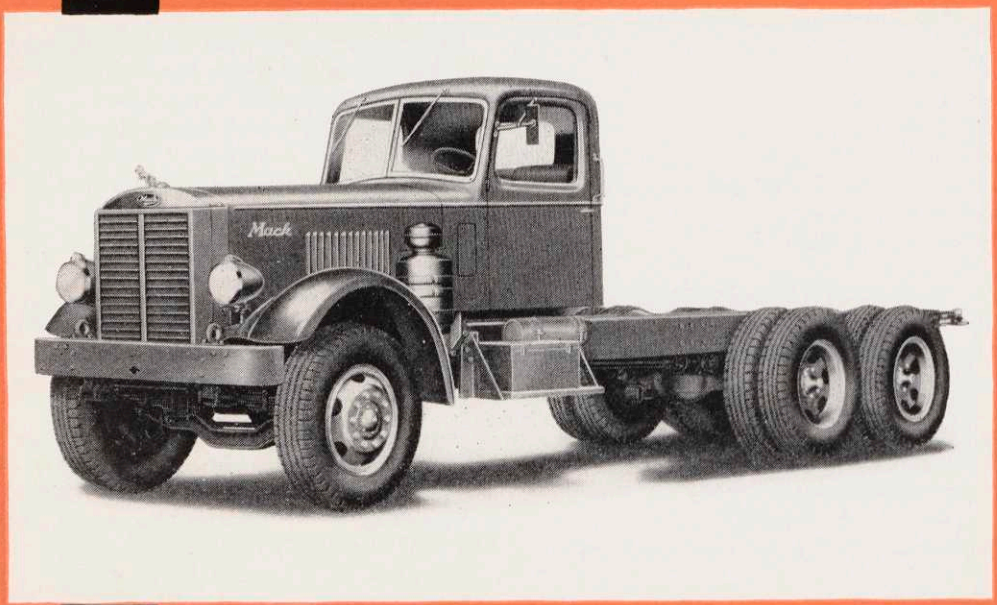
There being no annual or series models of MACK products, refinements and improvements are effected whenever sound development and thorough trial prove them to be advantageous. The right is therefore reserved to change specifications or prices without notice.



Mack Model F T Dumper

Mack

MODEL LTSW
SIX-WHEELED CHASSIS



POWER in abundance to operate with economy and dependability under the rigorous conditions imposed by most far-western states operation — this is a predominant feature of the Mack LTSW. A super-powered six-wheeler, this model is designed particularly for heavy-load transportation over long distances.

Versatile and reliable, it may be used alone or as a truck-tractor with semi-trailer or full trailers. Its high power-weight ratio insures maximum pay-load capacity and profit-making performance under the most exacting conditions.

MACK TRUCKS, Inc. New York, N. Y.

MODEL LTSW SPECIFICATIONS

WHEELBASES: 167½-52, 166-55, 179½-52, 178-55, 191½-52, 190-55, 203½-52, 202-55

TIRES: 10.00-22, 11.00-22 or 11.00-24 dual rear, maximum

WHEELS: Budd, ten stud disk

ENGINE: (Standard) Mack Thermodyne six-cylinder, overhead valves
- Bore and stroke, 5" by 6"
- Piston displacement, 707 cu. in.
- Horsepower, 196 @ 2000 r.p.m.
- Torque, 570 pound-feet @ 1000 r.p.m.
- Cylinders, cast in block, integral with upper crankcase
- Cylinder heads, cast in two piece
- Valves, intake, 30-deg. face 2-1/16"
  Exhaust, 45-deg. face 1¾"
- Exhaust seat inserts, Permafit of Niferrite, Stellited
- Pistons, T-slot, aluminum, tin-plated
- Crankshaft, seven-bearing, Tocco case-hardened, with twelve counterbalance weights
- Connecting rods, I-beam, drop-forged, 35° cap angle
- Air cleaner, oil bath type
- Water pump, centrifugal, at front of engine
- Thermostat, hot by-pass bellows type
- Fan, 24", aluminum, two 1-1/16" V-belts
- Radiator, continuous-finned, flat tube, equipped with shutters
- (Optional) Hall Scott, 1090 cu. in. piston displacement
- Horsepower, gasoline, 290 @ 1800 r.p.m.
- Horsepower, butane, 306 @ 1800 r.p.m.
- Torque, gasoline, 935 pound-feet @ 1350
- Torque, butane, 970 pound-feet @ 1100

CLUTCH: Single-plate, dry
- Area of engagement, 283.6 sq. in.

TRANSMISSION: Ten-speed Duplex; selective, constant mesh
- Ratios, 0.77 in tenth; 1.06 in ninth; 1.00 in eighth; 1.38 in seventh; 1.75 in sixth; 2.42 in fifth; 3.11 in fourth; 4.29 in third; 5.48 in second; 7.56 in first; 5.53 in fast reverse; 7.63 in slow reverse

UNIVERSAL JOINTS: Three, Spicer, needle-bearing type

REAR BOGIE: Model SW44 with 55" spacing or SW45 with 52" spacing
- Four-wheel drive, Dual Reduction, full-floating
- Drive, straight-through type; two universal joints
- Housings, one-piece banjo type
- Inter-axle differential, Mack Power Divider
- Final ratio, 5.77, 6.45 or 7.32 to 1
- Axle shafts, graduated heat-treated involute splines

BRAKES: Air
- Front, size, 16½" by 3½" or 4"
- Rear, size, 16½" by 6"
- Area, six wheels 1069-½ or 1104 sq. in.
- Hand, 16", four shoe disk on driveshaft

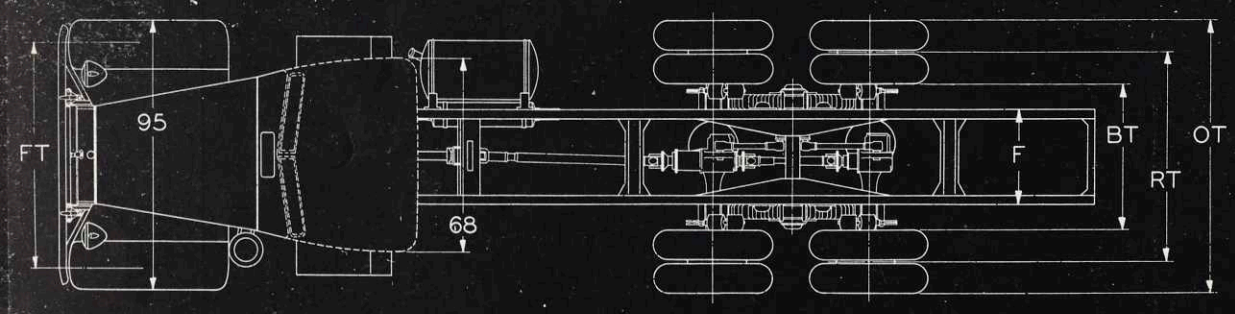
FRAME: Pressed chrome-manganese steel, heat-treated
- Side-members, size, 10½" by 3¼" by ¼" or 10⅝" by 3¼" by 5/16"
- Cross-members, two box-girder, three channel, one fabricated plate, two steel casting, one fabricated I-beam with gusset plates over bogie

STEERING GEAR: Worm and roller, 28.4 to 1 ratio

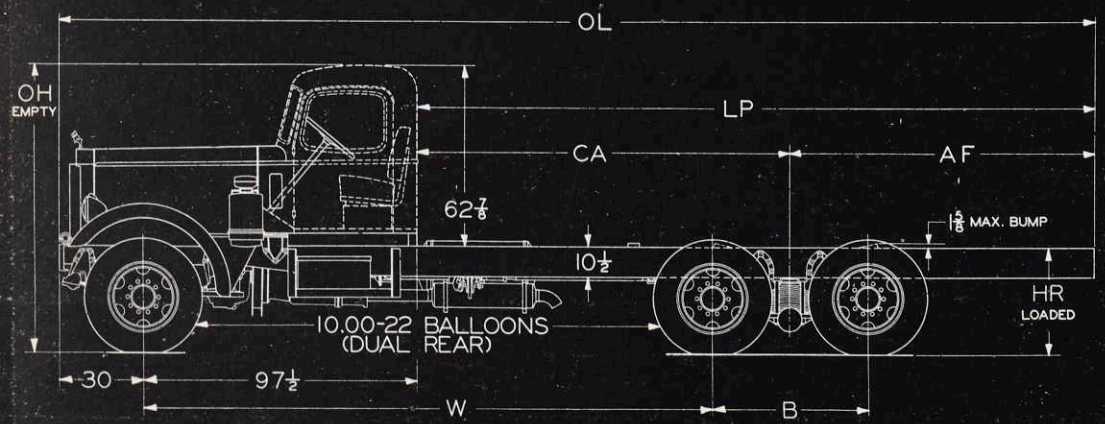
SPRINGS: Front, 50" by 3½"
- Rear, 55" by 4" or 52" by 5"
- Suspension, Mack rubber Shock Insulators

STANDARD EQUIPMENT: Painting in synthetic enamel; 55 amp. electric starting and lighting system; sealed-beam headlights; two combination stop and tail lights; electric horn; tachometer (obligatory extra); speedometer; Houdaille hydraulic shock absorbers on front; front bumper; tool kit with hydraulic jack; low-pressure indicating buzzer; manually-controlled radiator shutters; towing eyes at front; spare wheel and rim; right air-operated windshield wiper (obligatory extra)

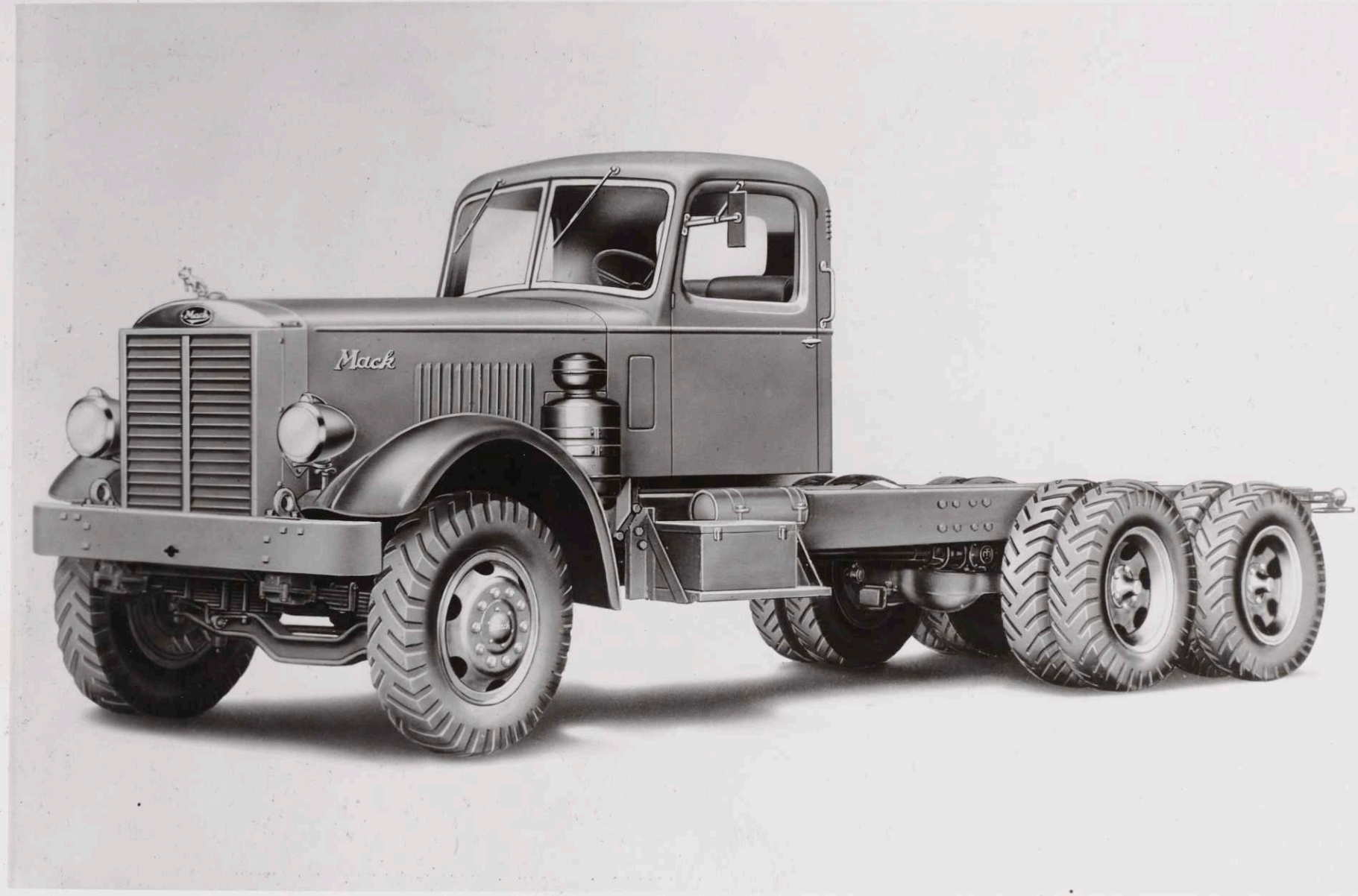
OPTIONAL EXTRAS: Cab; Hall-Scott gasoline or butane engines; two-plate Mack clutch; five-speed transmission with three-speed Brown-Lipe auxiliary; auxiliary lighting equipment; air horn; tachograph; air-operated radiator shutters; front wheel brake limiting valve; hand control valve



WB	B	OL	LP	CA	A
167½	52	295½	168	96	7
166	55	295½	168	96	7
179½	52	319½	192	108	8
178	55	319½	192	108	8
191½	52	343½	216	120	9
190	55	343½	216	120	9
203½	52	367½	240	132	10
202	55	367½	240	132	10

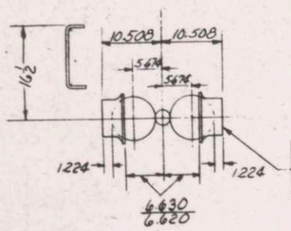


	FA56 Front Axle & SW44 Bogie 10.00-22, 12 ply Highway	11.00-22, 12 ply Highway	FA57 Front Axle & SW45 11.00-22, 14 ply Logger	11.00-24, Logg
RT	72¾	72¾	71⅞	
OT	96¼	96¾	95⅞	
BT	49¼	48¾	47⅞	
F	33¼	33¼	33⅜	
HR	38 1/16	38 13/16	40 13/16	
OH	101⅝	102¼	104	


Mack

7RTA46

60 GAL. FUEL TANK - UNDER TREAD PLATE

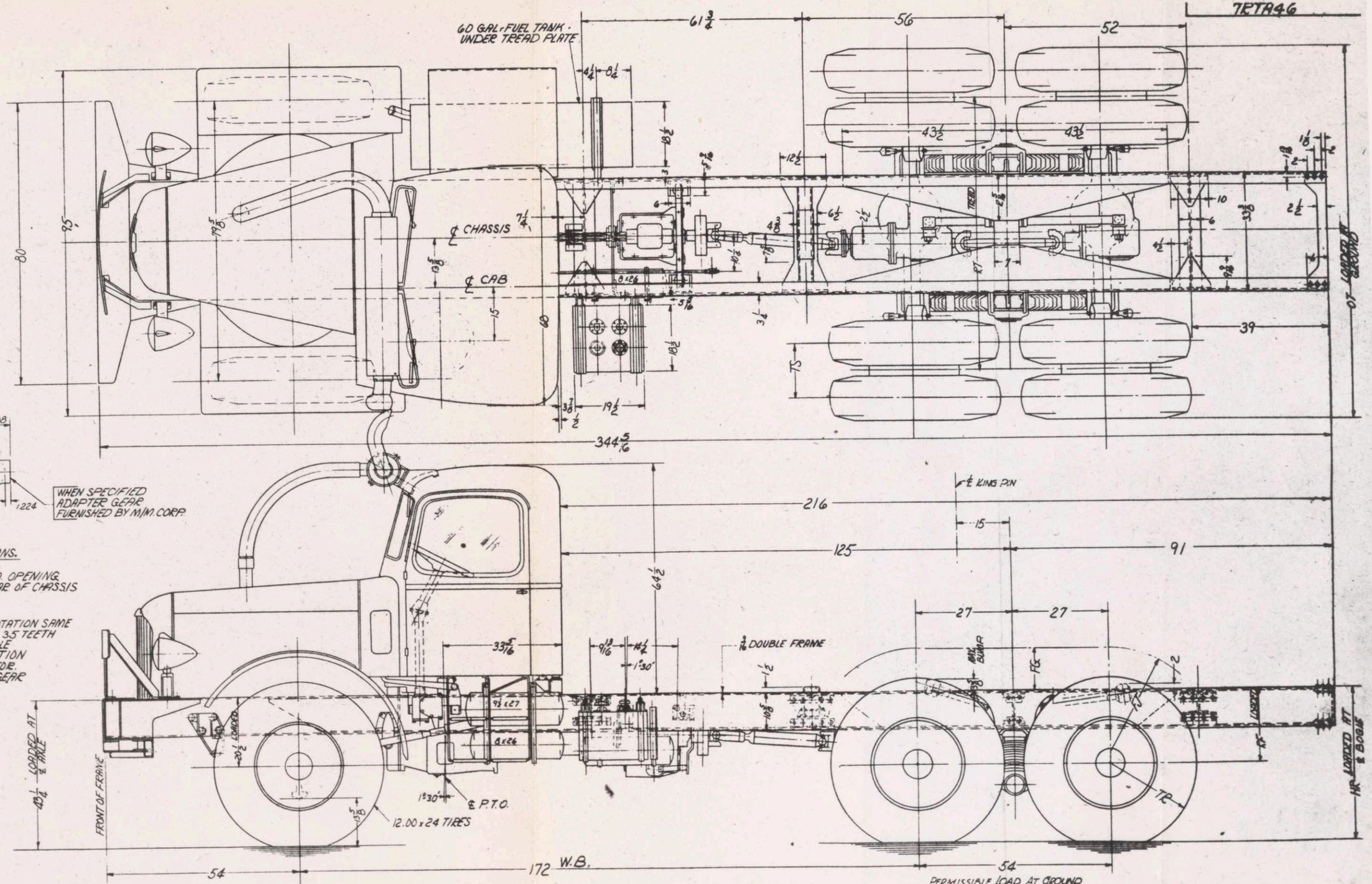


WHEN SPECIFIED ADAPTER GEAR FURNISHED BY M.M. CORP.

TR13 TRANS.

LOCATION OF P.T.O. OPENING LOOKING FROM REAR OF CHASSIS

TAKE-OFF GEAR ROTATION SAME AS MOTOR. 5 PITCH 35 TEETH 20° PRESSURE ANGLE FORWARD S.A.E. POSITION P.P.M. PER 1000 MOTOR. 386 ON ADAPTER GEAR



PERMISSIBLE LOAD AT GROUND 12,000 LBS.

PERMISSIBLE LOAD AT GROUND 50,000 LBS.

REAR TIRE SIZE	TS	RT	FG	FJ	RF	HR	OT	TR
12.00 x 24	15 5/16	77	15½	30	20½	43¼	105 1/16	24 3/8
11.00 x 24	12 3/16	72 1/8	14¾	30	20½	42 5/8	96 5/16	23 3/8

1945 - LMSWM

MACK MANUFACTURING CORPORATION ALLENTOWN, PA.

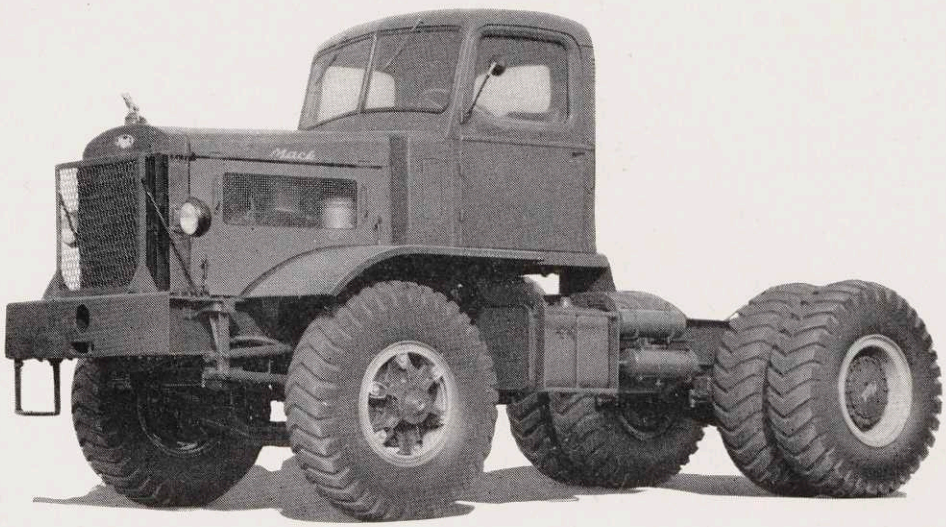
CHASSIS ASSEMBLY

ISSUED	L9-18		
REVISED DATA RECORDED	L9-25		
		DRAWN BY C. JOHNSON	DATE 1-30-45

7RTA46

Mack

model LR dumper & tractor



V-9179

RUGGED strength, plentiful power and indomitable performance endow this huge vehicle with capacity for phenomenal yardage output as a self-contained dumper and for herculean tasks as a tractor. Added to these qualities which spring mainly from ample size of structure and engine are others, equally important rising from advanced engineering and precision manufacture.

These are its stamina and dependability resulting from its all-welded alloy-steel frame, rubber-mounted rear axle and husky, wide-tread front axle; its ease of steering and control, owing to hydraulic steering, air-assisted clutch and hand brakes; its elbow steering column, well-engineered cab with extreme left driver position; and its unfailing pulling power assured by its two-plate clutch, eight-speed Duplex transmission and Planidrive rear axle.

MACK MANUFACTURING CORP.

New York, N. Y.

MODEL LR SPECIFICATIONS

PAYLOAD: 30,000 lbs., Dumper; 60,000 lbs. Tractor

WHEELBASES: 160" or 180"

TIRES: 14.00-24, front, maximum
16.00-24, dual rear, maximum

ENGINE, STANDARD: Mack Thermodyne six-cylinder, overhead valves, gasoline
Bore and stroke, 5" x 6"
Piston displacement, 707 cu. in.
Horsepower, 196 @ 2000 r.p.m.
Torque, 570 pound-feet @ 1000 r.p.m.

ENGINES, OPTIONAL:
Cummins diesel, HB-600; 4 7/8" x 6", 672 cu. in. disp.
Horsepower, 150 @ 1800 r.p.m.
Torque, 500 lb.-ft. @ 600 r.p.m.
Cummins diesel, NHB-600; 5 1/8" x 6", 743 cu. in. disp.
Horsepower, 200 @ 2100 r.p.m.
Torque, 537 lb.-ft. @ 1200 r.p.m.
Cummins diesel, NHBS-600; 5 1/8" x 6", 743 cu. in. disp.
Horsepower, 275 @ 2100 r.p.m.
Torque, 710 lb.-ft. @ 1600 r.p.m.
Hall-Scott 400, gasoline, 5 3/4" x 7", [redacted] cu. in. disp.
Horsepower, 290 @ 1800 r.p.m. 1090
Torque, 935 lb.-ft. @ 1350 r.p.m.
Hall-Scott 400, butane, 5 3/4" x 7", 1090 cu. in. disp.
Horsepower, 306 @ 1800 r.p.m.
Torque, 970 lb.-ft. @ 1100 r.p.m.

CLUTCH: Two-plate, dry, air-assisted
Area of engagement, 460 sq. in.

TRANSMISSION: Eight-speed, selective, constant mesh

Shift	High Range	Low Range
4th	0.66	1.60
3rd	1.00	2.43
2nd	1.85	4.50
1st	3.38	8.21
Rev	3.38	8.21

UNIVERSAL JOINTS: Two, Spicer, needle-bearing type

REAR AXLE: Planidrive; single-reduction; full-floating; planetary gear train within hubs, outboard
Housing, Heat-treated steel casting; vertical banjo; piloted carrier with pedestal supports
Final ratio, 17.2 or 19.4 to 1
Axle shafts, graduated heat-treated, involute splines

BRAKES: Air
Front, 17 1/4" x 5"
Rear, 20" x 7"
Area, four wheels, 932 sq. in.
Hand, 16" x 3", four-shoe disk; air-assisted, with co-incidental actuation of rear wheel brakes

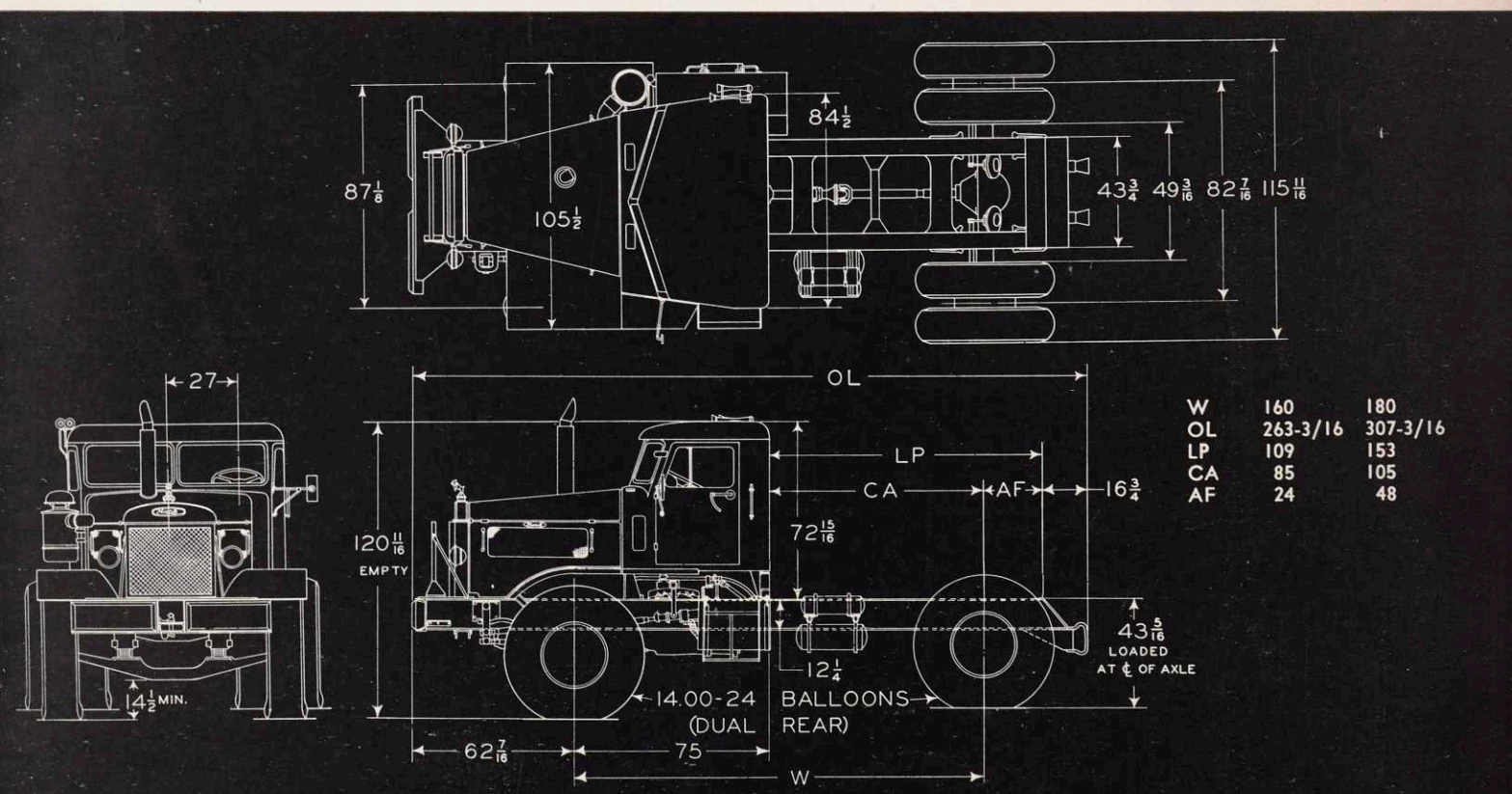
FRAME: Wide-flange I-beam; alloy steel
Side-members, 12 1/4" x 6-9/16", with 10 1/2" x 1/2" web-plate reinforcement

STEERING GEAR: Worm and roller, 28.4 to 1 ratio, with hydraulic booster

SUSPENSION: Front, springs, 54" x 4"
Rear, Mack rubber Shock Insulators, four-point

STANDARD EQUIPMENT: Painting in lead-varnish; electric starting and lighting system; sealed-beam headlights; air brakes; bumper, front and rear; radiator shutters with screen guard; hubodometer; tachometer; cab; front shock absorbers, front tow pin; air horn (obligatory extra)

OPTIONAL EXTRAS: Cummins diesel engine; Hall-Scott gasoline or butane engine; power-take-off; hoist pump and controls; hydro-tarder; trailer connections; hand control valve; front-wheel brake limiting valve; air separator.



W	160	180
OL	263-3/16	307-3/16
LP	109	153
CA	85	105
AF	24	48

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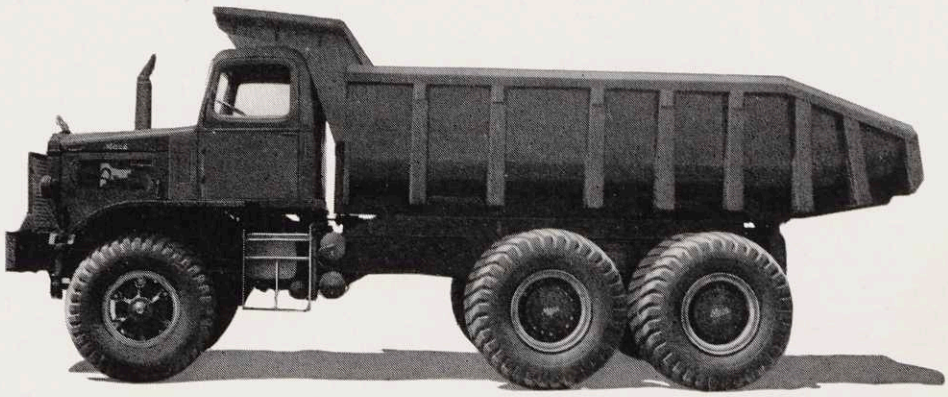
3-48C 4M

Mack model LRSW SIX-WHEELED dumper



M9539

HUGE loads are moved with celerity and certainty by this self-contained dumper. By reason of its six wheels and the full Power Divider equipment of its four-wheel driven Planidrive bogie, a high degree of flotation is combined with unequalled positiveness of traction.

Not only is ample engine power provided to assure unusual performance, but its efficient and adaptable application is assured by its air-assisted two-plate clutch and eight-speed Duplex transmission. Furthermore, ease and positiveness of control is imparted by its air-assisted clutch, hand-brake application and hydraulic power steering. Comfort and protection is attained by its superbly-designed cab, featuring an extreme left driver position.

Precision manufactured from masterful designs, this vehicle is massive, yet finely balanced, thus vouchsafing stamina, reliability and endurance with the utmost long-run economy.

MACK MANUFACTURING CORP.

New York, N. Y.

LRSW DUMPER SPECIFICATIONS

PAYLOAD: 60,000 lbs.

WHEELBASE: 171"–62"

TIRES: 14.00-24, front, maximum
16.00-24, dual rear, maximum

ENGINE: Cummins diesel NHBS-600, six-cylinder, dual intake and exhaust valves
Bore and stroke, 5 1/8" x 6"
Piston displacement, 743 cu. in.
Horsepower, 275 @ 2100 r.p.m.
Torque, 710 lb. ft. @ 1600 r.p.m.
Cylinders, Cast in block, with removable wet liners
Cylinder heads, cast in pairs
Exhaust seat inserts, Stellited
Pistons, aluminum, cam ground
Crankshaft, seven bearing, Tocco case-hardened
Connecting rods, drop-forged, 12" center to center
Air cleaner, oil bath type
Water pump, circulating centrifugal, driven by 1 V-belt
Thermostat, with main and by-pass flow control
Supercharger, Roots type; 1.80:1 ratio; gear driven
Radiator, continuous-finned, flat tube, fabricated steel tanks and cast sides
Water capacity, 12 3/4 gals.
Fuel capacity, 75 gals.

CLUTCH: Two-plate, dry, air-assisted
Area of engagement, 460 sq. in.

TRANSMISSION: Eight-speed, selective, constant mesh

Shift	High Range	Low Range
4th	0.66	1.60
3rd	1.00	2.43
2nd	1.85	4.50
1st	3.38	8.21
Rev.	3.38	8.21

UNIVERSAL JOINTS: Two, Spicer, needle-bearing

REAR BOGIE: Planidrive; Dual Reduction; planetary gear train within hubs, outboard
Housing, heat-treated steel casting
Mack Power Divider, three, two axle type and one inter-axle type
Final ratio, 19.2
Axle shafts, graduated heat-treated, involute splines

BRAKES: Air
Front, 17 1/4" x 5"
Rear, 20" x 7"
Area, six wheels, 1509 sq. in.
Hand, 16" x 3"; four-shoe disk; air-assisted, with co-incidental actuation of rear wheel brakes

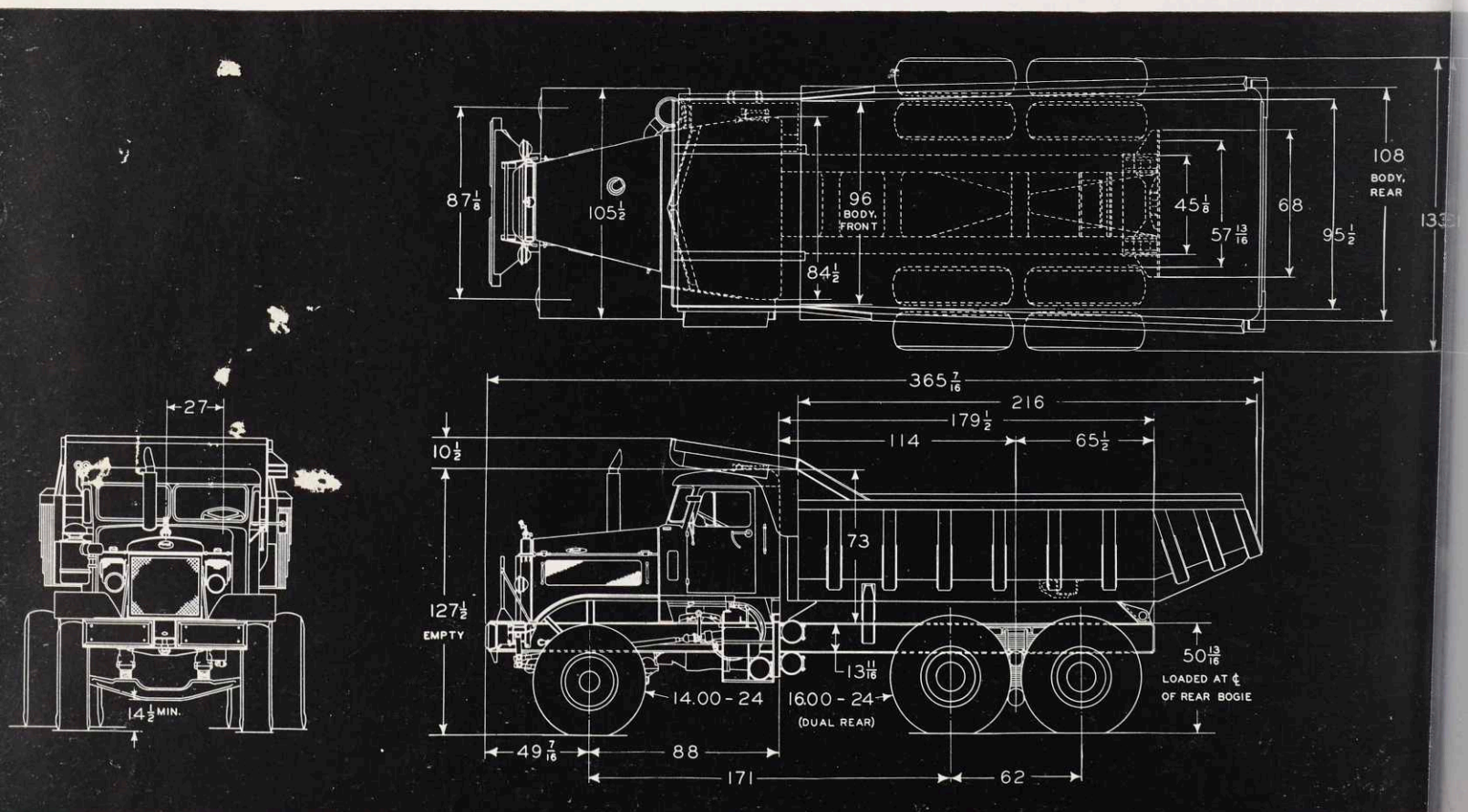
FRAME: Wide-flange I-beam; alloy steel
Side-members, size, 13-11/16" x 8", with two 1/2" formed angles welded into web of both members

STEERING GEAR: Worm and roller, 28.4 to 1 ratio, with hydraulic booster

SPRINGS: Front, 54" x 4"
Rear, 62" x 5"
Suspension, Mack rubber Shock Insulators

STANDARD EQUIPMENT: Painting in synthetic enamel; starting and lighting system; cast spoke wheels; sealed-beam headlights; air brakes; cab; front bumper with oak filler; air horn; front shock absorbers; tow pin; tachometer; radiator shutters, and guard

OPTIONAL EXTRAS: Screen guard, cab rear window; tachograph; power-take-off; front wheel brake limiting valve; air separator



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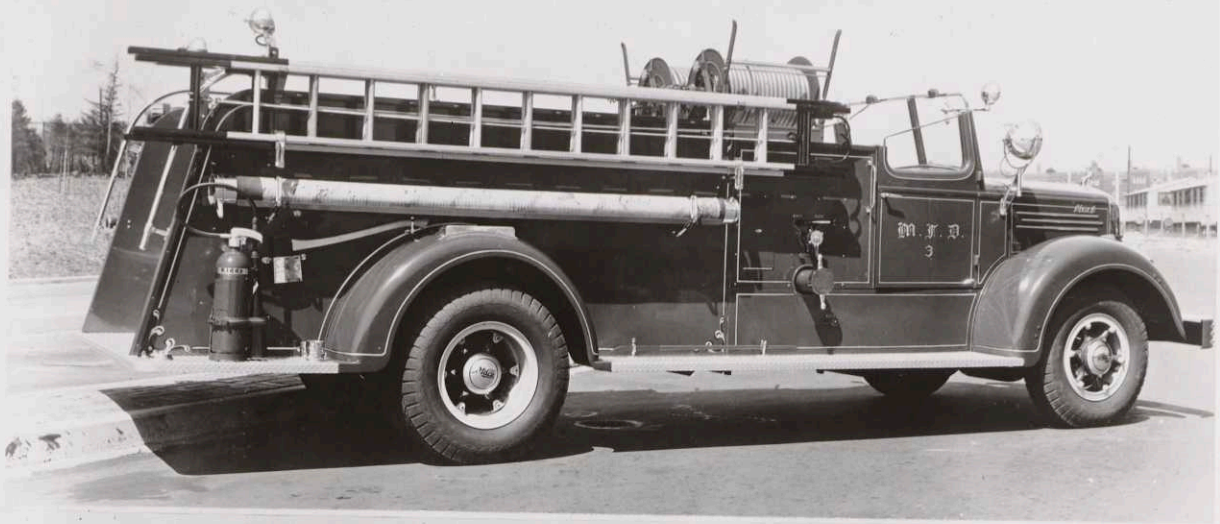
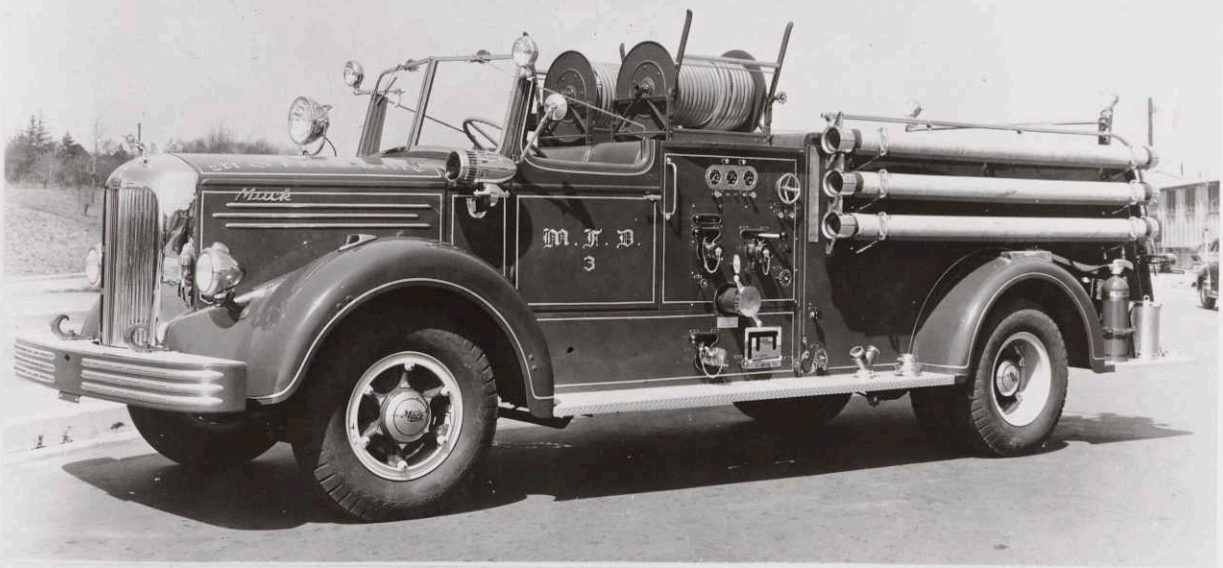
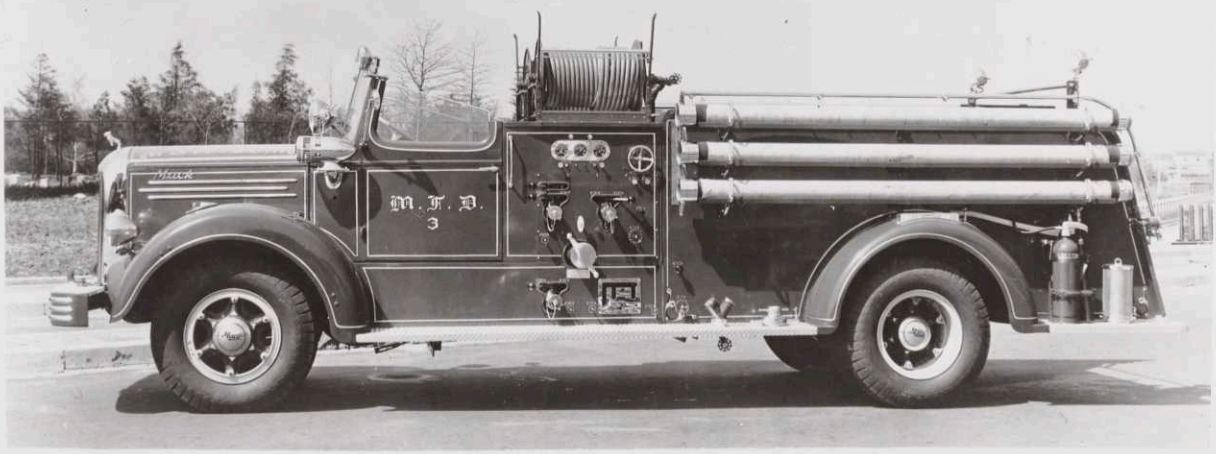
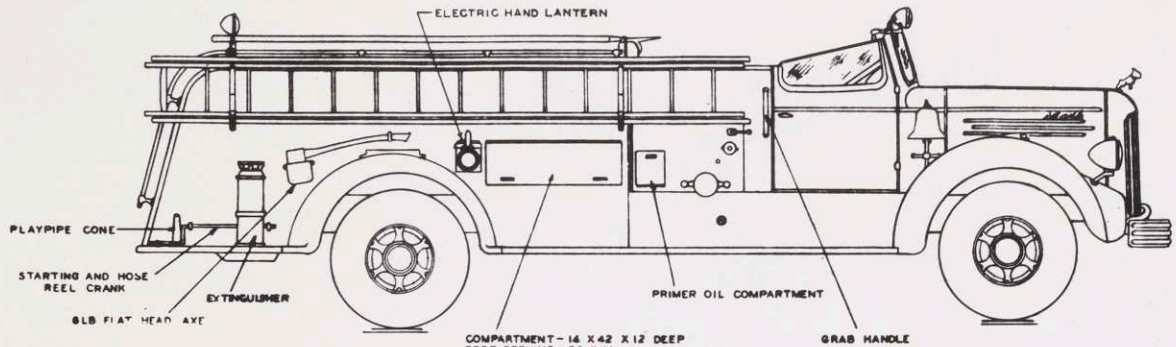
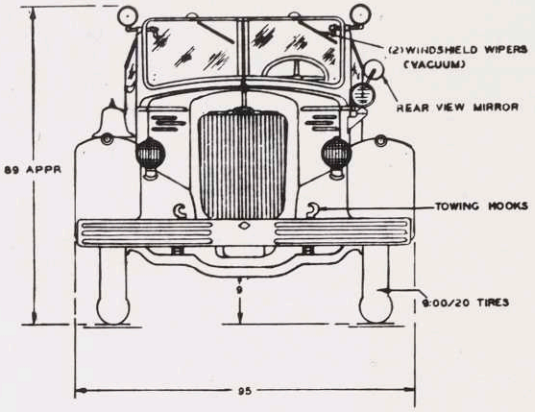
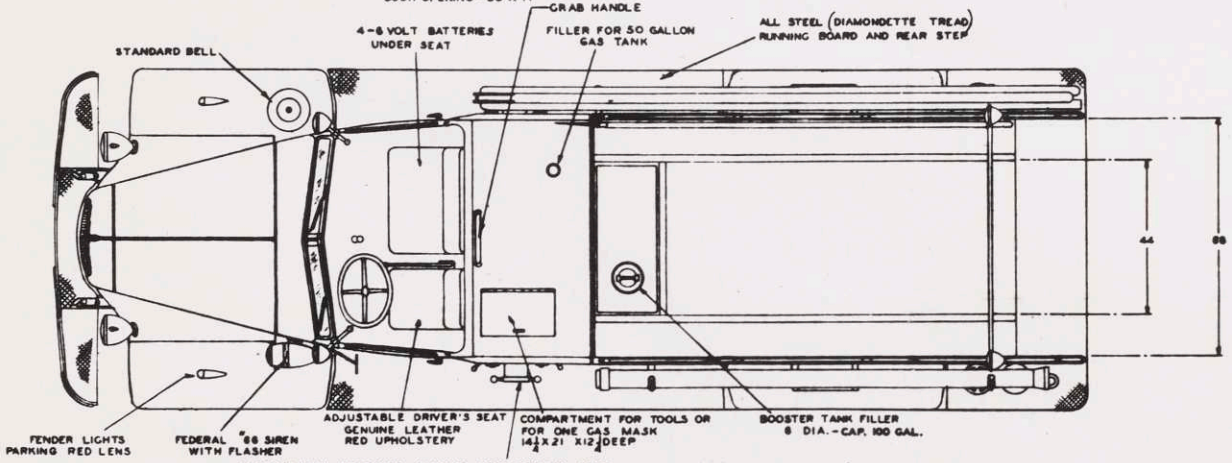

M. F. D.
3

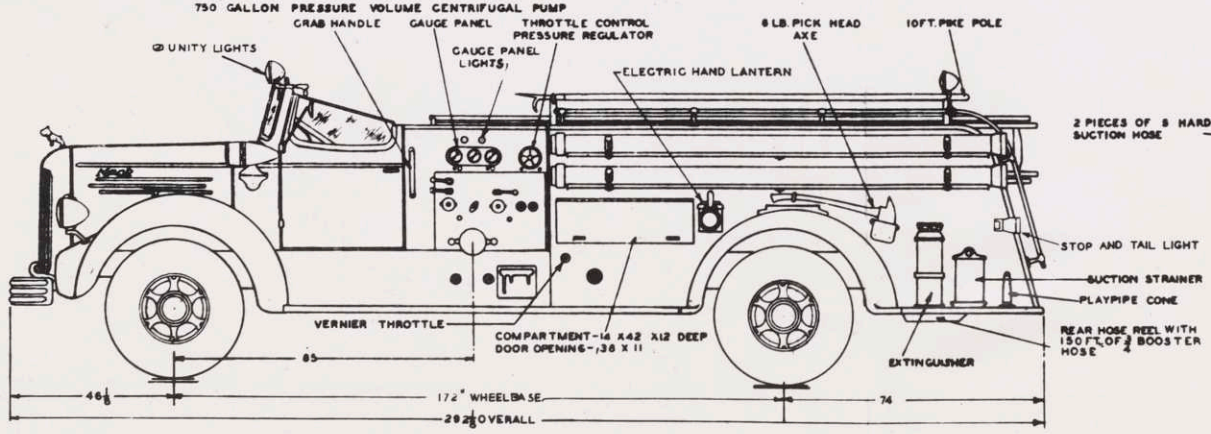

Mack
M. F. D.
3

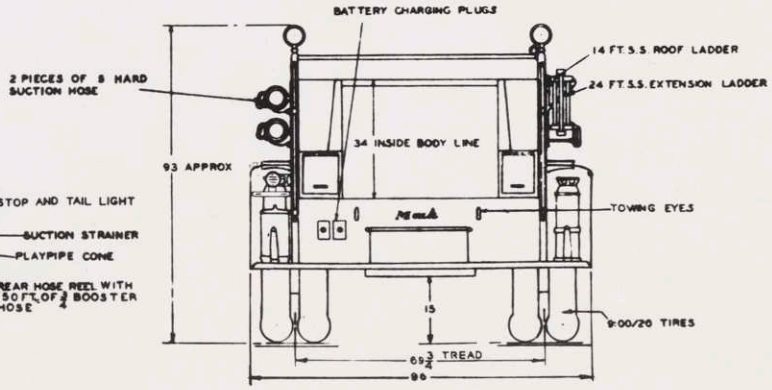

Mack
M. F. D.
3


ELECTRIC HAND LANTERN
PLAYPIPE CONE
STARTING AND HOSE REEL CRANK
EXTINGUISHER
6 LB FLAT HEAD AXE
PRIMER OIL COMPARTMENT
COMPARTMENT - 14 X 42 X 12 DEEP
DOOR OPENING - 38 X 11
GRAB HANDLE


(2) WINDSHIELD WIPERS (VACUUM)
REAR VIEW MIRROR
89 APPR
TOWING HOOKS
9:00/20 TIRES
95


STANDARD BELL
4-6 VOLT BATTERIES UNDER SEAT
GRAB HANDLE
FILLER FOR 50 GALLON GAS TANK
ALL STEEL (DIAMONDETTE TREAD) RUNNING BOARD AND REAR STEP
44
88
FENDER LIGHTS PARKING RED LENS
FEDERAL "66 SIREN WITH FLASHER
ADJUSTABLE DRIVER'S SEAT GENUINE LEATHER RED UPHOLSTERY
COMPARTMENT FOR TOOLS OR FOR ONE GAS MASK 14 1/4 X 21 X 12 1/4 DEEP
BOOSTER TANK FILLER 6 DIA. - CAP. 100 GAL.


750 GALLON PRESSURE VOLUME CENTRIFUGAL PUMP
GRAB HANDLE
GAUGE PANEL
THROTTLE CONTROL PRESSURE REGULATOR
6 LB. PICK HEAD AXE
10 FT. PIKE POLE
(2) UNITY LIGHTS
GAUGE PANEL LIGHTS
ELECTRIC HAND LANTERN
STOP AND TAIL LIGHT
SUCTION STRAINER
PLAYPIPE CONE
REAR HOSE REEL WITH 150 FT. OF 3/4 BOOSTER HOSE
VERNIER THROTTLE
COMPARTMENT - 14 X 42 X 12 DEEP
DOOR OPENING - 38 X 11
EXTINGUISHER
85
46 1/8
172" WHEELBASE
74
292 1/8 OVERALL


BATTERY CHARGING PLUGS
14 FT. S.S. ROOF LADDER
24 FT. S.S. EXTENSION LADDER
2 PIECES OF 6 HARD SUCTION HOSE
34 INSIDE BODY LINE
93 APPROX
TOWING EYES
15
9:00/20 TIRES
69 3/4 TREAD
90

CONTEMPORARY TRUCK DESIGN
AND STYLING

CONTEMPORARY TRUCK DESIGN AND STYLING

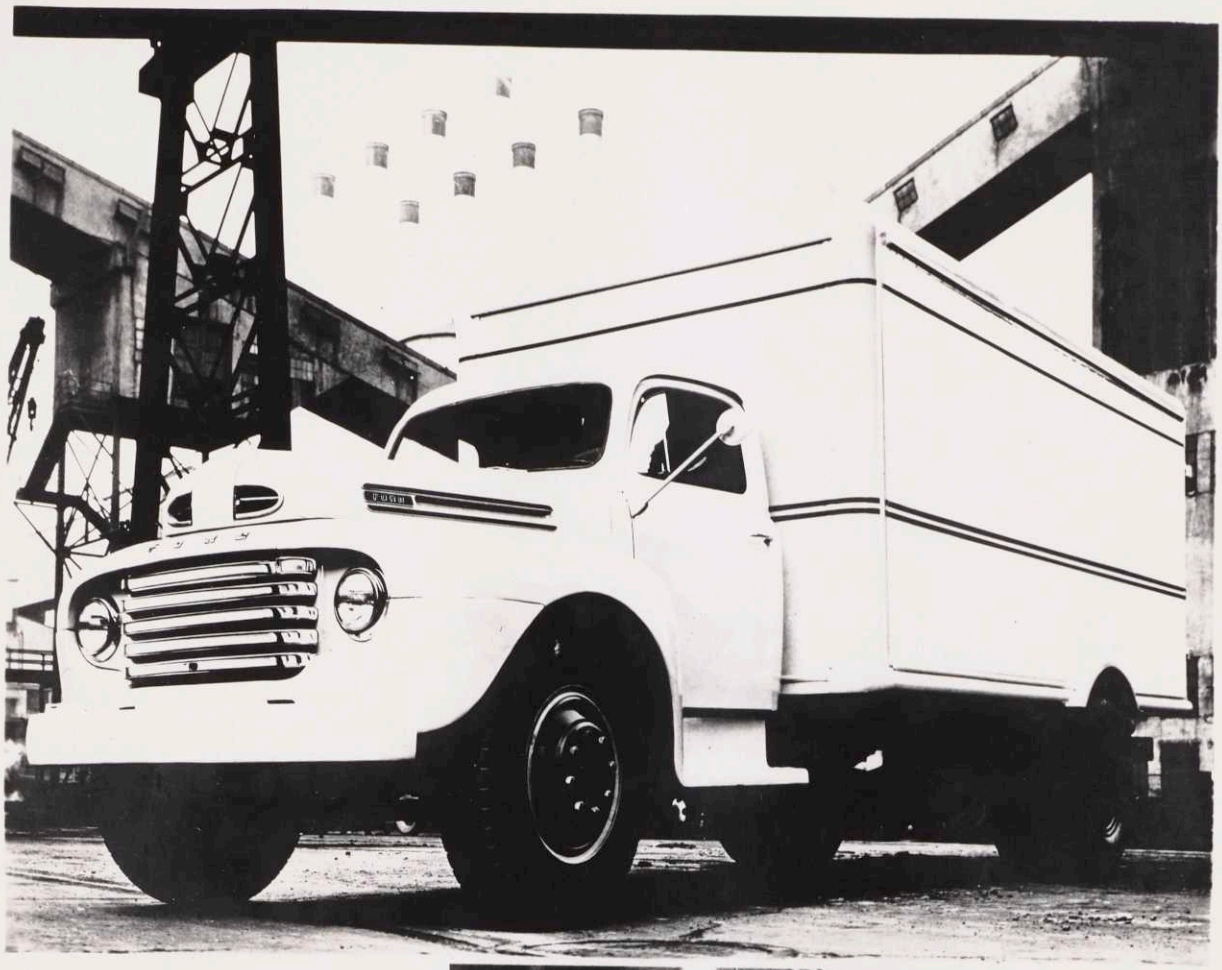
Included in this section is a study of the major competitors of Mack heavy duty trucks:

White
International
Diamond T
Autocar
G.M.C.
Reo
Sterling
Federal
Brockway
Walter

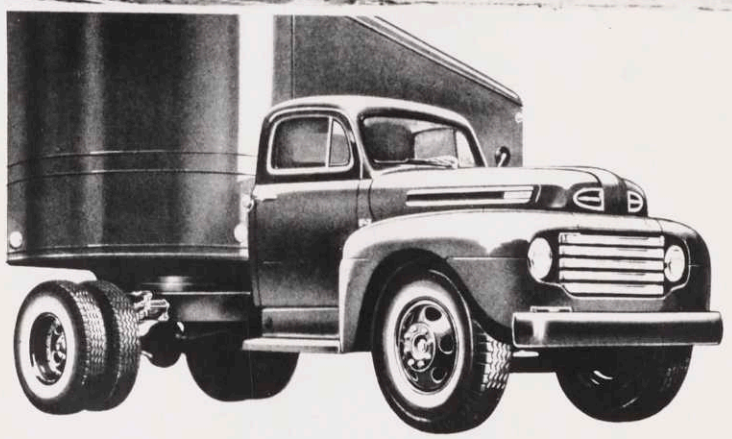
To study recent truck styling trends and to study cab dimensions, photographs and prints of several smaller trucks are included:

Ford
Chevrolet
Dodge
Studebaker

A summary of important dimensions pertaining to the cab and front end sheet metal is included for comparison with Mack.

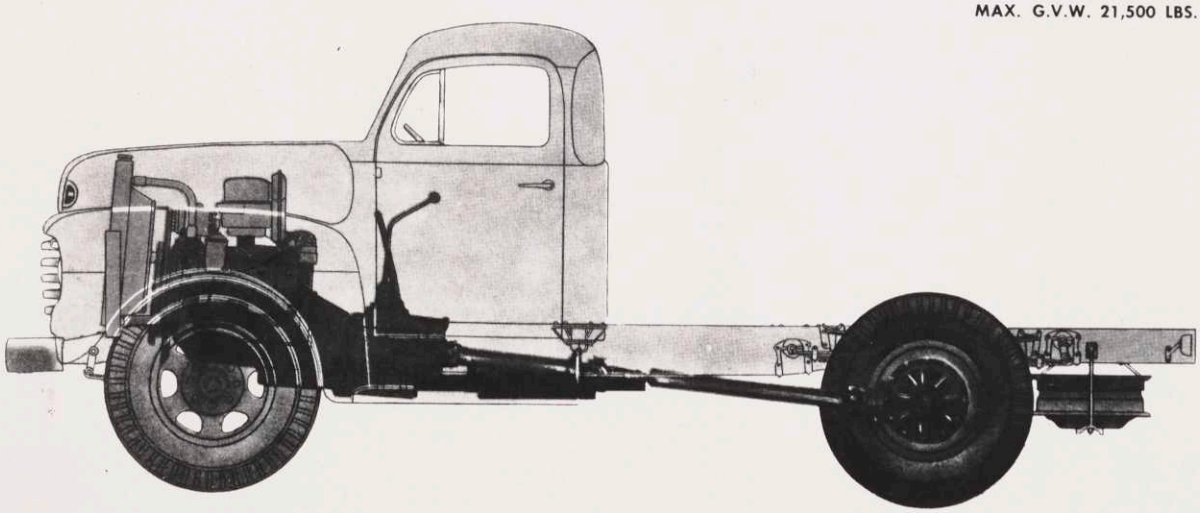


FORD

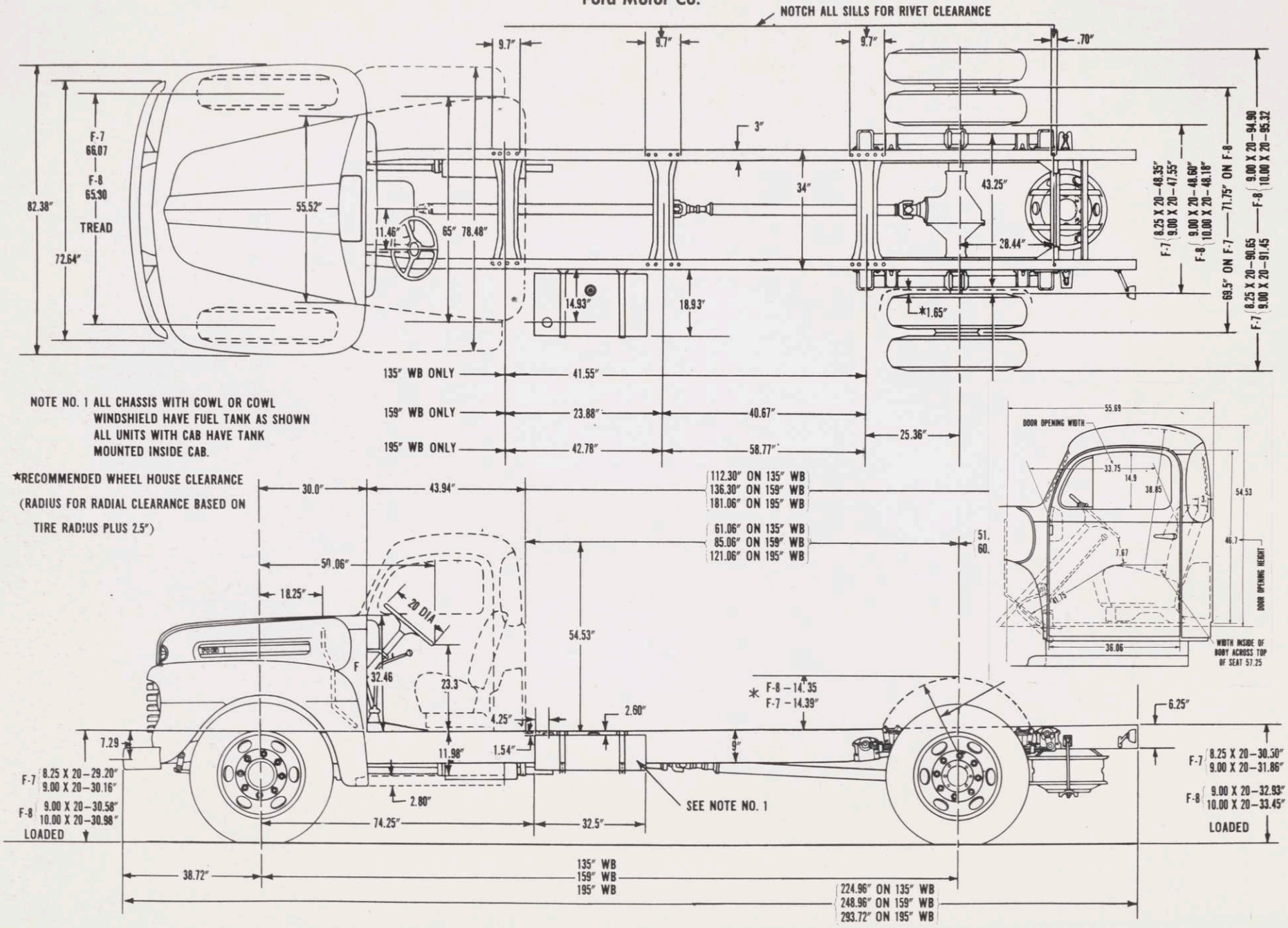


SERIES F-8 FORD *Bonus Built* TRUCKS

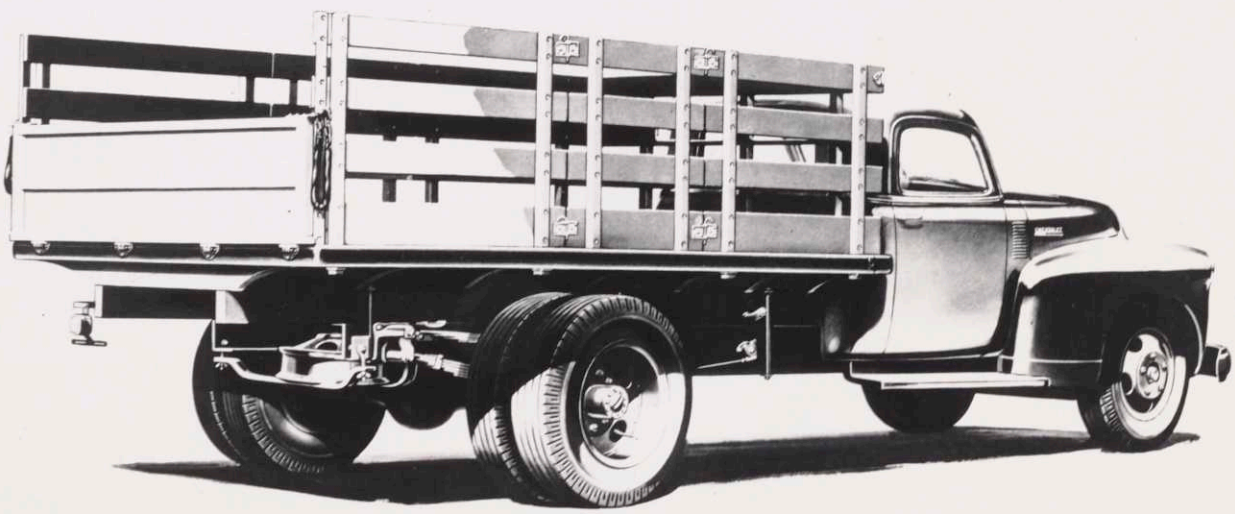
MAX. G.V.W. 21,500 LBS.

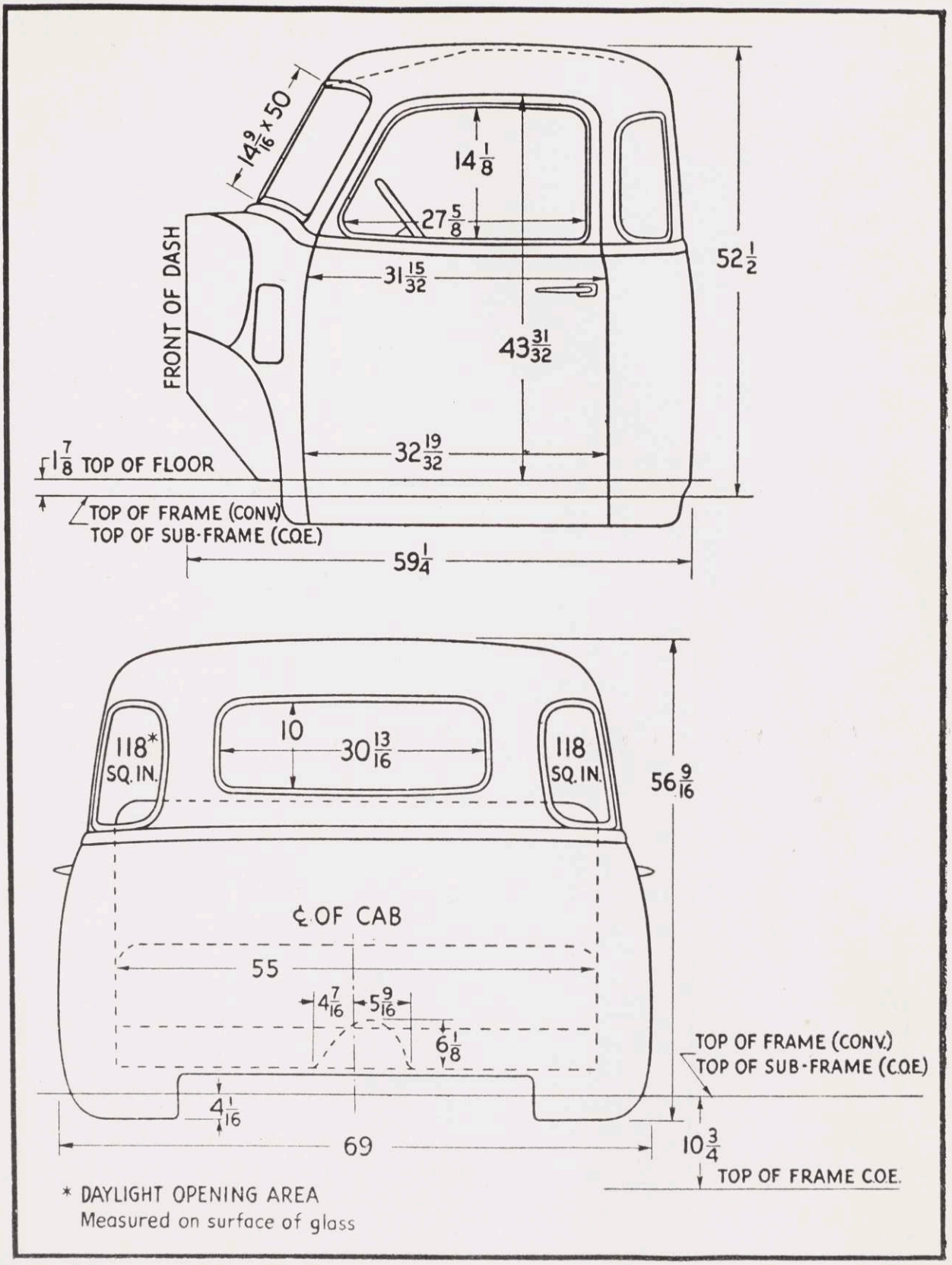


1948 Ford F-7 (2½ Ton) and F-8 (3 Ton) Trucks
Ford Motor Co.



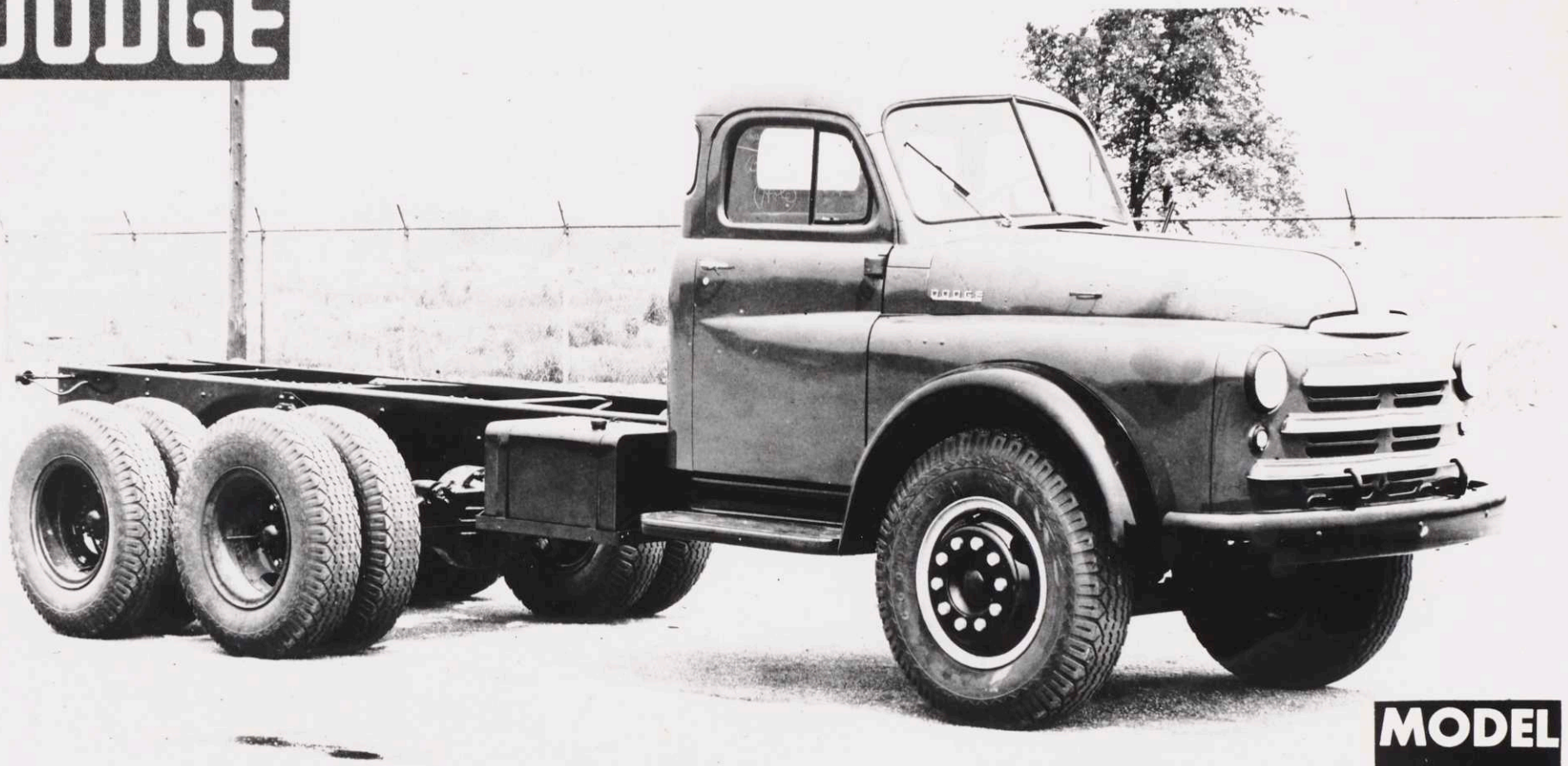
CHEVROLET



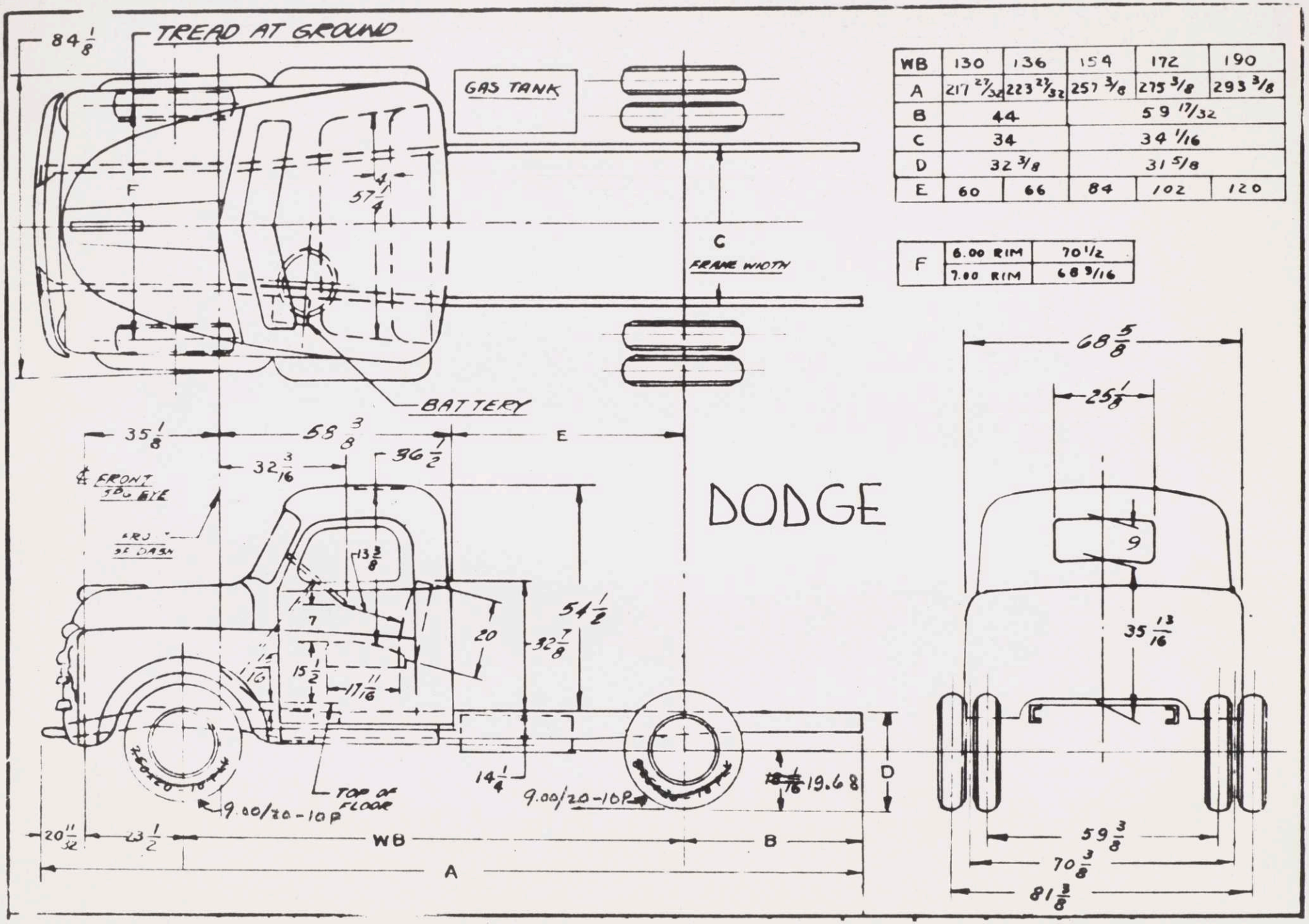


CHEVROLET CAB

DODGE



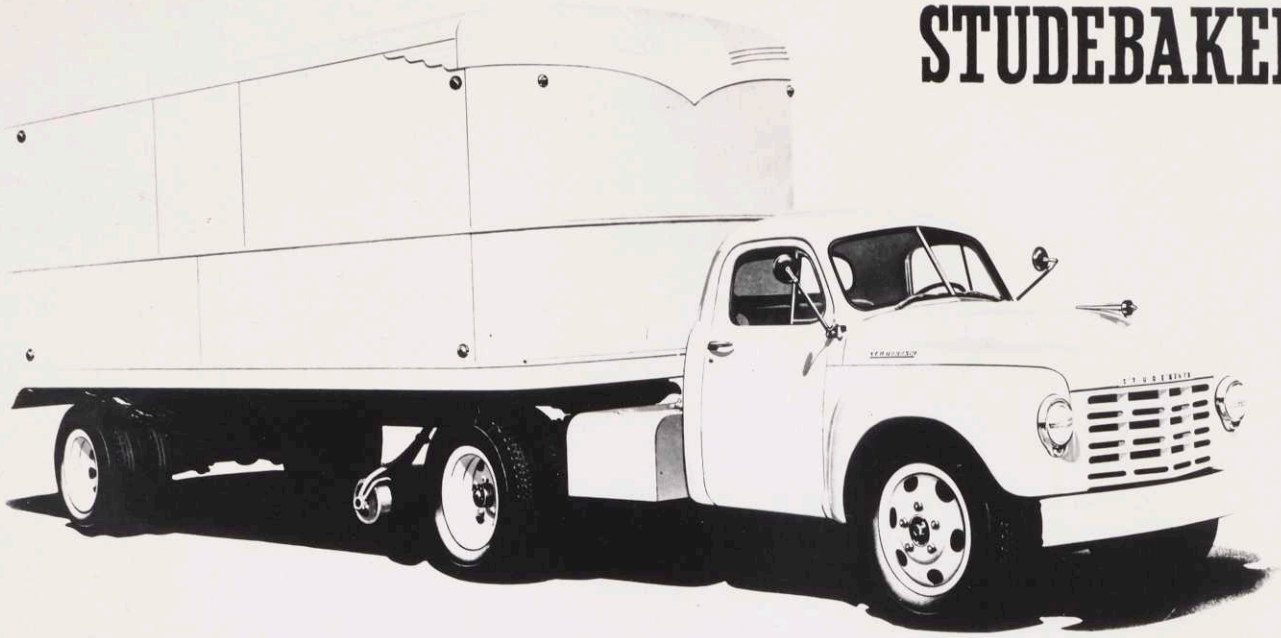
MODEL VX

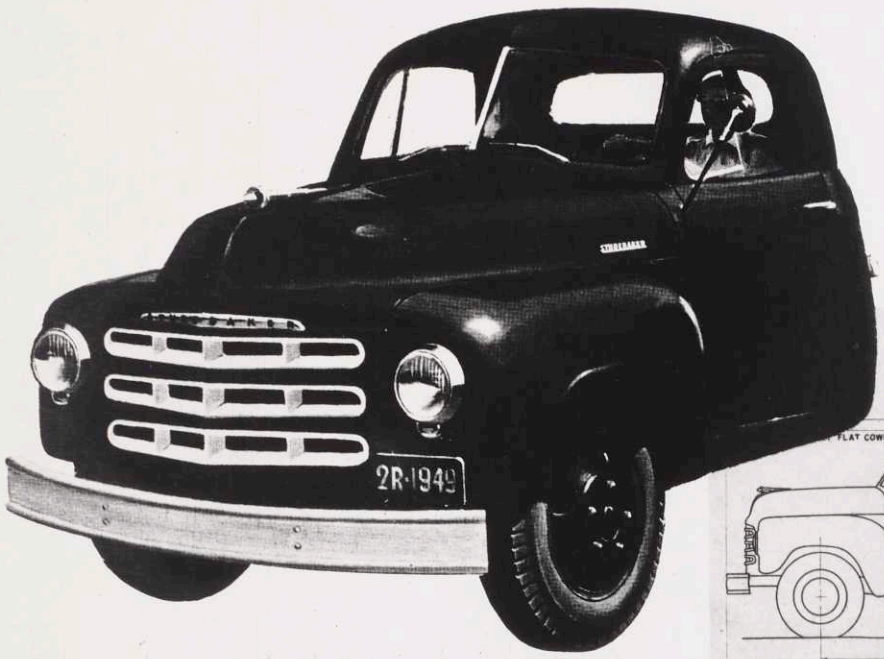


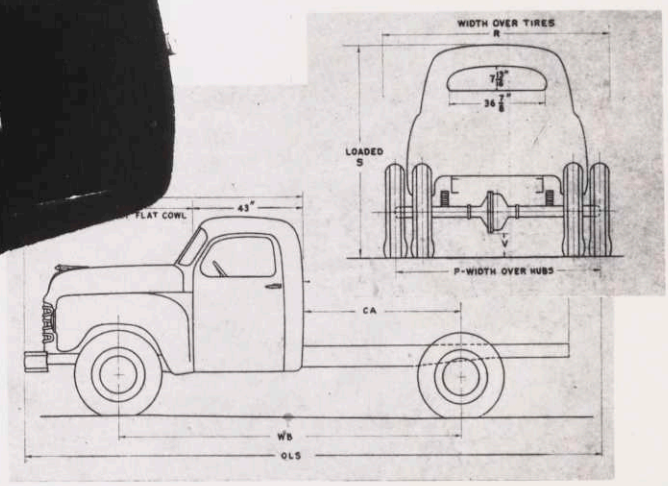
WB	130	136	154	172	190
A	217 27/32	223 27/32	257 3/8	275 3/8	293 3/8
B	44		59 17/32		
C	34		34 1/16		
D	32 3/8		31 5/8		
E	60	66	84	102	120

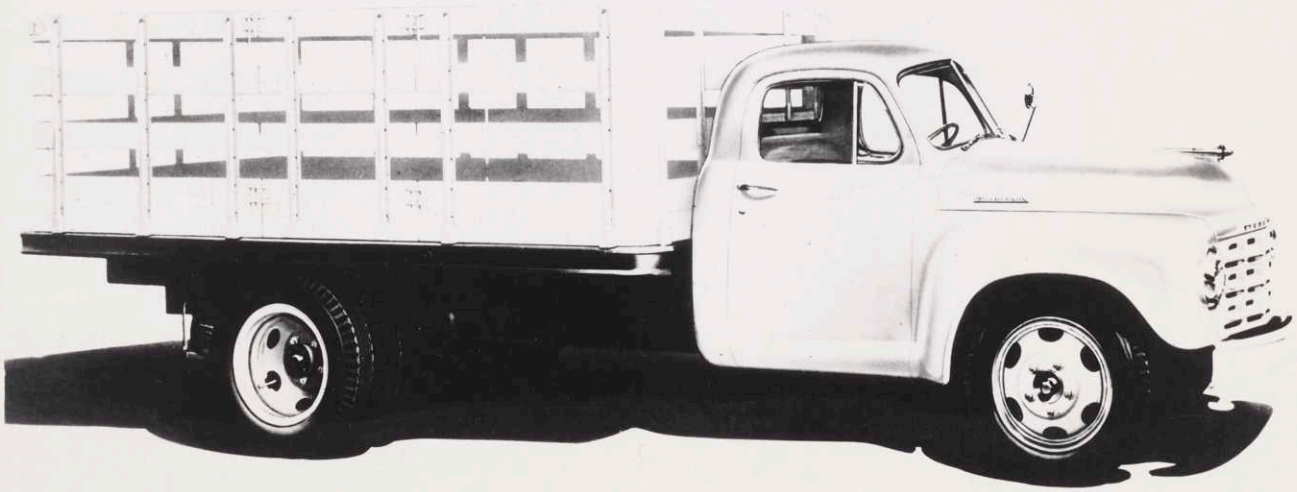
F	6.00 RIM	70 1/2
	7.00 RIM	68 9/16

STUDEBAKER

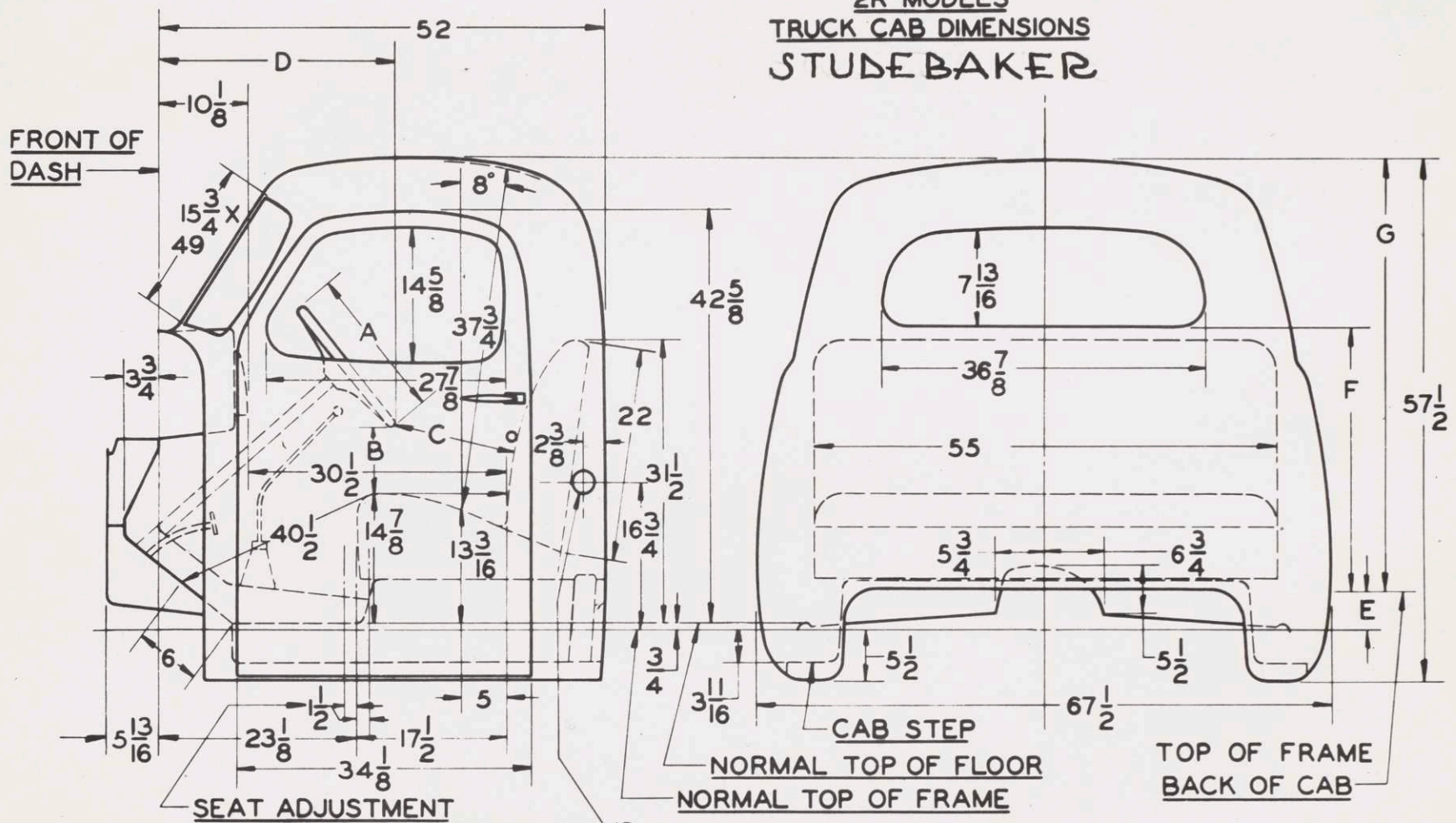



2R-1949


WIDTH OVER TIRES
R
LOADED
S
P-WIDTH OVER HUBS
FLAT COWL
43"
CA
WB
OLS



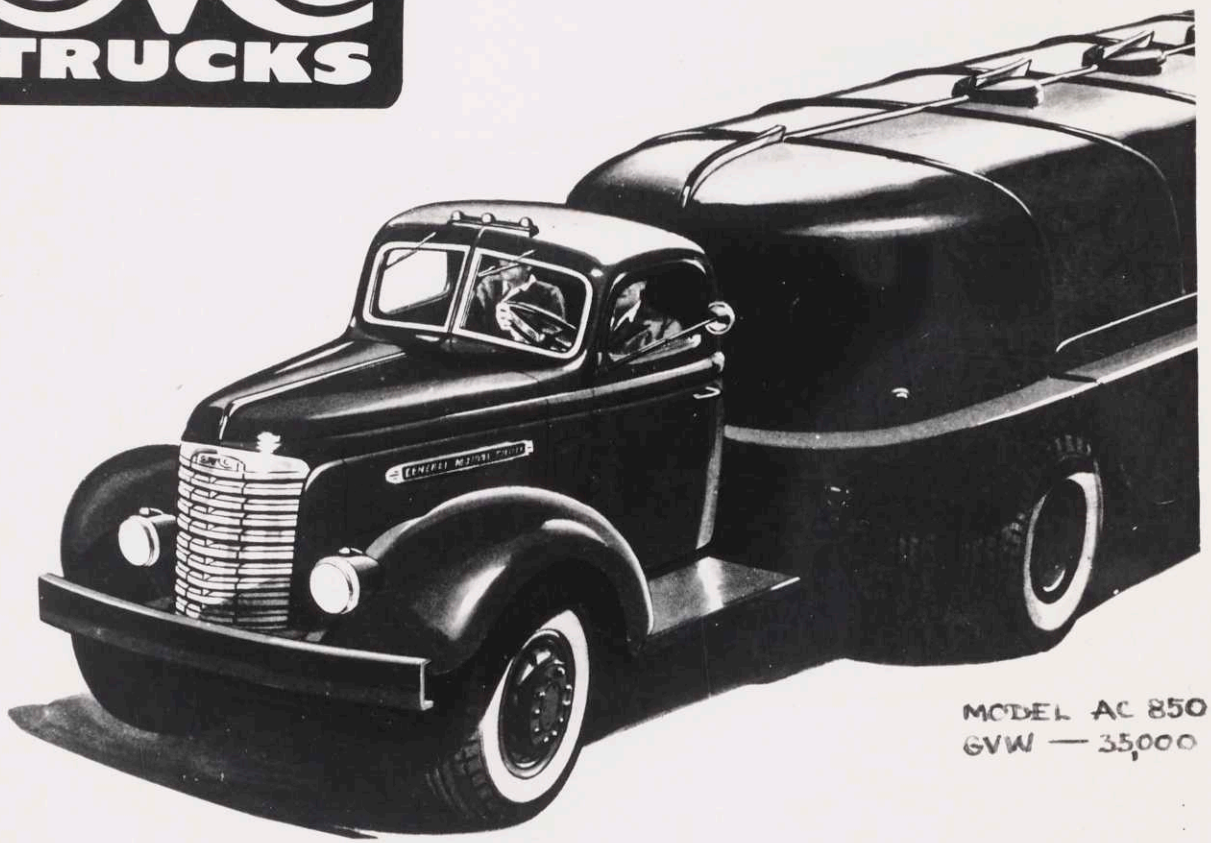
2R MODELS
TRUCK CAB DIMENSIONS
STUDEBAKER



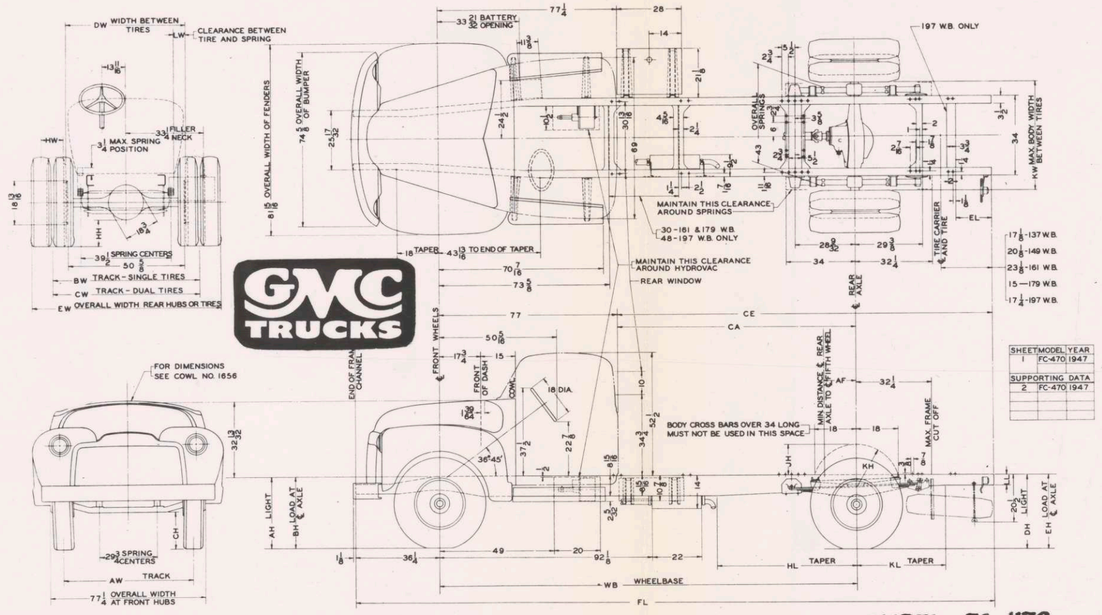
MODEL	A	B	C	D	E	F	G
2R5 2R10	17	7 3/8	14 1/4	27 7/16	3 1/16	31 15/16	48 15/16
2R15 2R16 2R17	18	7 1/8	14	27 5/8	3 1/2	31 1/2	48 1/2

MODEL FC-350

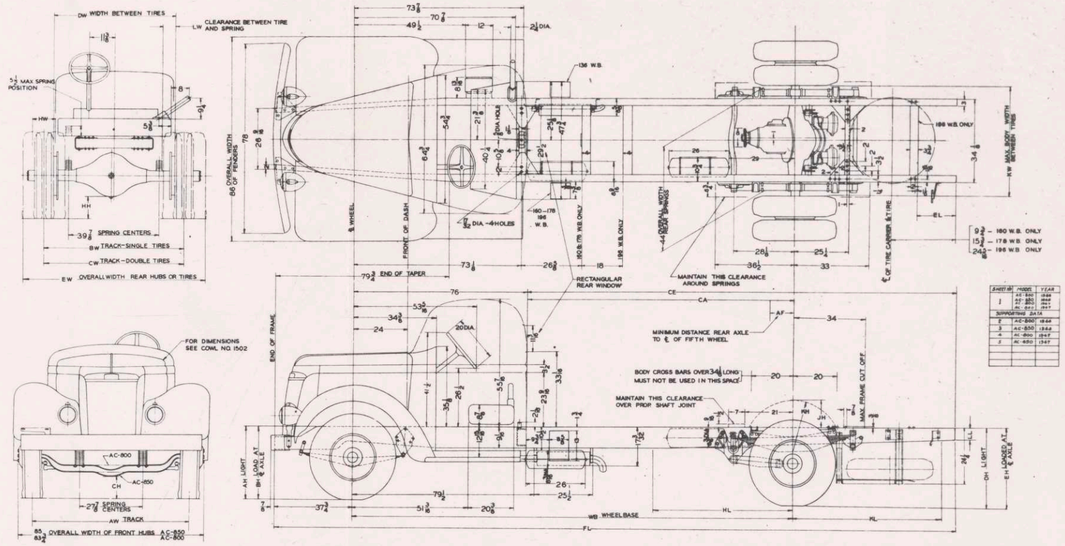
GMC TRUCKS



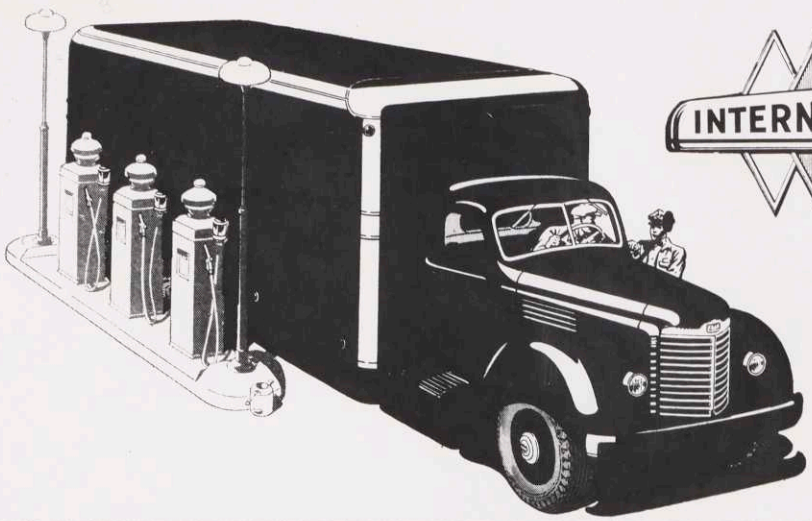
MODEL AC 850
GVW — 35,000



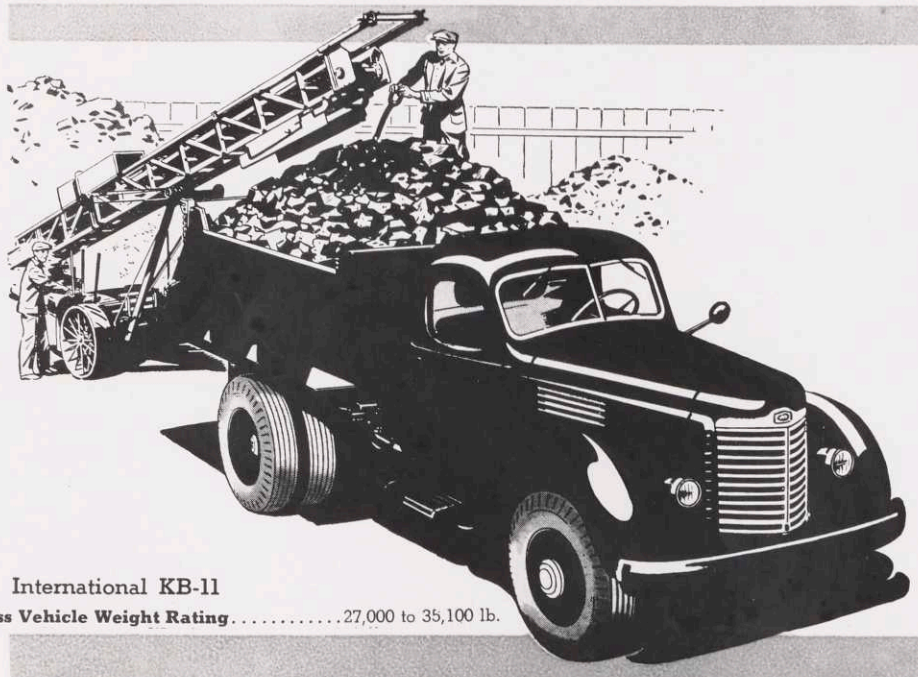
MODEL FC 470



MODEL AC 850



INTERNATIONAL



International KB-11

Gross Vehicle Weight Rating.....27,000 to 35,100 lb.

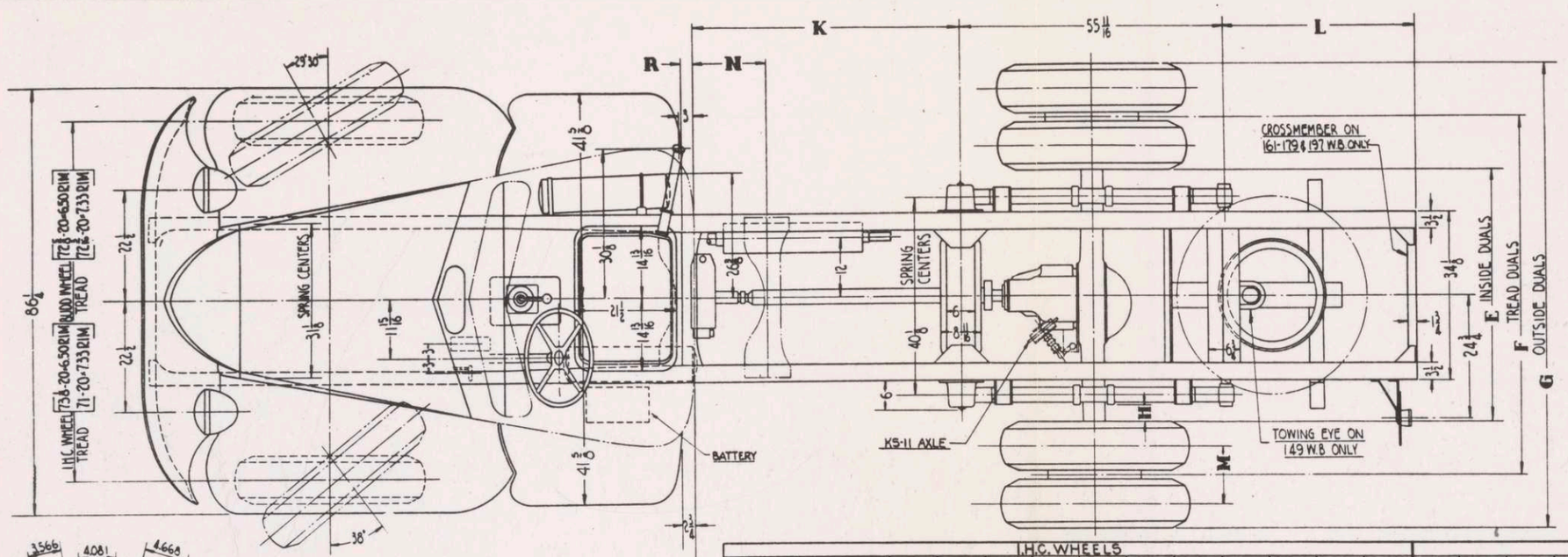
INTERNATIONAL TRUCKS

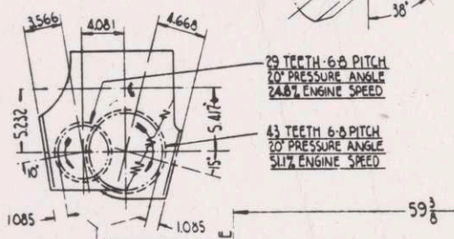
Model KR-11 ■

(KS-11 Two Speed Axle Equipped)

Subject to change without notice.

AM-17991—11-20-45





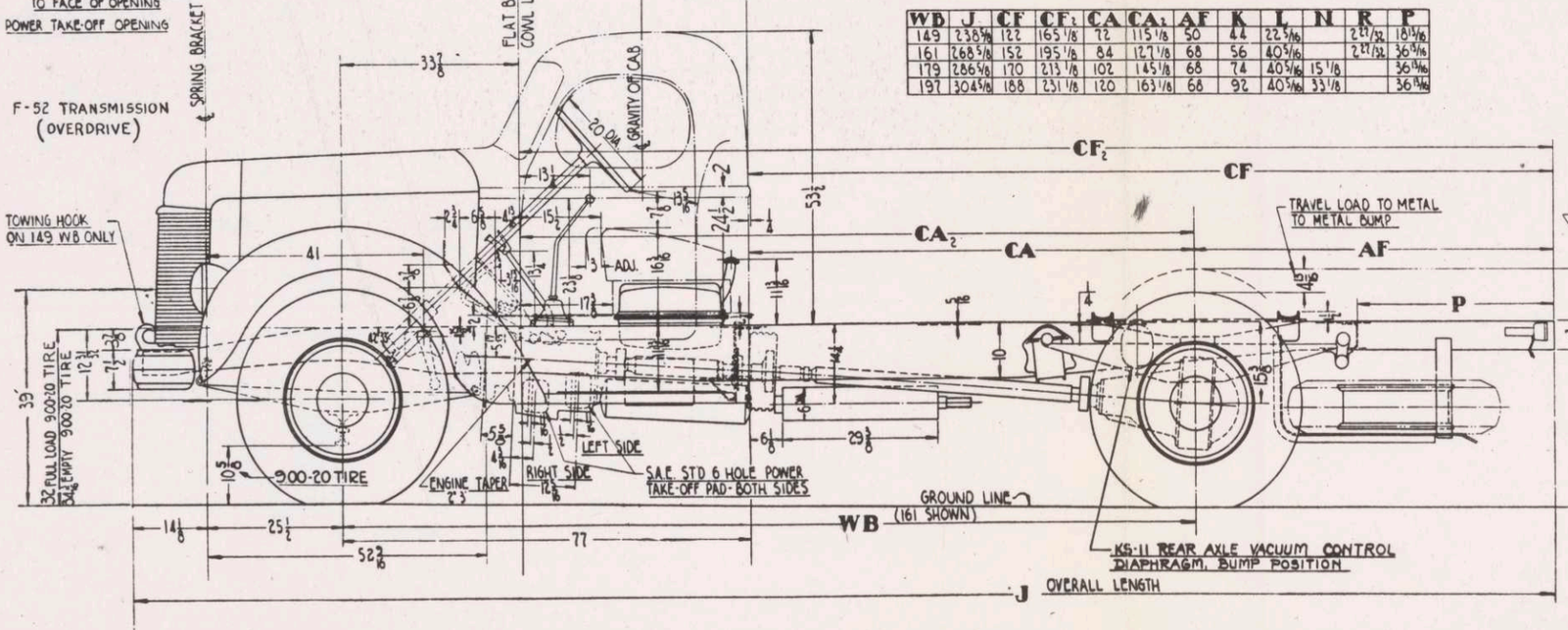
I.H.C. WHEELS

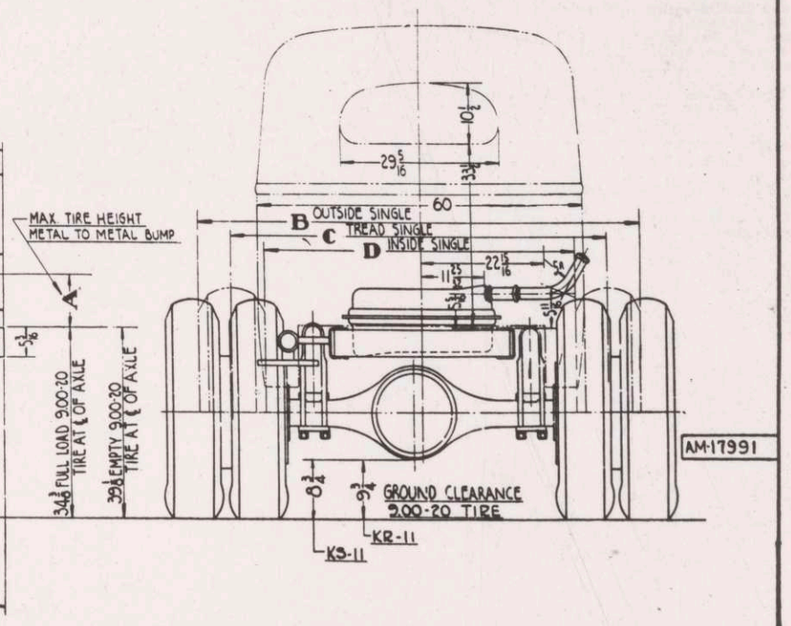
TIRE SIZE	9.00-20	10.00-20	11.00-20	12.00-20	13.00-20	14.00-20	9.00-22	10.00-22	11.00-22	9.00-24	10.00-24	11.00-24
RIM SIZE	20-6.50	20-7.33	20-7.33	20-7.33	20-11	20-11	22-6.50	22-7.33	22-7.33	24-6.50	24-7.33	24-7.33
A	9 1/2	10 1/8	10 7/8	11 1/2	12 3/8	13 3/8	10 1/2	11 1/8	11 7/8	11 1/2	12 1/8	12 7/8
B				82 15/16	91 3/4	92 11/16						
C				70 7/16	78 3/16	78 3/16						
D				58 7/16	64 9/16	63 3/16						
E	51 1/2	48 3/8	48 3/16				51 1/2	48 3/8	48 3/16	51 1/2	48 3/8	48 3/16
F	73 1/2	72	72				73 1/2	72	72	73 1/2	72	72
G	95 1/2	95 11/16	95 15/16				95 1/2	95 11/16	95 15/16	95 1/2	95 11/16	95 15/16
H	3 3/8	2 1/16	1 15/16				3 3/8	2 1/16	1 15/16	3 3/8	2 1/16	1 15/16
M	12	12 1/16	12 11/16				12	12 1/16	12 11/16	12	12 1/16	12 11/16

BUDD WHEELS

TIRE SIZE	9.00-20	10.00-20	11.00-20	9.00-22	10.00-22	11.00-22	9.00-24	10.00-24	11.00-24
RIM SIZE	20-6.50	20-7.33	20-7.33	22-6.50	22-7.33	22-7.33	24-6.50	24-7.33	24-7.33
A	9 1/2	10 1/8	10 7/8	10 1/2	11 1/8	11 7/8	11 1/2	12 1/8	12 7/8
E	49 7/8	48 1/2	48 5/16	49 7/8	48 1/2	48 5/16	49 7/8	48 1/2	48 5/16
F	72 3/16	72 3/16	72 3/16	72 3/16	72 3/16	72 3/16	72 3/16	72 3/16	72 3/16
G	94 1/2	95 7/8	96 1/16	94 1/2	95 7/8	96 1/16	94 1/2	95 7/8	96 1/16
H	2 13/16	2 1/8	2	2 13/16	2 1/8	2	2 13/16	2 1/8	2
M	12 5/16	12 3/4	12 3/4	12 5/16	12 3/4	12 3/4	12 5/16	12 3/4	12 3/4

WB	J	CF	CF₂	CA	CA₂	AF	K	L	N	R	P
149	238 3/8	122	165 1/8	72	115 1/8	50	44	22 5/16		2 27/32	18 13/16
161	268 3/8	152	195 1/8	84	127 1/8	68	56	40 5/16		2 27/32	36 13/16
179	286 1/8	170	213 1/8	102	145 1/8	68	74	40 5/16	15 1/8		36 13/16
197	304 1/8	188	231 1/8	120	163 1/8	68	92	40 5/16	33 1/8		36 13/16



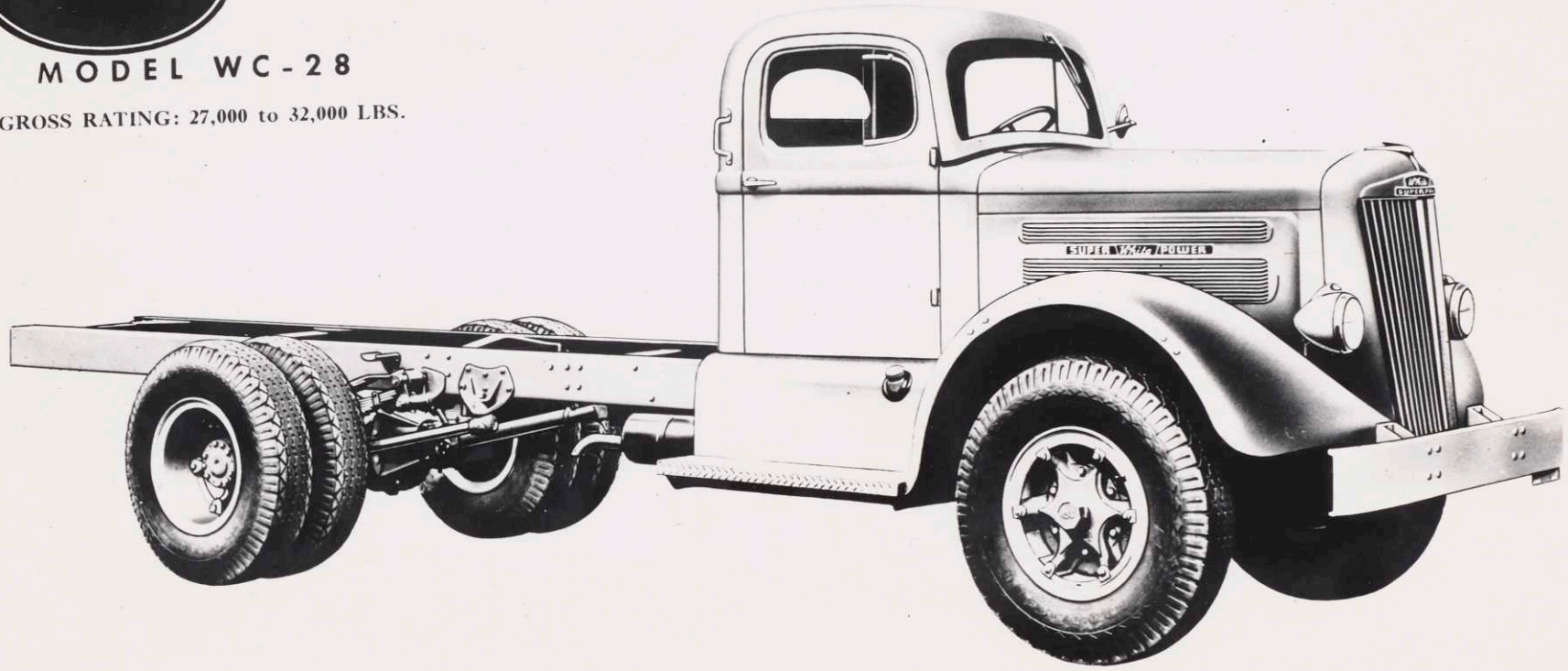


Form CT-249. 13,500—3-8-46.

White

MODEL WC-28

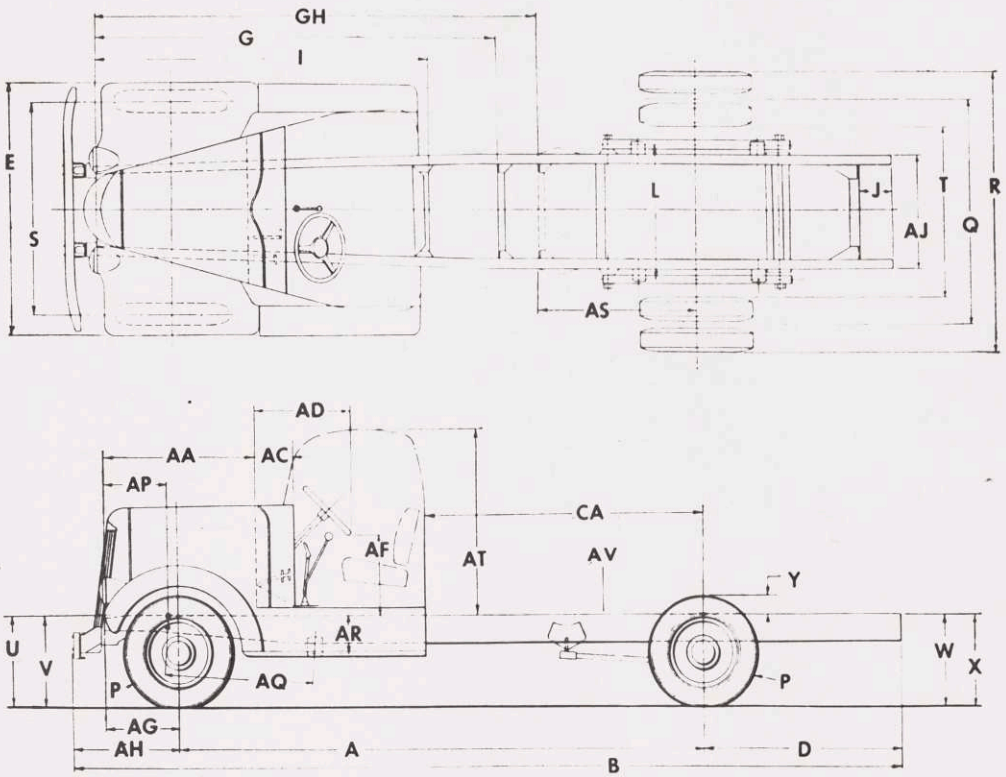
GROSS RATING: 27,000 to 32,000 LBS.



White

CHASSIS DIAGRAM AND DIMENSIONS

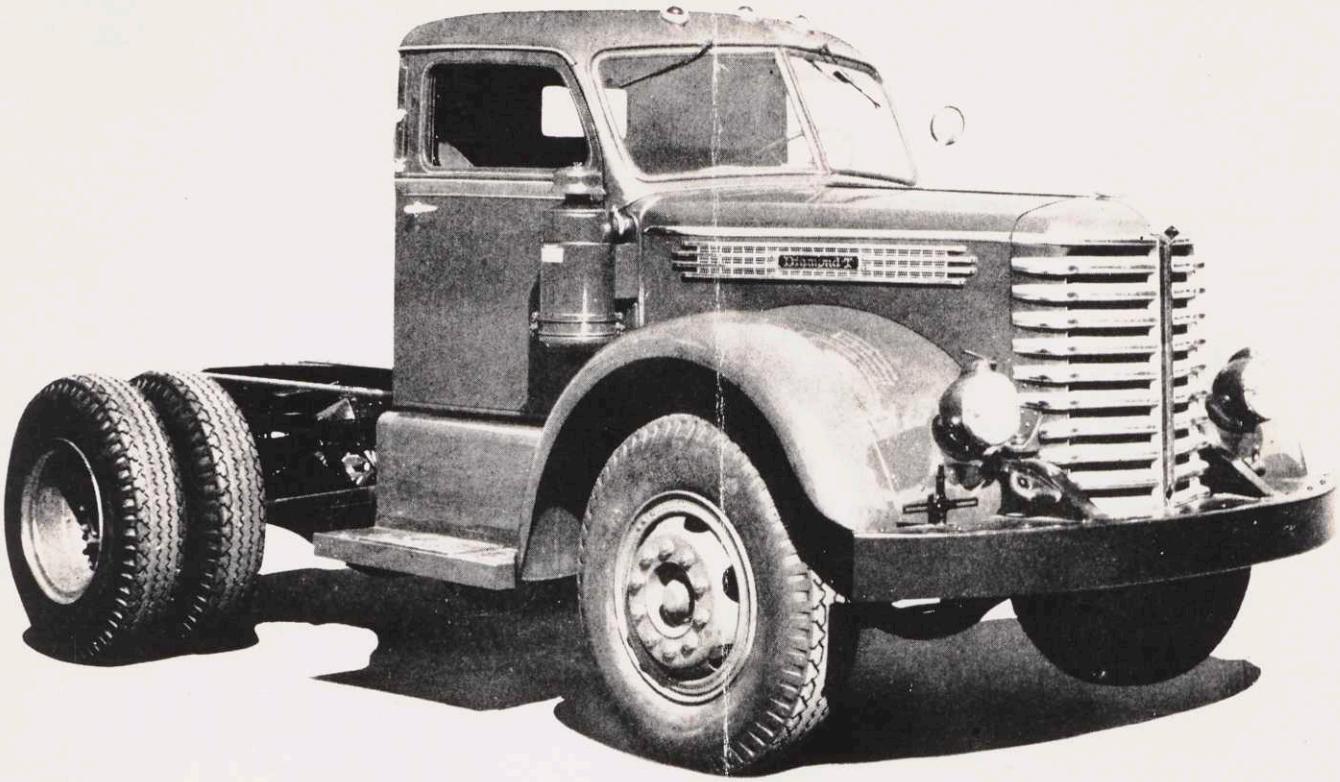
MODEL WC-28



A	B	CA	D	G	GH	I	J	P	S		Q		T		R		U	V	W	X	Y
				Front of Frame to					Tread								Frame Height				
Wheel-base	Over-all Length	Rear of Cab to C/L Rear Axle	Over-hang	Center Bearing Cross-Member	Center Bearing Cross-Member	Cab Cross-Member	Rear of Frame to Rear Cross-Member	Tire Size	Front		Rear		Width Inside Rear Tires		Width Over Rear Tires		At Centerline of Front Axle		At Centerline of Rear Axle		Clear-ance
									Cast	Disc	Cast	Disc	Cast	Disc	Cast	Disc	Light	Loaded	Light	Loaded	
134 Std.	211 25/16	60	37	None	None	104 7/8	10	9.00-20D	72 3/16	72 3/16	71 3/4	71 3/4	50 3/8	50 1/16	93	93 7/16	35 1/2	33 1/2	39 5/16	34 5/8	9 15/16
146	248 15/16	72	62	None	None	104 7/8	10	9.00-22D	72 3/16	72 3/16	71 3/4	71 3/4	50 3/8	50 1/16	93	93 7/16	36 1/2	34	40 1/2	35 7/16	8 7/8
158	272 13/16	84	74	None	None	104 7/8	10	10.00-20D	72	71 1/2	71 3/4	71 3/4	47 7/8	48 1/4	95 5/8	95 1/4	36 1/8	33 1/8	40 3/4	35 5/16	9 1/16
176	308 15/16	102	92	144	None	104 7/8	10	10.00-22D	72	71 1/2	71 3/4	71 3/4	47 7/8	48 1/4	95 5/8	95 1/4	37	34 7/8	41 3/4	36 1/4	10 1/16
194	344 15/16	120	110	144	None	104 7/8	10	10.00-24D	72	71 1/2	71 3/4	71 3/4	47 7/8	48 5/16	95 5/8	95 1/4	38	35 7/8	42 3/4	37 1/4	11 1/16
212	380 13/16	138	128	158	None	104 7/8	10	11.00-20D	72	71 1/2	71 1/2	71 3/4	47 3/8	47 21/32	95 5/8	95 7/8	36 13/16	34 5/8	41 5/16	36	9 5/8
224	380 13/16	150	116	164	None	104 7/8	10	11.00-22D	72	71 1/2	71 1/2	71 3/4	47 3/8	47 21/32	95 5/8	95 7/8	37 13/16	35 5/8	42 5/16	37	10 5/8
								11.00-24D	72	71 1/2	71 1/2	71 3/4	47 1/4	46 15/16	96	95 7/8	38 13/16	36 5/8	43 5/16	38	11 5/8

E	L	AA	AC	AD	AF	AG	AH	AJ	AP	AQ		AR		AS	AT	AV
										Power Take-Off Location						
Width Over Front Fenders	Center to Center Rear Springs	Front of Frame to Dash	Depth of Cowl	Dash to Rear of Steering Wheel	Top of Frame to Bottom of Steering Wheel	Front of Frame to C/L of Front Axle	Front of Bumper to C/L of Front Axle	Width of Frame at Rear	Front of Frame to Front of Crank-case	Front of Crankcase to C/L of P.T.O. Opening		Top of Frame to C/L of P.T.O. Opening		Radius Rod Front Bracket to C/L Rear Axle	Top of Cab to Top of Frame	Top of Frame to Top of Cross-Member
										Right	Left	Right	Left			
89 13/16	40 13/16	52 3/4	11 7/16	29 9/16	27 3/8	30 5/8	40 13/16	34	19 11/16	50 31/32	50 31/32	11 27/32	11 27/32	48 5/8	56 1/2	2 11/16

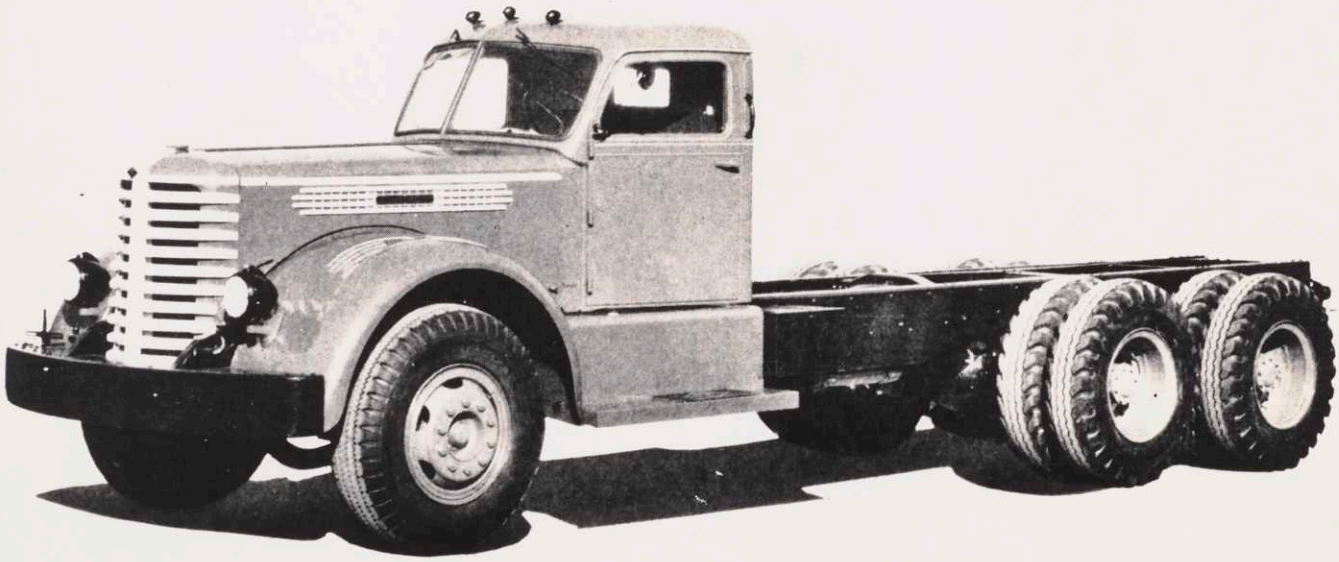
ALL DIMENSIONS GIVEN IN INCHES



DIAMOND T

MODEL 901

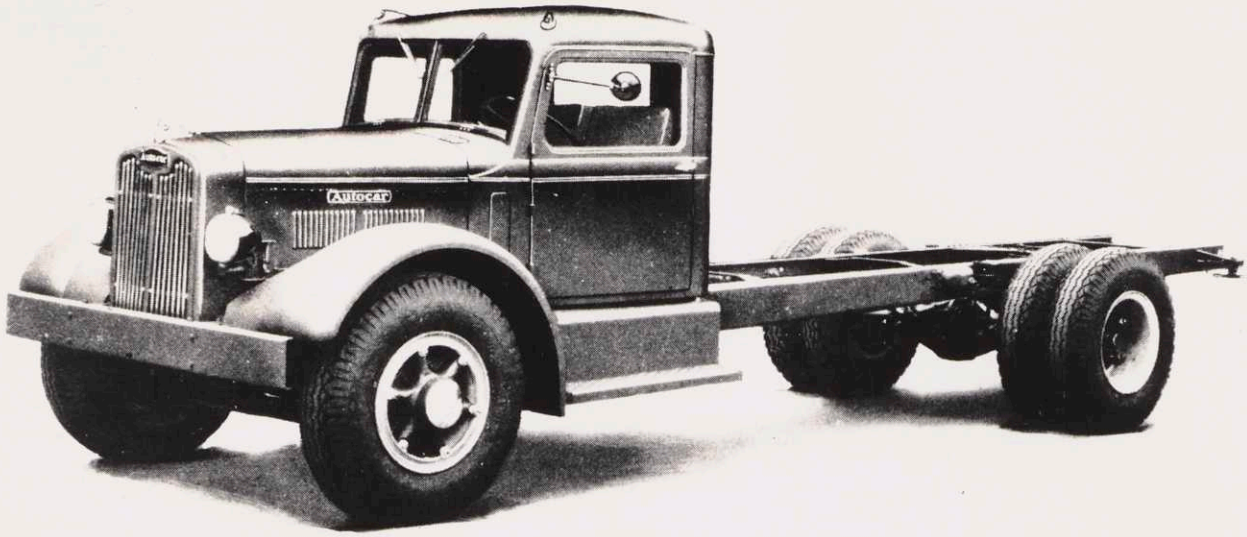
Maximum Gross Weight 28-30,000 lbs.



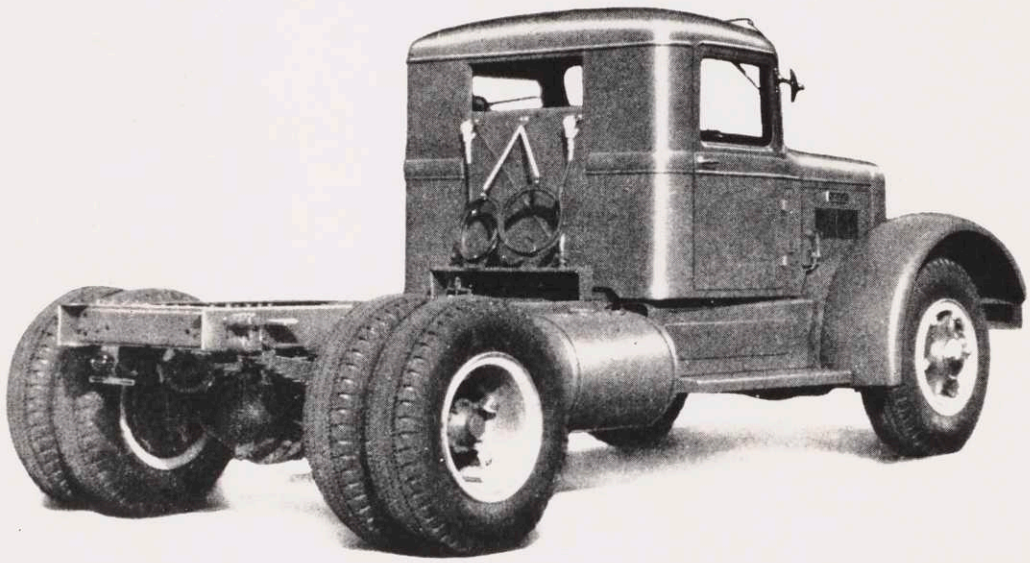
MODEL-702A-703-704

BATTERY UNDER STEP BOARD SHIELD-TRUCK ONLY.
BATTERY UNDER SEAT WITH TWO 43 GAL. FUEL TANKS-TRACTOR ONLY.
THIS CROSSMEMBER OMITTED ON 130 3/4 W.B.
43 GAL. FUEL TANK L.H. SIDE OF TRUCK ONLY. FOR TRACTOR SERVICE 43 GAL. FUEL TANK ALSO PROVIDED ON R.H. SIDE.
ON 142 3/4 W.B.
ON 154 3/4 W.B. & UP
SPOKE 7.5=70 7/8 7.0=71 7/8
BUDD 7.5=70 3/4 7.0=71 1/4
℄ WHEEL TRACK
℄ TO ℄ OF FRONT SPRINGS
℄ FRONT AXLE
℄ POWER TAKE OFF OPENING
REAR VIEW OF TRANSMISSION
BACK OF DASH
REAR WINDOW 8" HIGH 16" WIDE
HIGH-16 1/4 LOW-21 1/4
HIGH-25 3/4 LOW-20 1/2
270 V-VO TRANSMISSION
276 V-TRANSMISSION
FACE OF FLYWHEEL HOUSING
ROAD CLEARANCE 9 1/2 WITH 10:00-20 TIRE
STRIKING POSITION
MIN. FRAME LENGTH FROM ℄ REAR AXLE-32 7/8
℄ SPRING
OW
IW
TRACK
FHF AT AXLE LOADED
FHR AT AXLE LOADED
H1 LOADED
H2
TH
CA
F
W.B.
OA

DIAMOND T MOTOR CAR CO.

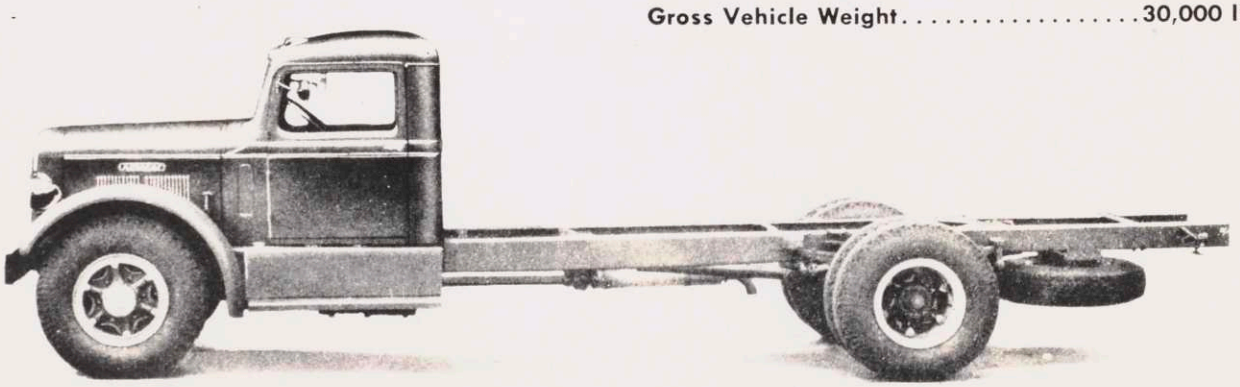


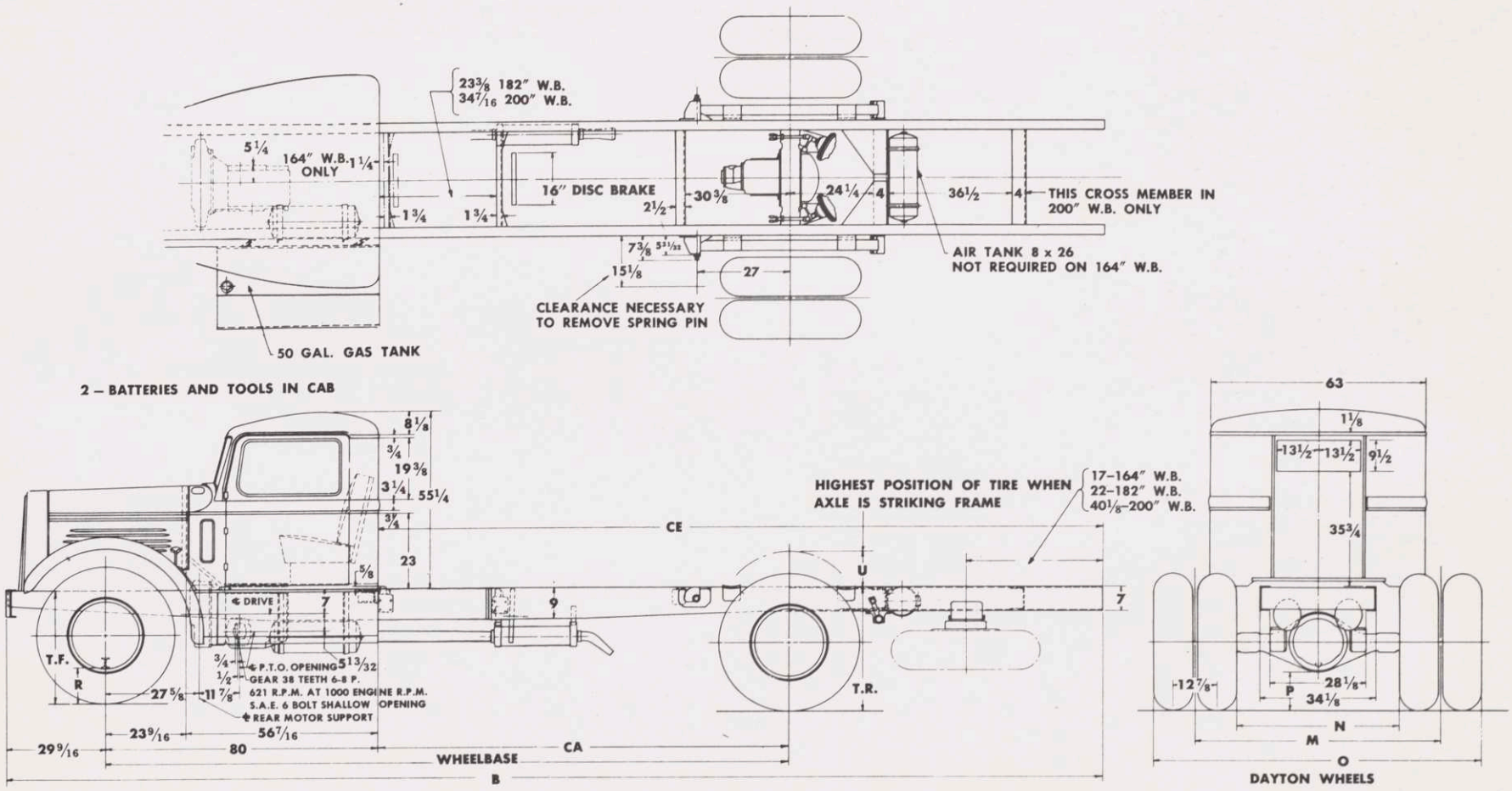
AUTOCAR TRUCKS



Model C-70

Gross Vehicle Weight . . . . . 30,000 lbs.



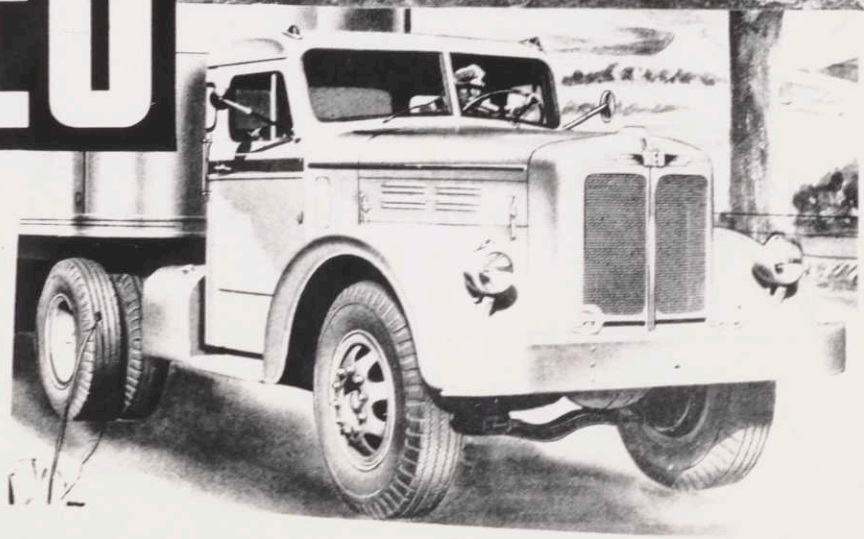


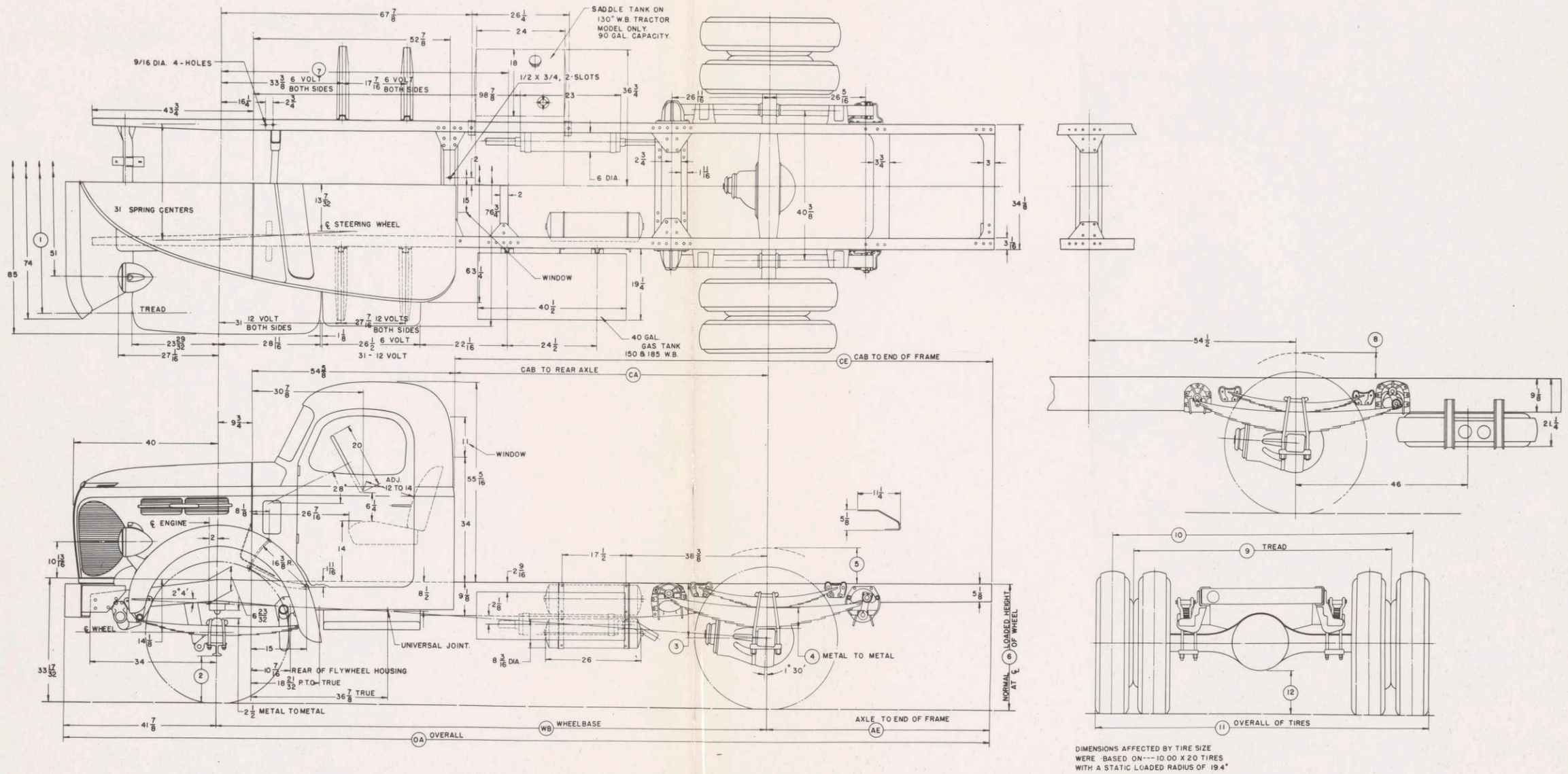
AUTOCAR : MODEL C-70

MODEL D-23R

MAX. GROSS RATINGS D-23R
TRUCK 23,000-26,000 lbs.

REO





DIMENSIONS AFFECTED BY TIRE SIZE WERE BASED ON---10.00 X 20 TIRES WITH A STATIC LOADED RADIUS OF 19.4"

BODY CLEARANCE DIAGRAM FOR REO MODELS C-23 & C-25

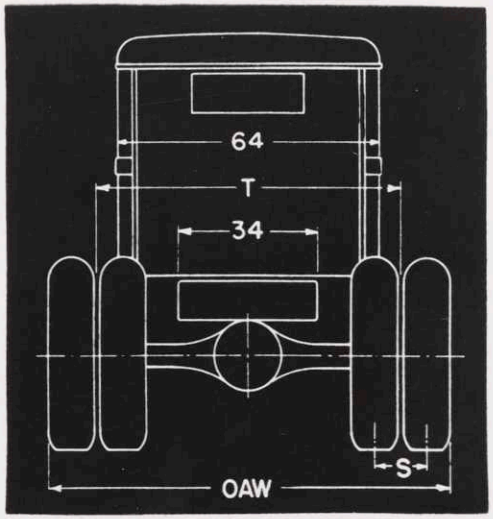
Sterling

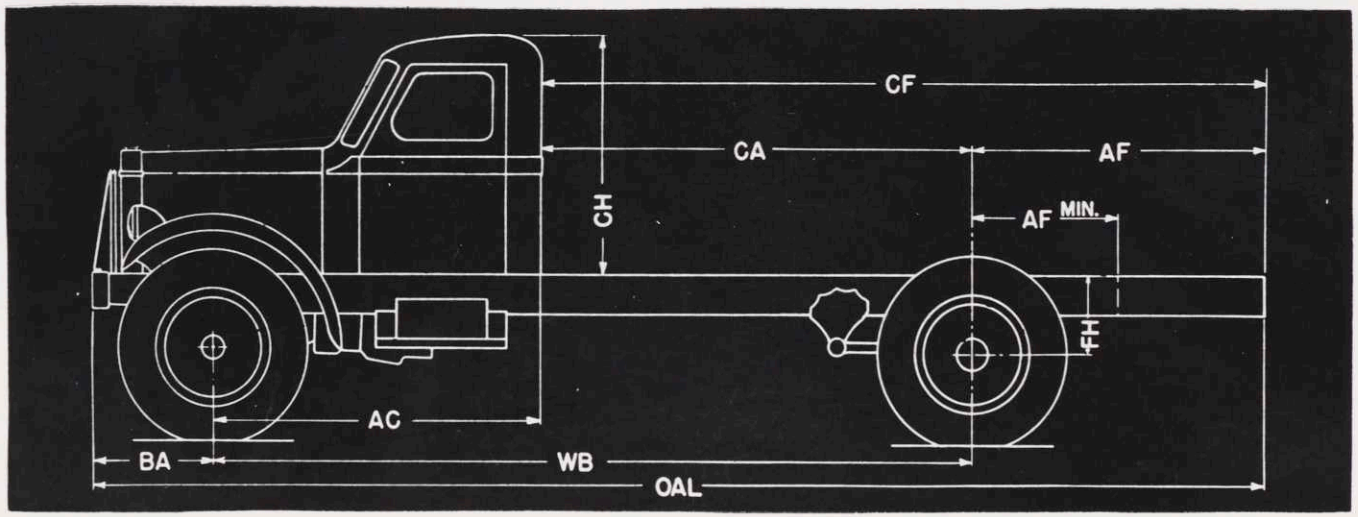
HA1401

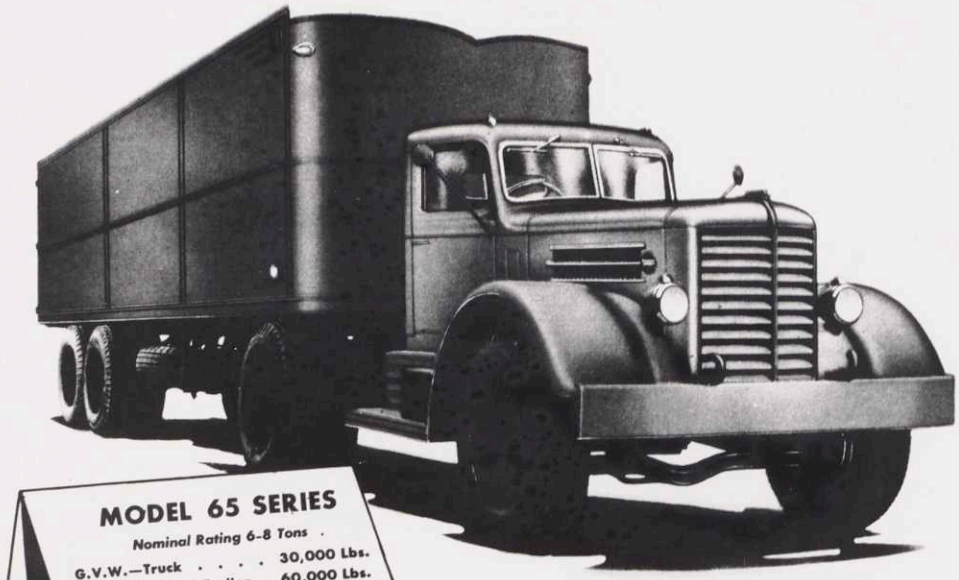
GROSS VEHICLE RATING ..... 28,000 Pounds

Sterling

MODEL HA1401







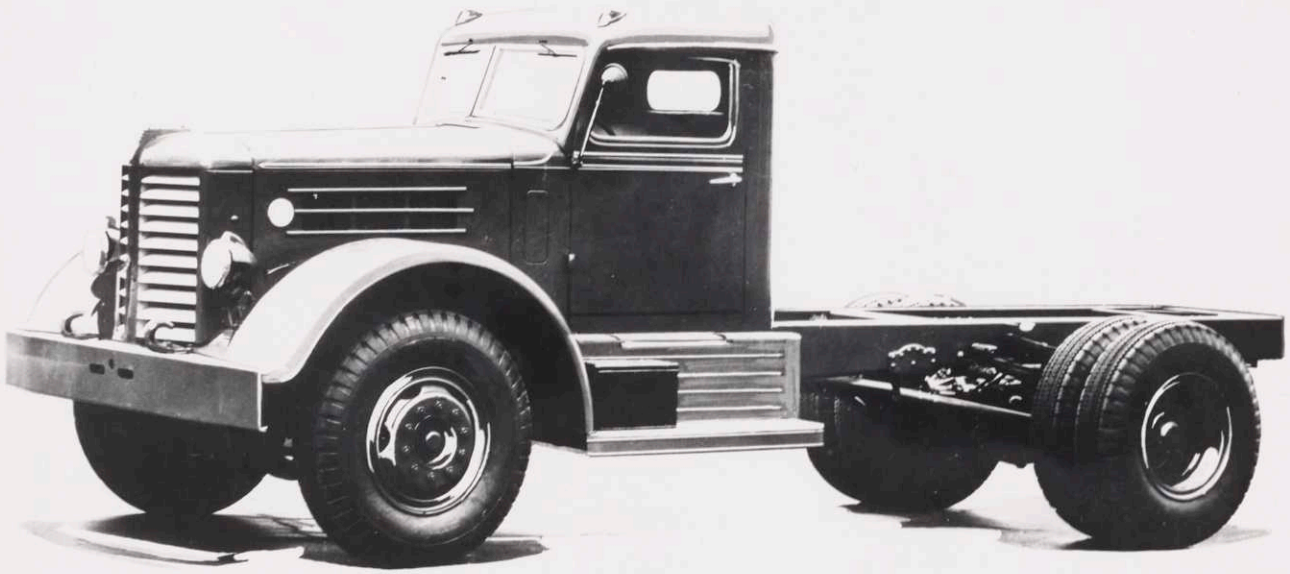
MODEL 65 SERIES

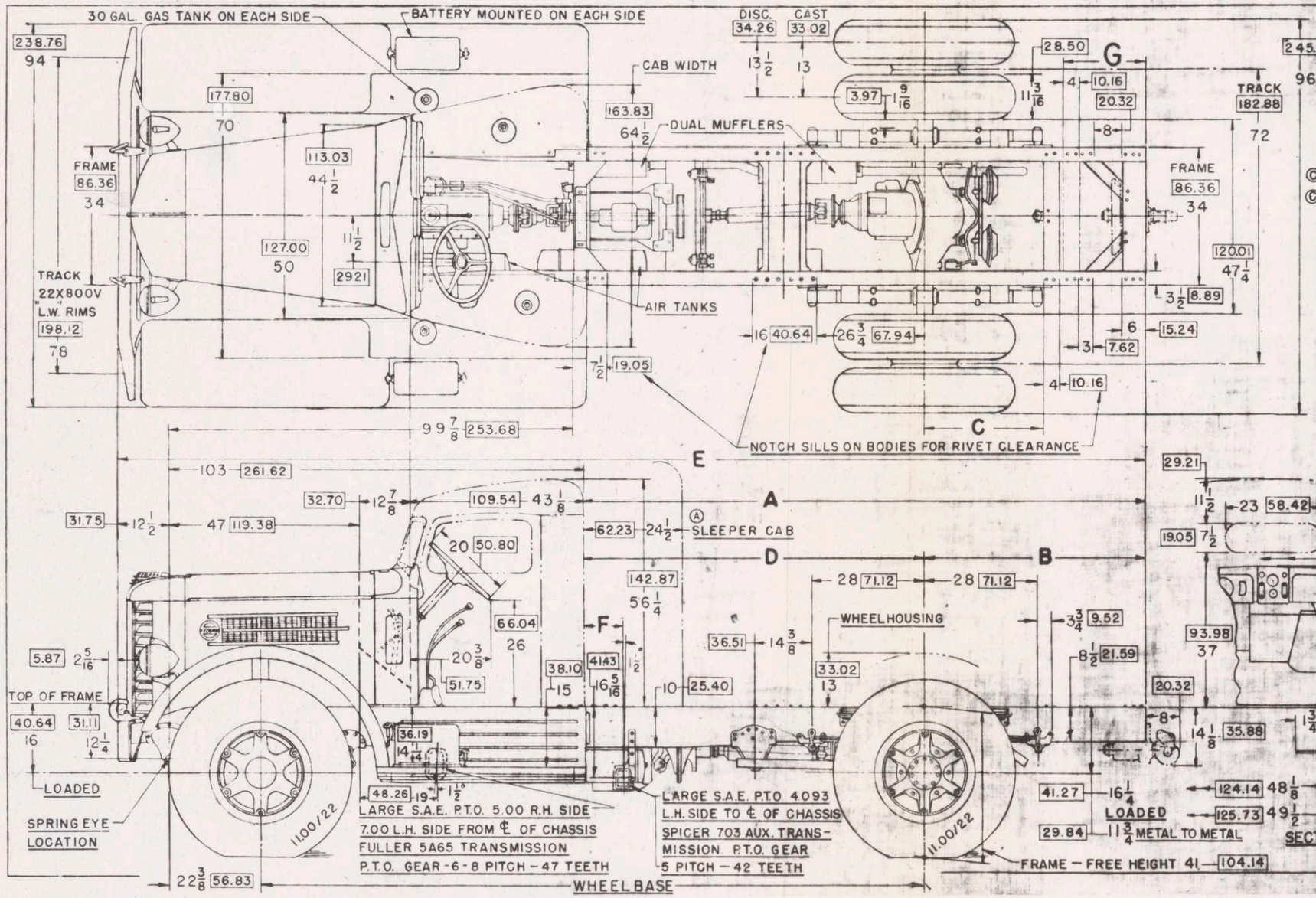
Nominal Rating 6-8 Tons

G.V.W.—Truck . . . . 30,000 Lbs.

G.C.W.—Tractor-Trailer . 60,000 Lbs.

FEDERAL TRUCKS





CHANGES	CHANGES	CHANGES
		A SLEEPER CAB NOTE
		– ADDED 1-21-47
		B WAS BUDD WHEELS. 5-9-47
		C LOADING SPACE EXTENDED
		– 1" ON TWO W. BASES. 5-9-47

6-8 TON CAPACITY

MODEL SYMBOL	WHEEL-BASE	A	B	C	D	E	F	G		
Ⓒ 65-153-106	153⅛	106½	34	—	72½	222	8¼	—		
Ⓒ 65-165-118	165⅛	118½	34	—	84½	234	8¼	—		
65-165-139	165⅛	139	54½	33⅛	84½	254½	8¼	—		
65-177-163	177⅛	163	66½	33⅛	96½	278½	32¼	—		
65-201-211	201⅛	211	90½	33⅛	120½	326½	32¼	37⅜		

METRIC DIMENSIONS

65-153-106	388.94	270.51	86.36	—	184.15	563.88	20.95	—		
65-165-118	419.42	300.99	86.36	—	214.63	594.86	20.95	—		
65-165-139	419.42	353.06	138.43	84.14	214.63	646.42	20.95	—		
65-177-163	449.90	414.02	168.91	84.14	245.11	707.39	81.91	—		
65-201-211	510.86	535.94	229.87	84.14	306.07	829.31	81.91	94.93		

REAR AXLE DATA:-
TIMKEN S-200-P-X-31
(Axles 65 M A)

NOTE:- ALL FIGURES SHOWN ENCLOSED ARE METRIC EQUIVALENTS OF INCH DIMENSIONS.

MAR 2- 1949

FEDERAL MOTOR TRUCK CO.
DETROIT, MICH.

BODY BUILDERS DIMENSION DRAWING

MODEL 65 QA

DR. V.A.S. & L.M. | DATE 7-15-46 | CH. G.H. | APP.

15D2480

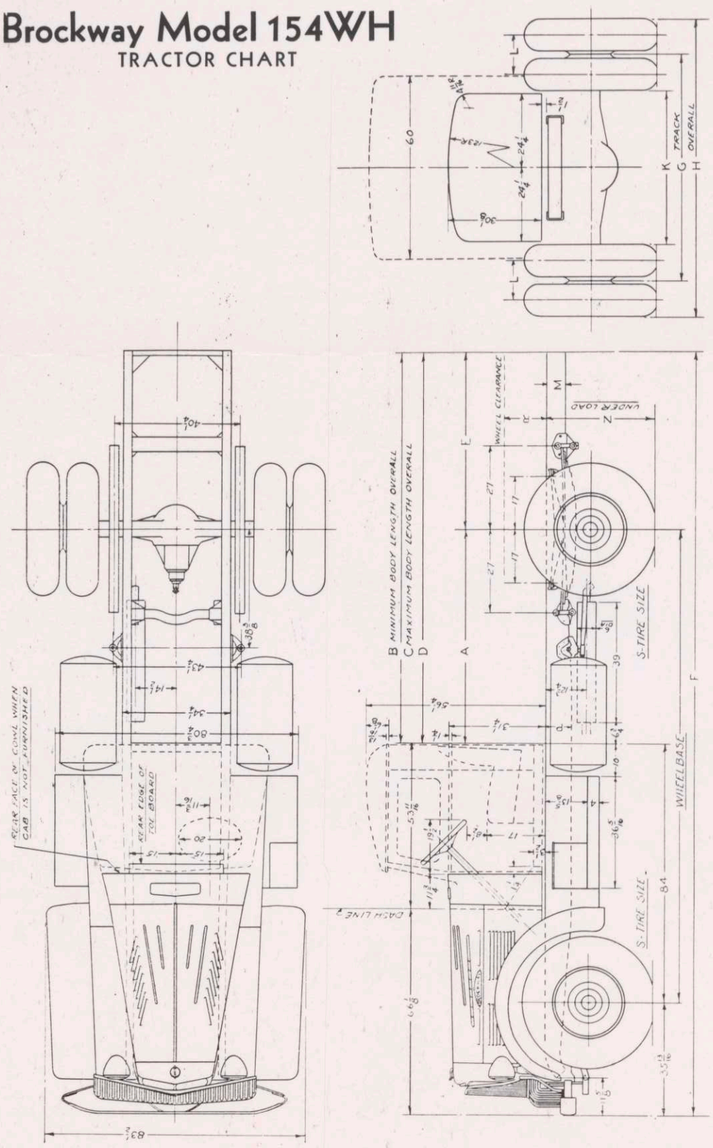
Model 260XW

BROCKWAY

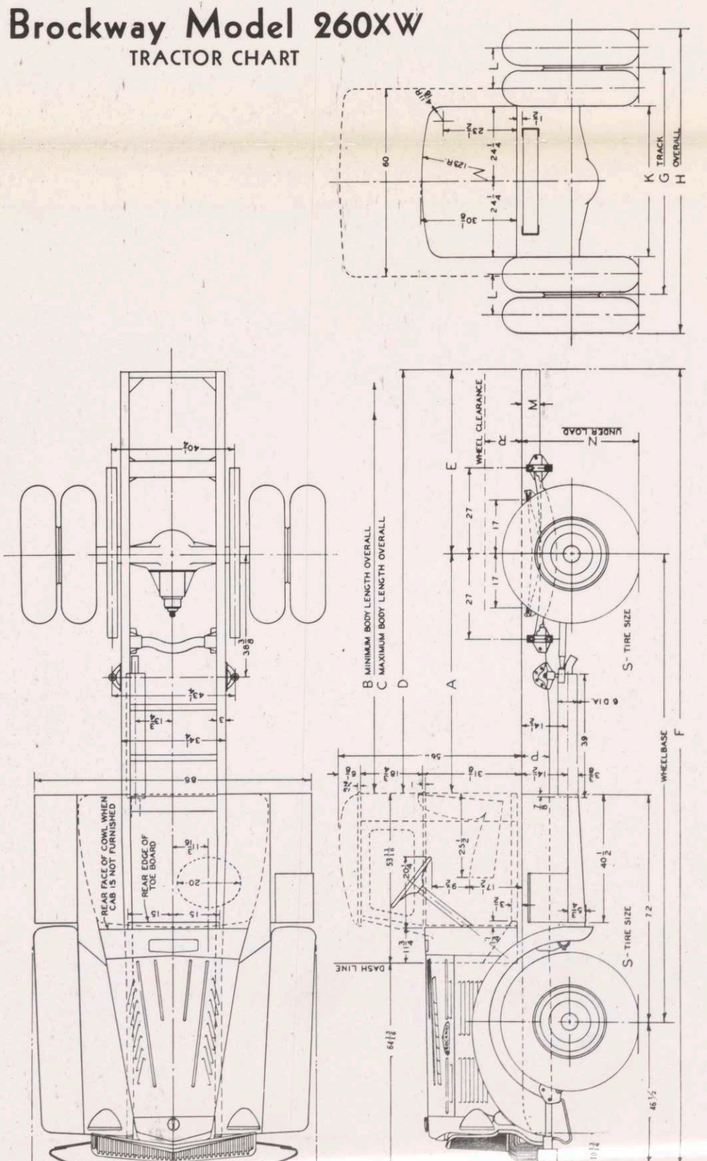
G. V. W.—As tractor-trailer—50,000 lbs.

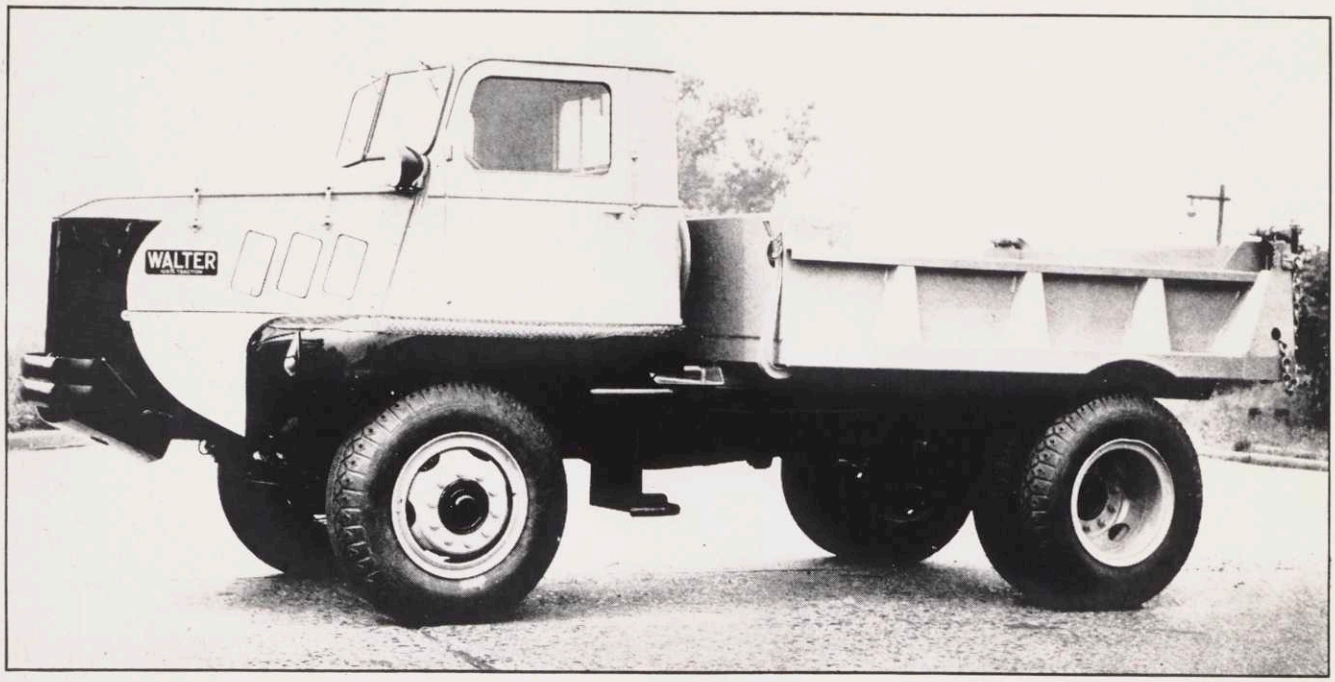
Model 154WH

Brockway Model 154WH
TRACTOR CHART



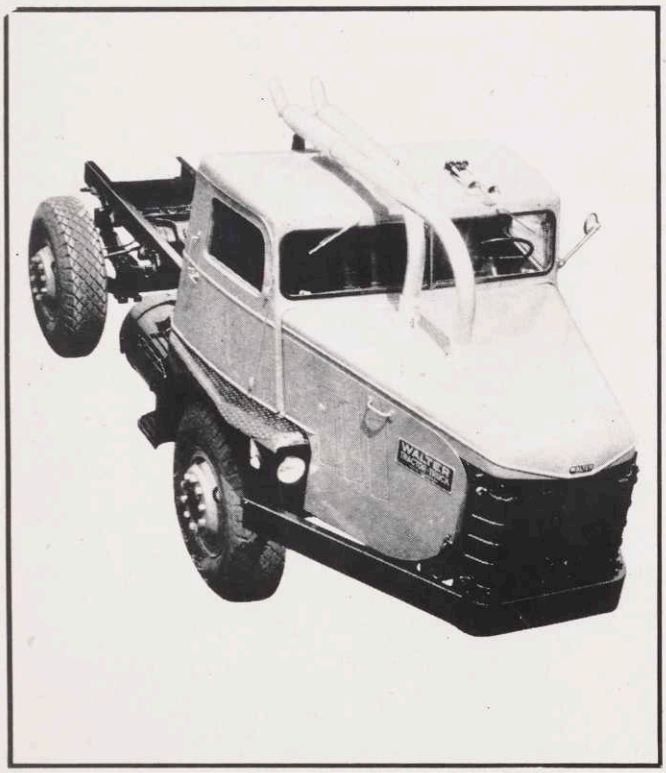
Brockway Model 260XW
TRACTOR CHART

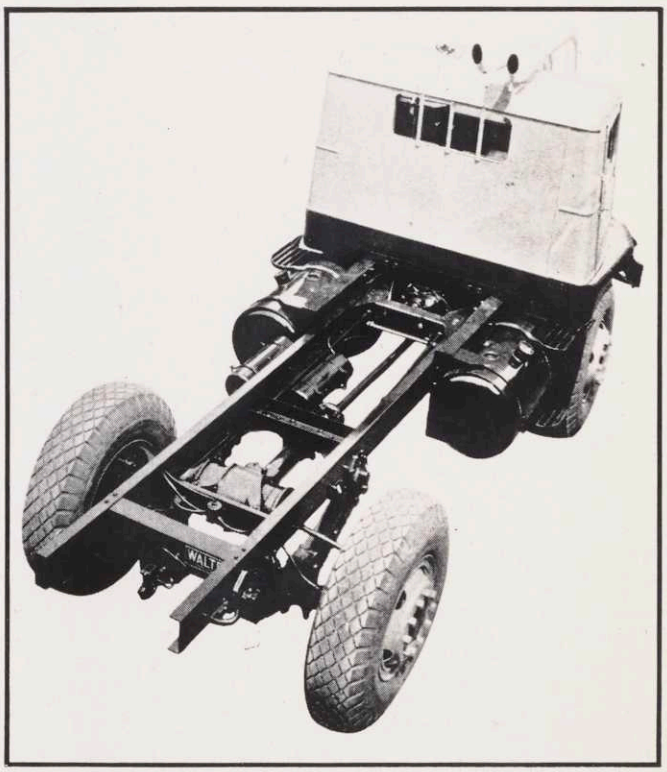




Models FZM — 125 H. P. — 24,000 Lbs. G.V.W.

WALTER MOTOR TRUCK





STYLING AT MACK

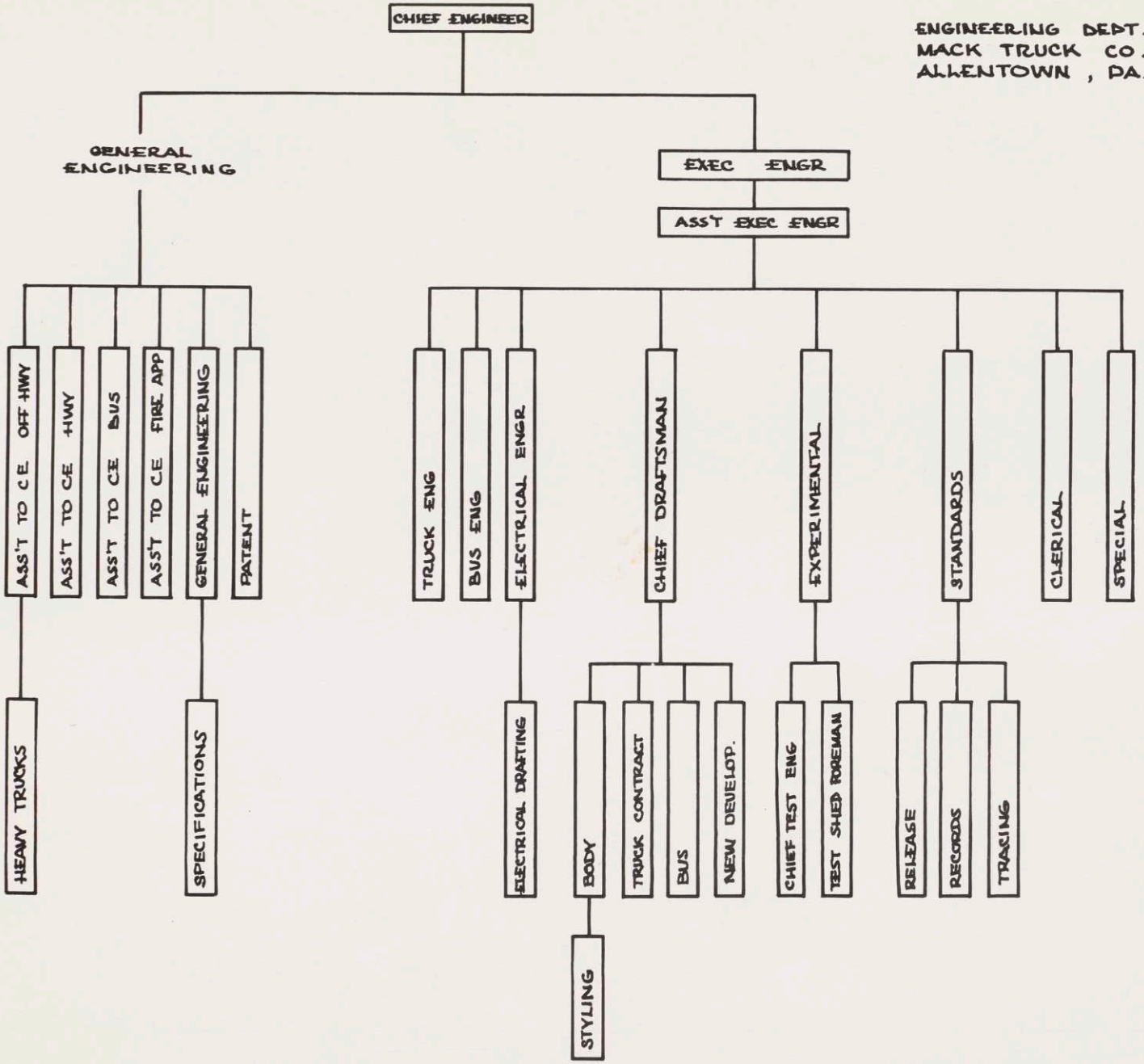
STYLING AT MACK

In the Mack Engineering Building at Allentown, Pennsylvania, the complete second floor is devoted to engineering. The engineering department is a huge, well lighted room filled with drawing tables, desks and offices. All styling is done on the third floor by one man, the Art Director of the Mack Body Engineering Department. His room contains several drawing tables, all necessary art supplies, and a personal file. The wall is lined with a series of colored renderings of obsolete Mack truck designs. Here the stylist is responsible for all the art and styling that goes into truck design. Adjacent to the stylist room is the model room where new designs are built in clay and full scale "mock ups" are built and assembled.

The Art Director is one member of the Body Engineering Department. The Body Engineering Department is directly responsible for new cab and front end sheet metal design and engineering. The stylist, then, works very closely with engineering. He conceives the original shape, handles all styling details and makes sure all compromises conform with correct design principles and good styling.

When an order comes to the Body Engineering Department for a new cab and front end sheet metal, the stylist is given the design requirements, exactly what is wanted and

ENGINEERING DEPT.
MACK TRUCK CO.
ALLENTOWN, PA.



what limitations are imposed. He begins sketches to determine the general shape and styling of the new design. When he arrives at a design, that seems reasonable, he renders it in color. If it is passed by the Chief Body Engineer, it is presented to the high ranking engineers for discussion. If the design is approved, 3/8 scale models are built and displayed to the Board of Directors. If this design is agreed upon, full scale "mock ups" are made and corrected over and over until the final form is reached and all the engineering details have been ironed out by the engineering department. The design is, then, ready for the die makers. In the meantime, also, the stylist must be considering the interior styling and color schemes, the dash board design and the details such as the horn button, hub caps, name script etc. His ideas are rendered and presented for approval.

It can not be over emphasized in truck design that engineering is the important element. Basically a truck must be a functional, rugged, dependable vehicle. The responsibility of the stylist is to make sure the vehicle has a pleasing appearance under the various design and cost limitations of a purely functional, relatively low production unit.

Styling, then, in the truck industry holds none of the importance of styling in the automobile industry. But the appearance of a truck is being recognized as an increasingly

important factor in truck sales. Actually art in the truck industry is relatively new. For years, until the middle thirties in some cases, what little styling had to be done was done by engineers. This accounts for the angular, powerfuly, rugged, engineered look which is clearly evident in the historical study of the Mack truck. It is interesting to note how more and more styling gradually came into the picture. Now the truck industry is realizing the real value of good styling and styling is gaining more and more importance.

DESIGN REQUIREMENTS OF TRUCK CAB AND FRONT-END SHEET-METAL DESIGN

DESIGN REQUIREMENTS OF TRUCK CAB AND FRONT-END SHEET-METAL DESIGN

The development of the truck as we know it today has been brought about by a very, very, slow process. The historical study presented in this thesis shows clearly the growth of truck design up to the present. Take, for example, the cab. Only a few years before the war, the cab of a motor truck was often treated somewhat as an afterthought. It was one of those necessary things that generally had to be provided by the truck manufacturer as an item of equipment. About all that was expected of a cab was that it provided a semblance of protection for the driver against the elements. No particular consideration was given the driver as long as he could somehow get himself inside.

It wasn't felt that the driver needed a cab with a permanent top or windshield. The truck driver was considered to be a "guy who could take it". When doors were installed, they were only solid half doors.

The operator's driving posture was often very uncomfortable. The first trucks had hard seats with flimsy cushions containing few or no springs. The "lazy back" supported only a few inches of the driver's back and bounced up and down on his kidneys with every jolt.

The interior of the completely enclosed cabs were

generally very hot and stuffy in summer and quite cold with plenty of drafts in winter, plus an abundance of fumes from the engine during all seasons. In addition, the life of the cab was short and of course, appearance meant little or nothing.

However, with the great advancements of passenger car body design, in recent years, the truck driver began to demand a more comfortable cab which would more closely approach the driving conditions of his own passenger car. In addition, with competition among freight carriers becoming keener, the advertising value of good appearance in commercial vehicles began to be realized.

A comfortable driver is a safe driver. When a man is too hot, too cold, or is "cramped up" in a cab, he is not physically able to drive safely. Also, it is only natural that a driver will take better care of a truck that is comfortable to drive and handsome to look at.

Today, then, we find ourselves confronted with a particularly strong demand for more driver comfort, lower maintenance costs and smarter appearance.

The approach to truck cab and sheet metal design requirements must be considered from at least four basic viewpoints, all of which often differ rather widely from one another; the owner, the maintenance mechanic, the driver and the truck manufacturer.

The owner or operator is naturally interested in earning

the greatest possible return for his investment. As a result, he expects his vehicles to haul the greatest possible load in the shortest conceivable time through twenty-four hours. With strict legal limits imposed on lengths and widths, it is the tendency to shorten the cab as much as possible to allow for a greater pay load. Since even greater power seems to be desired in order to move the pay load at a faster rate, the trend toward larger engines tend to steal more length from the cab. The owner often insists that the cab sell for about half as much as it does and should last twice as long with no repairs.

The maintenance mechanic insists that accessibility is about the only thing of real importance in the design of the cab and front-end sheet metal. His viewpoint is of great importance and must be considered as such. The designer will possibly never be able to completely satisfy his demands because of manufacturing cost limitations. However, it must be recognized that every single item that is involved in the design of a cab and front-end sheet metal must be examined carefully from the point of view of maintenance.

The driver's opinions and ideas are of very great importance to the designer; in fact, during the past few years the driver has often influenced the operator considerably in determining the make and type of equipment purchased. A well satisfied driver is the best salesman in the world for any truck manufacturer.

The cab of a truck is the driver's office and his working conditions should more closely approach that of a modern office. The average man spends less than one hour in his passenger car every day, whereas, the truck driver spends eight hours a day in his cab. That is, more time than he spends awake in his own home. On an average, he spends less than one hour a day in his favorite arm chair. Therefore, something must be done to improve the driver's working conditions. In many cases greater vehicle cost is justified by doing a good job of satisfying the driver.

Naturally, the designer must, at all times, be concerned with the viewpoint of the truck manufacturer. The manufacturer is generally desirous of completely satisfying the owner, the maintenance mechanic and the driver providing the production cost is low enough to permit a competitive selling price with a reasonable profit for him and his dealers. In design "cost" will be repeated again and again.

There are additional important factors that must be taken into serious consideration by the designer, when he attempts to determine the requirements of a new cab and front-end design.

The wide variety of legal limitations imposed upon commercial vehicles operating over the public highways, governing their size, type and weight distribution has made it impossible to design one given vehicle that can be operated with any degree of efficiency on the highways of all forty-eight states. Cab

and front-end design is affected by this unfortunate situation.

A number of conditions are imposed on the designer by the truck manufacturer over which the body engineering department has little or no control. Often, these conditions have quite an effect on determining the requirements of a new truck design.

Company policy determines whether low price is to be the basic goal to shoot for, or high quality at a definitely higher price. Perhaps, some sort of a compromise between these two conditions is desired. Whether the styling of a vehicle shall follow the passenger car trend or perhaps, be something very new and original; or possibly carry out a traditional motif, or is to be based purely on the function of the vehicle, generally, becomes a company policy decision heavily influenced by the sales department.

Production estimates to be used as a basis for design must be obtained from the manufacturing and sales departments; also, any outstanding features that are considered especially desirable by the sales department must be included, when setting up the requirements for a new truck design.

The question of export business can not be overlooked. The packing and shipping of knocked-down vehicles must be considered. Right hand drive vehicles for export definitely affect cab design (for example, the design of the dash board) and must generally be thought of as a requirement, the import-

ance of which may be determined by the estimated export sales figures supplied by the sales department.

The manufacturing policy of the company must be borne in mind.. Will the cab be fabricated and assembled in one plant or will parts of it be fabricated in several different plants and be assembled in one plant?

The major problem of actually determining the requirements for a new cab and front end project must be solved by the Body Engineering department, after careful consideration of all these factors.

Many technical papers have been written on future truck design requirements. Extensive research has been and is being done by the U.S.Army on the dimensions of the average human being and data concerning human fatigue under various conditions.

Several educational institutions and truck manufacturers have conducted extensive polls on the opinions of drivers relative to cab requirements. The following, then, is a summary of data available at present determining the requirements for new cab and front-end design.

1. Strong Sturdy Cab Design

Whatever the selling price of the cab may be, the highest quality obtainable for that investment is essential. The cab structural problem must be recognized as being distinctly different than that of the passenger car body. Since the chassis ~~front~~ of a truck is usually designed with the express

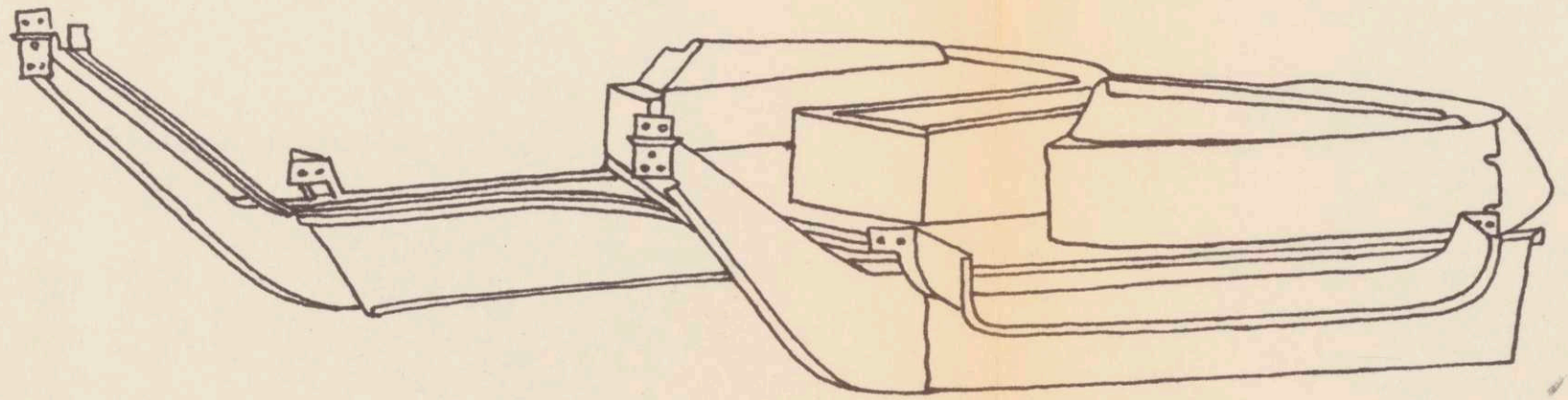
purpose of allowing the frame to twist under extreme wracking conditions, the cab is subjected to considerable more stress than a passenger car body which is mounted on a stiff X member frame. A cab should be designed for 500,000 miles of service without major repair as compared with the probable 100,000 miles of vehicle service required of a passenger car body.

Full structural advantage should be taken of deep-drawn light gage shapes thus keeping the cab weights and material costs down to a minimum without sacrificing strength. Every stamping should be carefully analyzed from the tooling standpoint in order to avoid blanking and restrike operations wherever possible. The number of parts in the cab should be reduced to a minimum in keeping with sound structural design and production limitations. The sequence of assembly and subassembly operations should be planned with extreme care to keep them simple and make them entirely fool-proof so that there is less possibility of incorrect alignment. Full advantage should be taken of all possible interchangeability of parts within the cab. One cab should be used on as many vehicles as possible.

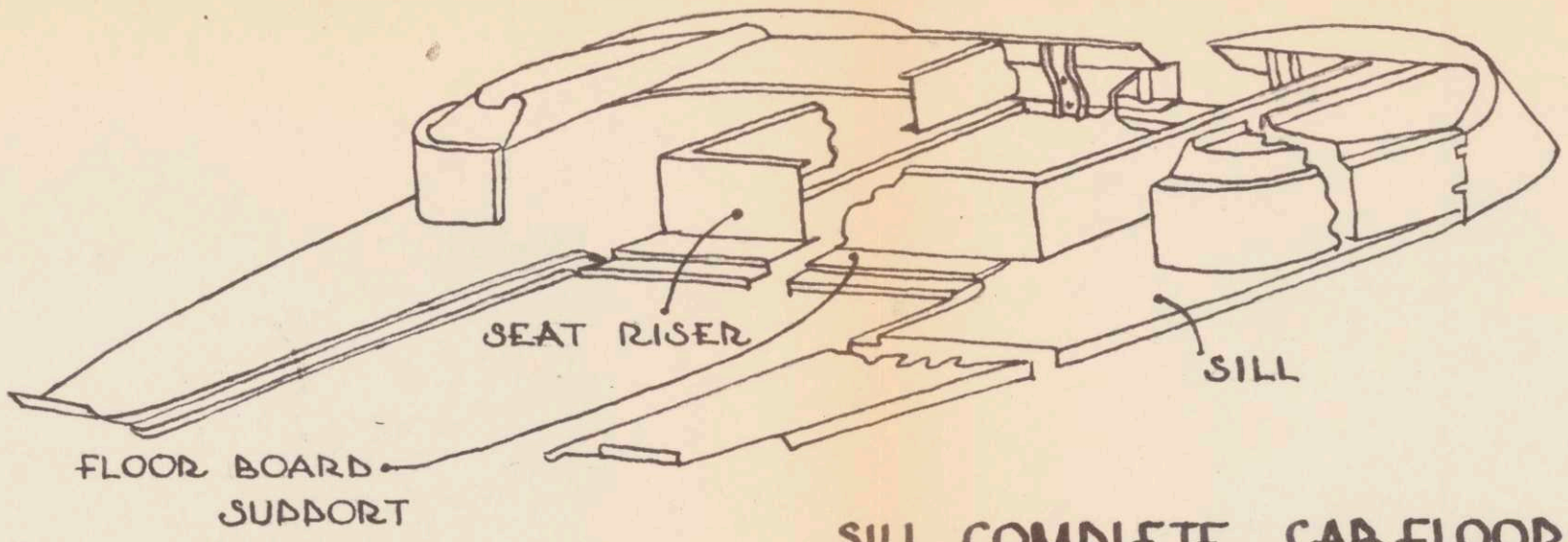
2. Cab Hardware

The cab hardware such as door glass regulators, door handles, door locks and windshield regulators should be more desirable for truck service.

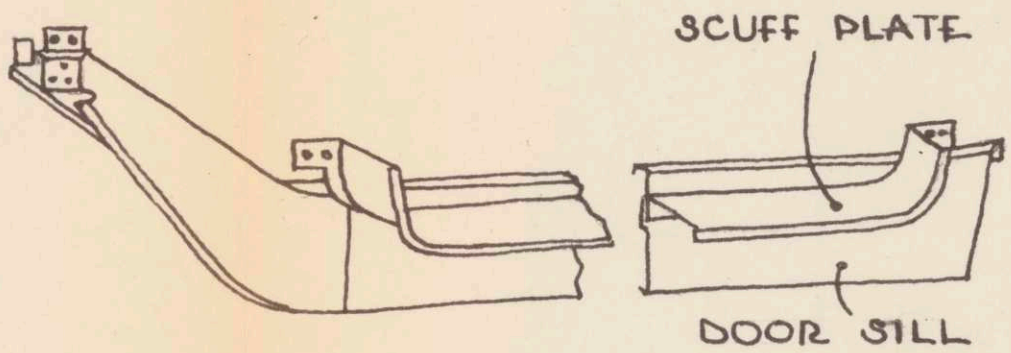
3. Driver Comfort



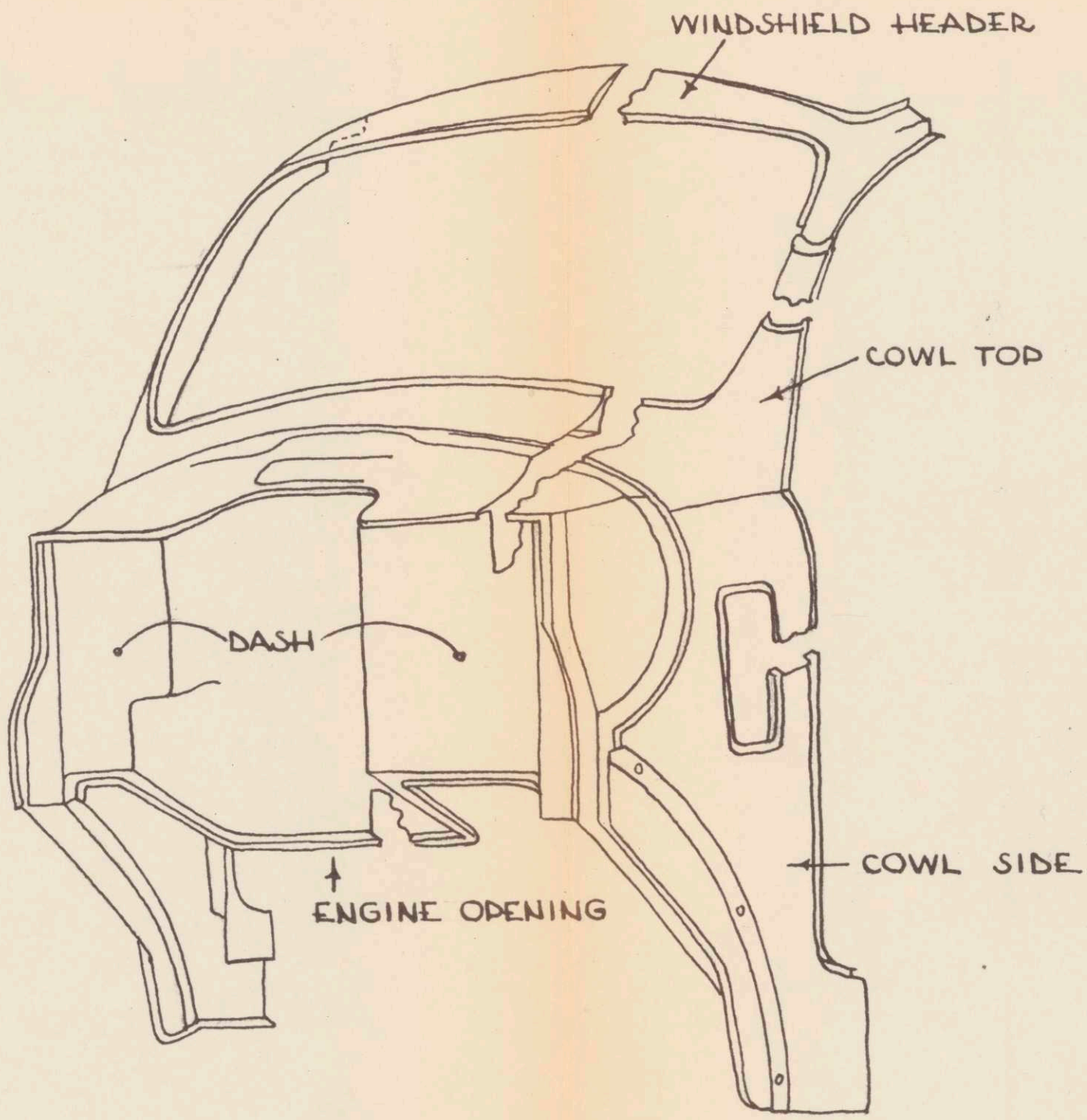
SILL COMPLETE, CAB



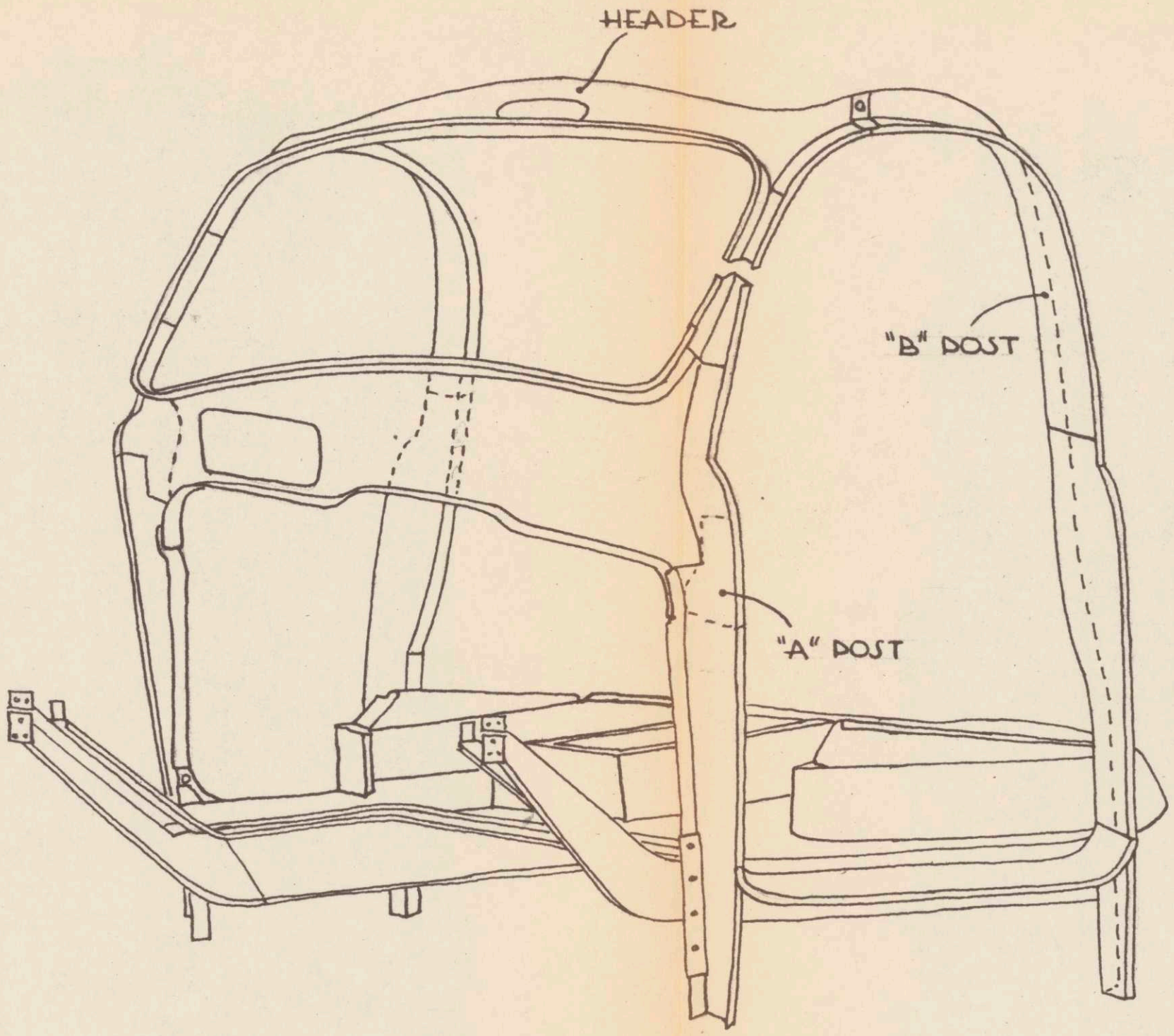
SILL COMPLETE, CAB FLOOR



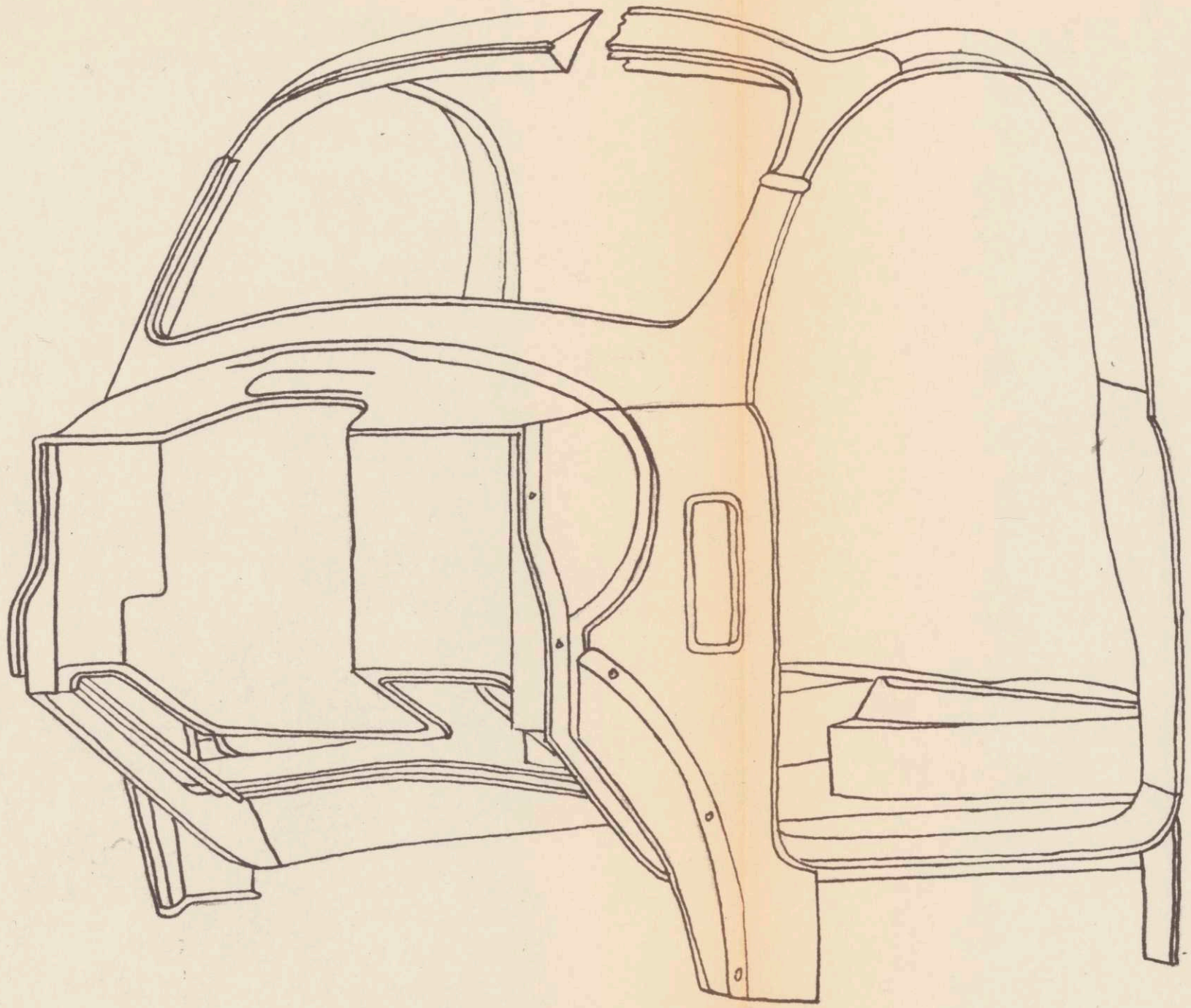
SILL COMPLETE, CAB SIDE



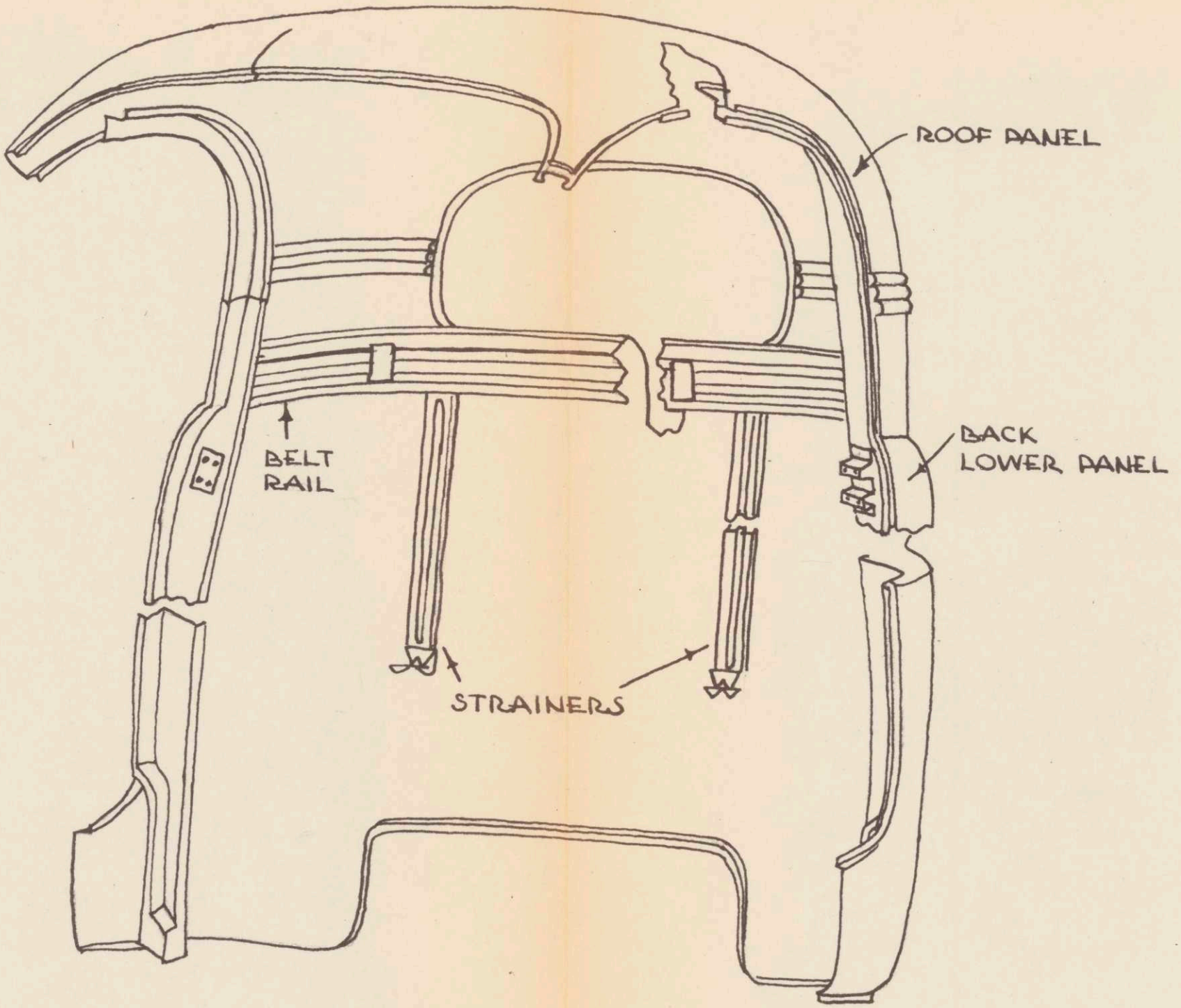
CAB SKIN ASSEMBLY



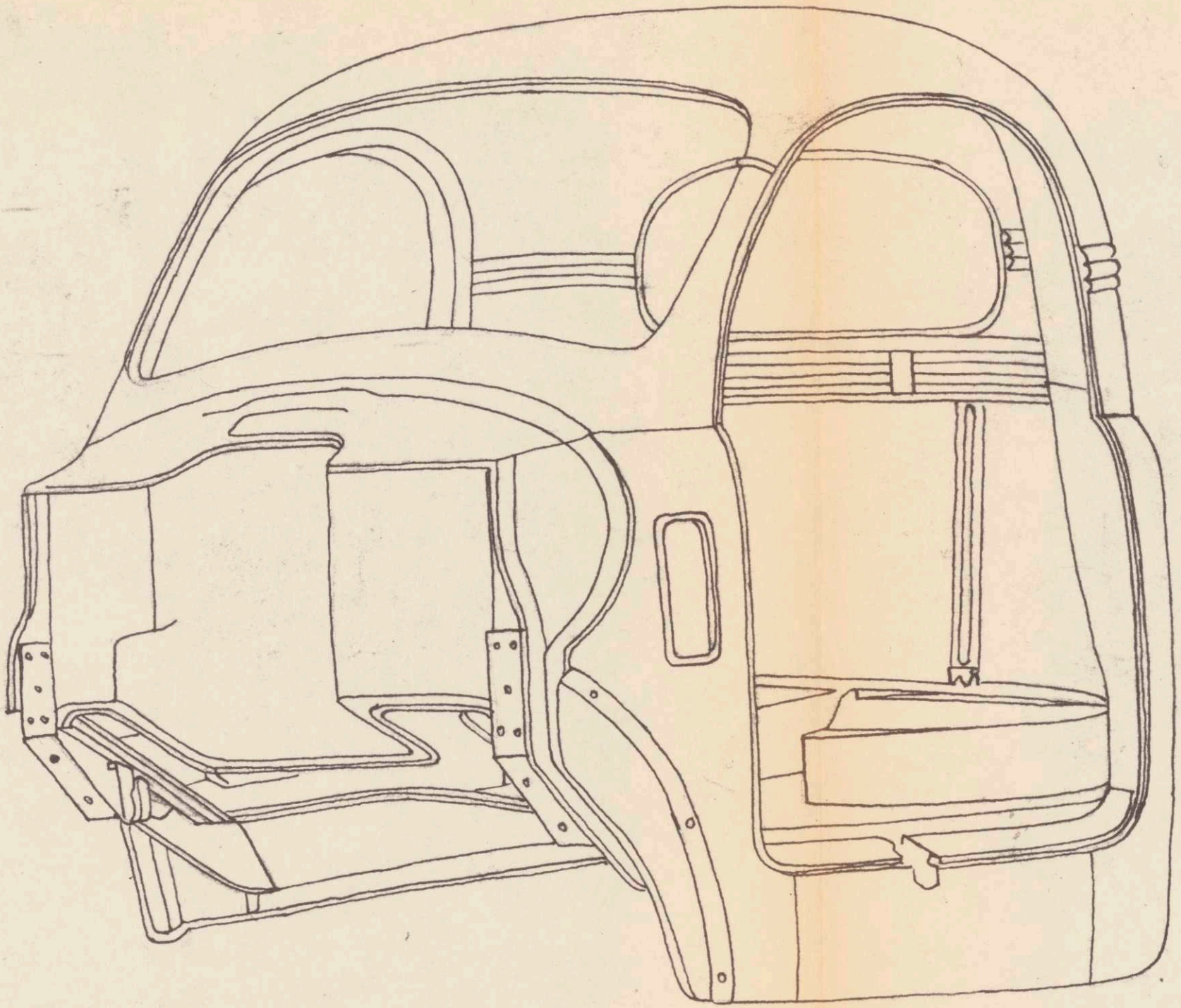
CAB FRAME ASSEMBLY



CAB FRAME AND
COWL ASSEMBLY



PANEL COMPLETE
CAB BACK



CAB (IN WHITE)
COMPLETE

Improved driver comfort is a necessity and of all design requirements is one of the most important. The relation of the driver to the steering wheel and column, the tow board, the floor board, the pedals, the hand brake lever, the gear shift lever, the door glass regulators handle, the arm rest and the bottom of the door window opening must be analyzed by mock-ups and actual test driving plus the summary of information already gathered and published in order to arrive at a really desirable combination. We must not jack-knife the driver into the cab as has often been done in the past, even if space must be sacrificed elsewhere.

The seat itself must be given a great deal of consideration. There seem to be two theories on this subject. Some believe seat cushions should be mounted in such a way as to provide an entirely independent motion in relation to the movement of the cab. Others are of the opinion that the seat cushions should be mounted so that they will move with the cab and the cab should be mounted with considerable flexibility on the chassis frame. They believe the place to improve the driver's ride is in the design of the chassis suspension and then mount the cab in such a way as to complement the riding qualities of the chassis. Ride sickness must be avoided.

The shape, position, depth and material used in the seat cushions is best determined by actual driving test. Perhaps, foam type rubber cushions without springs may eventually be

the answer; however, at present cost of such a system is prohibitive.

Proper adjustment of the seat is an important item. Due to the length of time the truck driver spends behind the wheel compared with the time the average passenger car driver spends in his car, it is obvious that it is even more important that each individual truck driver should be provided with a seat position that will best suit him. Not only must seat adjustments be provided that will satisfy the various preferances of the driver, but also the various size drivers must be taken into account. The driver should be able to conveniently change the adjustment of the seat, while the vehicle is in motion, since it often restful to change posture during a long haul.

Ample head and shoulder room as well as plenty of leg room is essential for proper driving comfort.

Effective cab ventilation is highly desirable. For winter driving, thermostatically controlled heated fresh air forced into the cab would be a forward step. Effective ventilation in summer with windows closed tightly during wet weather is almost as important. Eventually, for summer driving, it will probably be necessary to refrigerate the air brought into the cab.

The insulation and sealing of the cab should be effective. The driver should be well protected against engine heat and fumes as well as direct heat from the sun. It is important

to prevent drafts and dust from entering the cab, when the windows are closed.

When the driver sits in the cab, he should enjoy the feeling of warmth and comfort that he enjoys in his own sedan. The "cold" atmosphere that has been so common in truck cabs should be avoided. It is realized that we cannot resort to the attractive cloth trims used in passenger car body interiors, but a careful choice of interior finish. together with the selection of a warm but comfortable color combination will help considerably.

4. Vision

Better driving vision is a necessity. The cab and front end should be styled as to provide the greatest possible downward vision. The position and width of the front pillar must be carefully studied in order to reduce the blind spot to the minmum. A throughly effective system for defrosting not only, the windshield but also the door window should be provided. In cold weather the pressurization of the cab with warm fresh air would perhaps solve the problem. Dependable, well placed windshield wipers are vital. The visibility through the door windows should be well planned. Some cab door windows have been either too small or have been so placed that they have seemed like port holes. The position of the rear window in relation to the driver is important. It need not be excessively large as long as its location is correct. Whenever possible the cab door should be hinged forward so that the

driver can open the door and lean outside for backing operations. In this connection the Mack Truck Company has found it highly desirable to off-set the cab on the chassis for better backing vision in the case of special purpose vehicles such as off-highway trucks that are frequently used in strip mining operations. However, under present trends in truck styling the appearance of a highway type vehicle with an off-set cab would be very queer and strange. Such a possibility leads too new concepts and shapes in future truck styling.

5. Instruments

Improved instrument visibility without glare is very desirable. The position of the instruments in relation to the driver's eye should be so planned that all possible obstructions are eliminated and the instrument dials should be as close to perpendicular to the line of vision as possible. The dials should be distinct and easy to read. Perhaps, light signals may be found more effective than needle dials in some cases. The reflection of instrument panel lighting on the windshield glass during night driving should be avoided.

6. Ingress and Egress

Convenient ingress and egress is sometimes difficult to obtain especially when large vehicles are involved. Every effort should be made to improve this situation even though we may have to discard some of our conventional ideas. In this connection, the engine and chassis designer could help considerably.

7. Truck Noise

There is no doubt in some cases accidents are due to faulty brakes, bad tires, or failure of the steering mechanism. However, in a great many cases, drivers are accused of falling asleep. A big cause of fatigue can be found in truck noise. There are three basic sources of noises heard in the truck cab, viz: the power plant, the transmission system and the road and wind noises. In addition to noises radiating directly from the engine, there are air-borne noises from the cooling fan, exhaust muffler, and carburetor intake duct. The vibration of the engine is transmitted through the engine mounts and to a lesser extent through the drive shaft, each of which in turn excite the frame and cab panels, so that they, through diaphragmatic action, set up sound waves in the driver's compartment.

Irregularities in the surface of the road transmitted through the wheels and spring suspensions cause recurrent stresses to be set up in the frame which are then conducted to the cab panels. These panels are easily excited into vibration, tend to resonate and act as diaphragms thus creating noises in the cab. This drumming can be reduced to a minimum by designing enough shape into the panels of the cab.

In addition, air-borne sounds are radiated directly from the engine and get through to the inside of the cab by transmission through dash and floor or by leaks through small openings.

Elimination of bolted fastenings wherever possible thus approaching a solid welded cab will tend to reduce rattles, squeeks etc. If the doors and windows are not properly designed, high frequency whistles and hisses become very prominent at high speeds.

Cab noise levels can be reduced to less than half over the complete noise spectrum by the use of better sound barriers between the offending noise and the interior of the cab, reduction of panel vibration by means of deadeners and dampers and also absorbent materials, isolation of the cab by means of vibration control mounting and absorption of noises within cab by special surface treatment. The development of a more scientific type of cab mounting should also result in a more comfortable ride for the driver and longer life for the cab.

8. Serviceability

When we stop to consider that the maintenance cost during the life of a commercial vehicle is often many times the original cost, we realize that everything possible must be done to facilitate the servicing of that vehicle.

Instruments are usually very difficult to reach for servicing, but with careful study this condition can easily be improved. The battery should be so located that water can be added conveniently and the removal of the battery must be a simple operation. The clutch, transmission and steering gear should be accessible without requiring a major disassembly operation on the cab. Provision should be made for

the convenient and effective lubrication of the door hinges Door glass, windshield and rear window replacement must be an easy operation that can be performed quickly. The removal of the door glass regulator for repair or replacement must be as simple as an operation as can be conceived. An accessible location for an I.C.C.kit must be provided for vehicles operating over the highways. A worthwhile tool compartment should be provided in order to avoid the necessity of cluttering the cab floor with such items as chains, jacks and tire tools. The sheet metal and cab should be designed so that oil and water can be positively checked with a minimum of effort, otherwise they will be neglected. The design should be planned and the hood opening wide so that engine adjustments and minor repairs can be accomplished with little or no disassembly of sheet metal. However, when it is necessary to remove sheet metal for major servicing operations, it should be accomplished as simply as possible.

10. Styling

Styling of a commercial vehicle will assume increasing importance in the future and since this thesis deals primarily with heavy duty truck styling a whole section will be devoted to the requirement of styling and will present a new philosophy of heavy duty truck styling.

It would seem, then, that the requirements of truck cab and front end design are many and must be considered from a number of viewpoints. The design of a new cab and front-

end sheet metal is largely a matter of sound engineering and styling coupled with wise compromise.

HEAVY DUTY TRUCK STYLING

HEAVY DUTY TRUCK STYLING

The styling of trucks until recent years (what styling was done) was done to a large extent on the basis of sharp lines and definite mass relationships yielding a very square, angular design. Since the war, a new trend has appeared in light duty truck styling. This trend is clearly evident in the latest Ford, Dodge and especially in the Chevrolet and Studebaker trucks. Post war light duty truck styling closely parallels post war automobile styling in which an increasing importance is placed on form rather than line with an increase in simplicity and massiveness. This trend features sweeping, bold, bulging surfaces and takes advantage of the fact that the public has been well educated in curves with respect to aerodynamics and streamlining. Such "streamline styling" is well adapted to light weight trucks, which are in some cases no more than a rugged, reinforced, overgrown automobile and are constantly in the public eye.

However, this thesis deals with heavy duty truck styling--the styling of big, heavy, powerful, rugged, precision engineered work horses which are built to do heavy work, do it with ease and do it for years. This is an entirely different function from small pickups, panel and most stake trucks.

To be honest, we must develop, therefore, a theory of styling which will be consistent with the construction and task of heavy trucks. These trucks were never meant to be

beautiful or to be a suave, sleek glob of sheet metal. Heavy trucks must be purely functional and should be styled as such. Such styling we shall call "Functional Styling". Why should we be ashamed of the power built into these units or why should we want to cover up the rugged, precise engineering that goes into these vehicles with vast areas of bulging sheet metal.

The continuation of crisp, sharp lines contrasted with functional form will accentuate the mass, power and ruggedness of the vehicle. By following "functional styling", we can meet the needs of the driver, the service repairman, the owner and the manufacturer and yet produce a truck that is handsome and looks as if it were capable of doing twice the work it was designed to do.

In the next section of this thesis "Functional Styling" will be clarified in an original design (which for discussion purposes we shall call model C). To clarify the point even further a design following "streamlined styling" will be presented for comparison.

MODEL C

MODEL C

The model C was designed by the author and is presented here as an illustrative example of the points discussed in this thesis with regard to heavy duty Mack truck styling. The model C is designed as the new cab front-end sheet metal for the present model L series which could be put in production within the next few years. In this section blueprints and drawings are presented as the stylist would present them before any compromises or engineering changes have been made.

The model C was designed to meet the requirements of the present model L series Mack. The model C series would consist of the model CM equivalent to the LF plus a model CMT (tractor) and model CMSW (six wheeler). The model CJ would replace the model LJ. The CJ model series would include the CJSW and CJT. Line drawings of the standard chassis, the tractor and the six wheeler are included in this section. Also, shown are drawings of the important variations on the C series cab and front-end sheet metal. These include the basic fire apparatus body and the "West Coast model" CTSW. The front-end sheet metal is retained on the CTSW by merely lengthening the hood and raising it on the chassis. The cab has also been raised on the chassis (as on the LTSW) and is in the position it would be on such models as the model CR extra heavy duty "off highway" units, the model CF dumper

(on which a half door would be used) and the CQSW-M on which the cab would be off set.

From the study of the history and traditions of the Mack Truck Company and especially from the historical model study, we have become familiar with the Mack character. One of the goals of the model C styling is a strong expression of this Mack character.

The design of the model C follows "functional styling". It was styled to look rugged and powerful with no attempt to cover over the rigid, precise engineering that goes into such heavy duty trucks. These qualities are clearly evident, when the model C is compared with ~~the~~ an original Mack design following "streamlined styling" which is included/with the Chevrolet or Studebaker truck styling in the section on contemporary styling.

The important dimensions of the model C are included in this section. These dimensions are compared with other present Mack models (including the model L series) and with thirteen competitors of Mack. These dimensions do not depart radically from the present model L series.

The model C is accessible. The huge, two piece, aligator hood opens or lifts off completely for all minor repair or adjustment. On the occasion of major overhaul, the fenders and side panels may be easily removed completely exposing the engine.

Driver's comfort and vision has been increased in all

directions over the model L series. A complete air conditioning - heating unit is included with the air intake visible along the side of the hood. The instruments have been grouped around the steering post on a plate hinged to a box which is attached to the dash board. The instruments are readily accessible by the removing of screws and by swinging the plate upward. The whole instrument box may be attached to the right hand side of the dash for right hand drive export units.

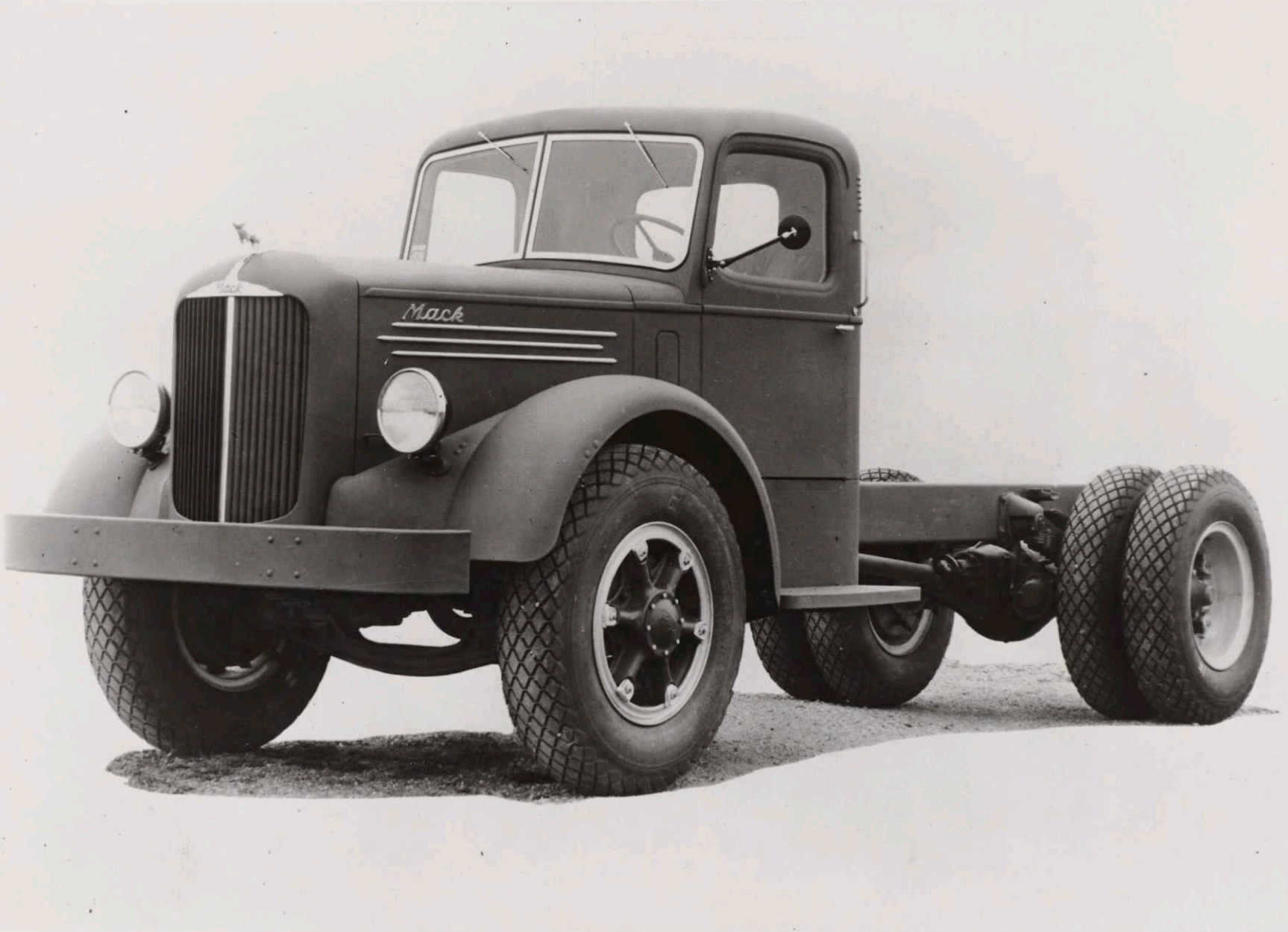
The front end treatment allows the maximum amount of air to get to the engine and cooling system.

The band around the bottom of the cab and above the side aprons is part of the cab. This band gives a complete , finished look to the cab, when it is used without the stainless steel fluted aprons on such models as the "off highway" units, west coast model or special purpose vehicles.

Drivers like little items which make their truck distinctive such as the traditional Mack radiator ornament--the bull dog. The bull dog is a popular gadget among truckers, much as the 1949 Buick "port holes" and front "sight" are with automobile drivers. The stainless steel aprons similiar to the fluting used on many trailers adds a dressed up touch to the unit, will attract public attention and in the author's opinion this feature has the potentiality of being one of those styling details which will soon be adopted by most trucks.

The model C is a conventional design slightly radical for the conservative Mack Truck Company. Nevertheless, it illustrates and brings together in a concrete way the different things we have discussed so far.

In the next section the series of sketches which lead to the model C will be presented along with a number of new and future ideas in Mack trucks.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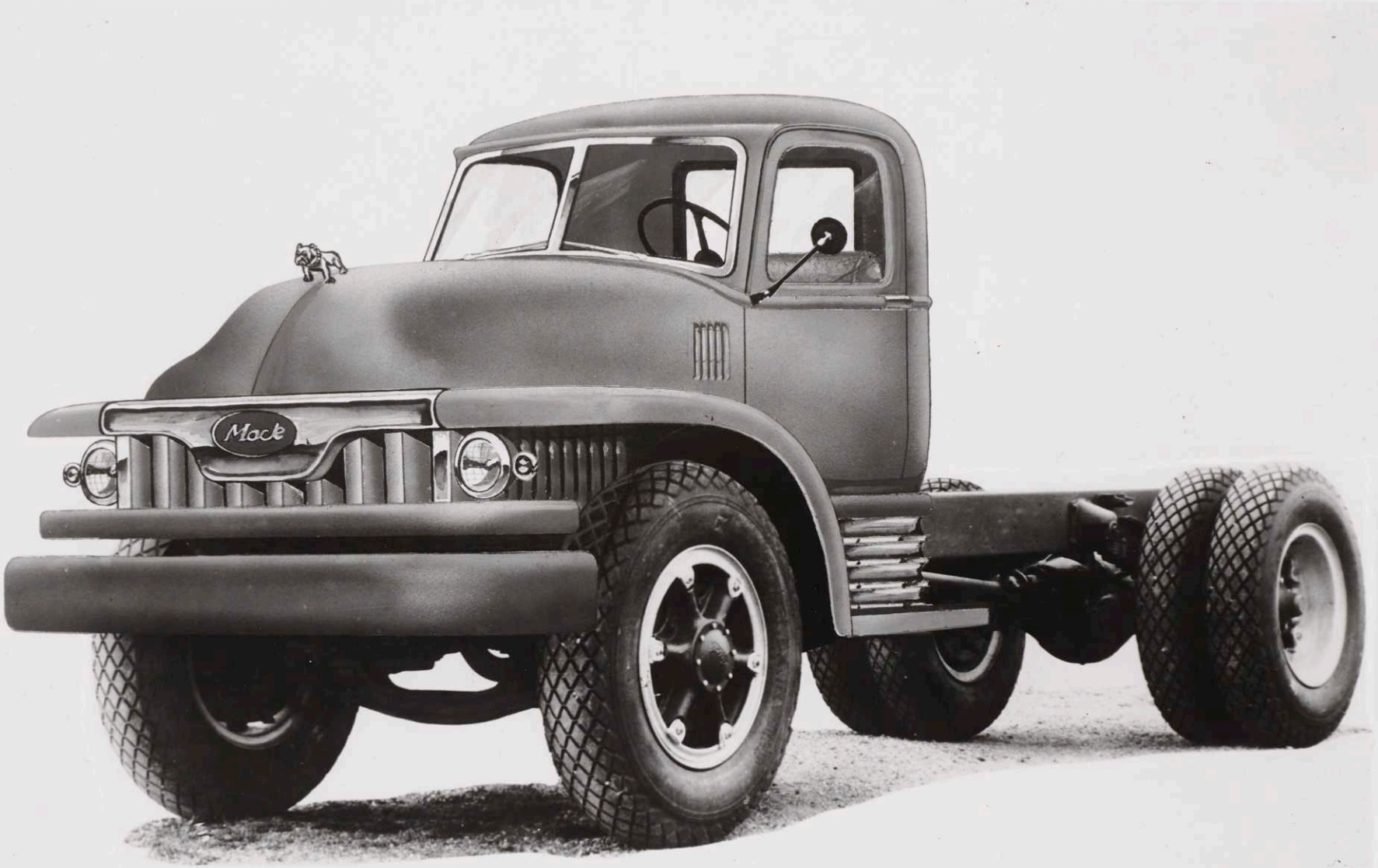
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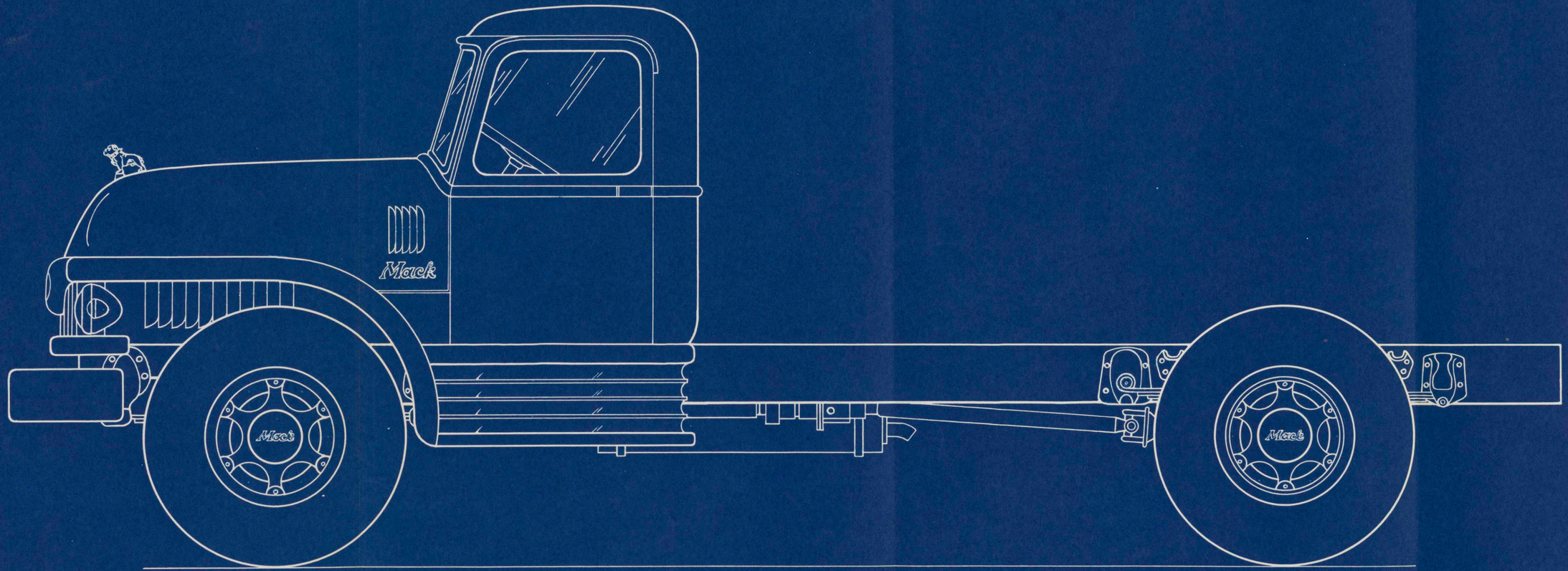
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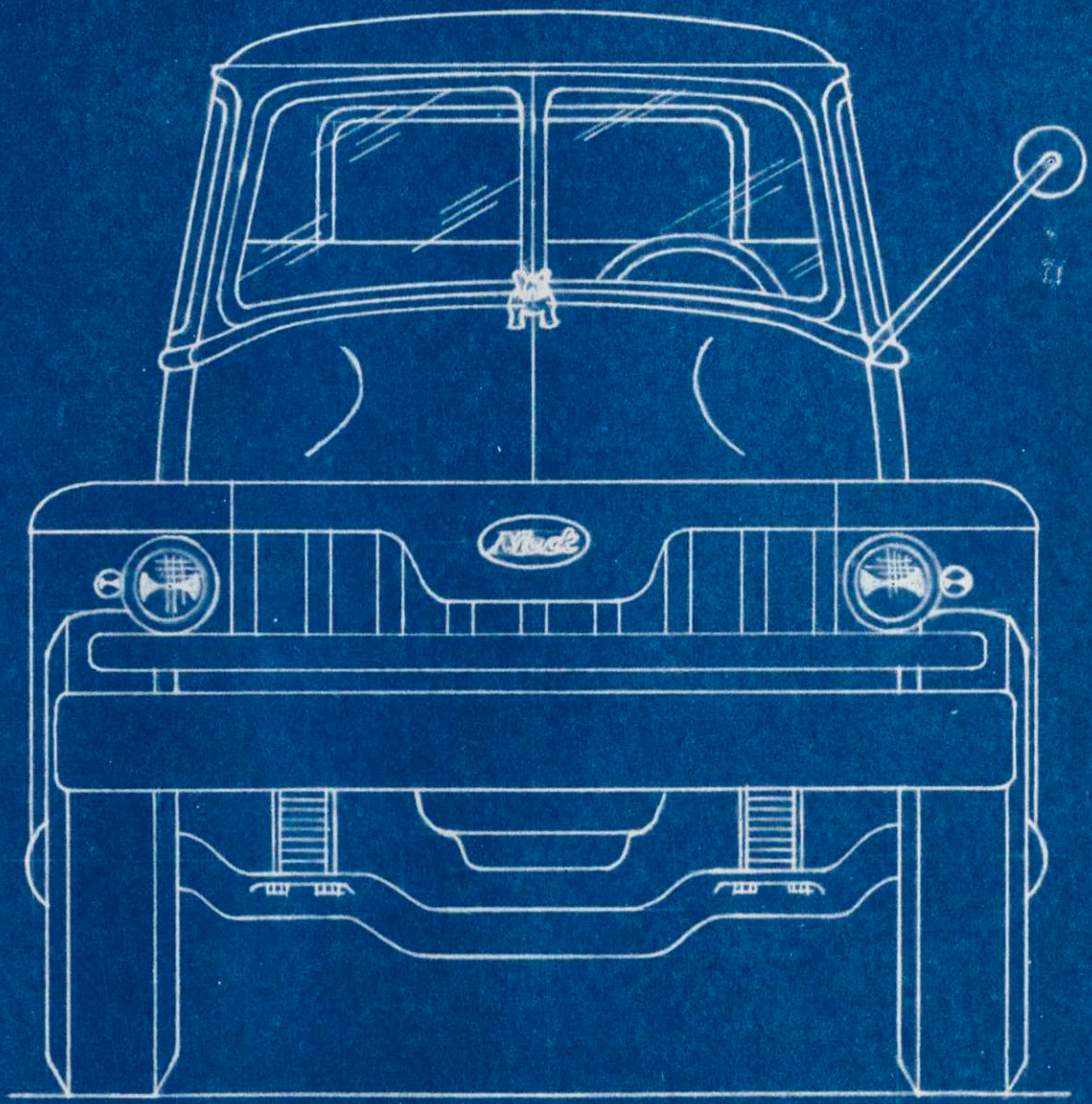
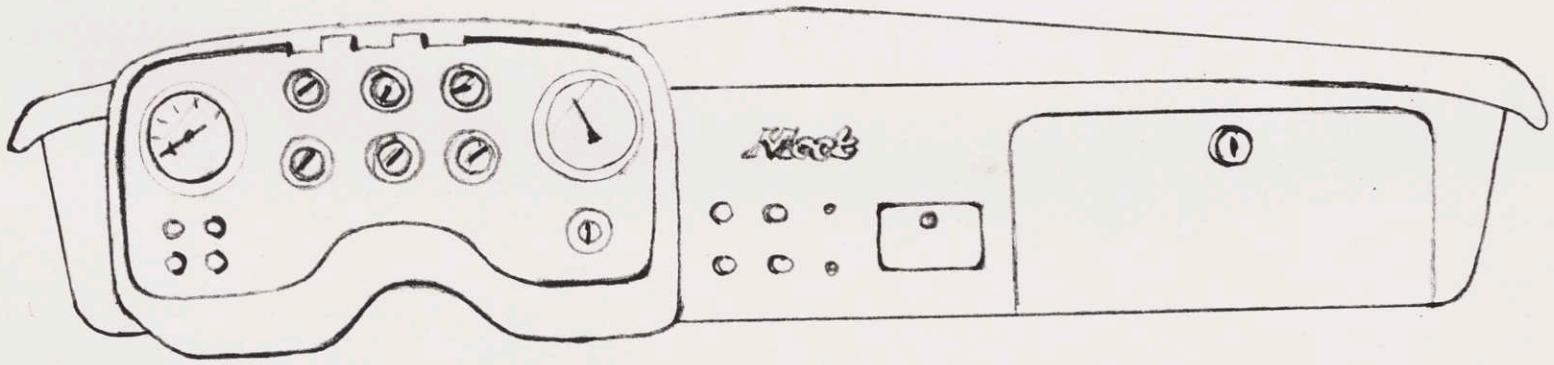


MACK MODEL C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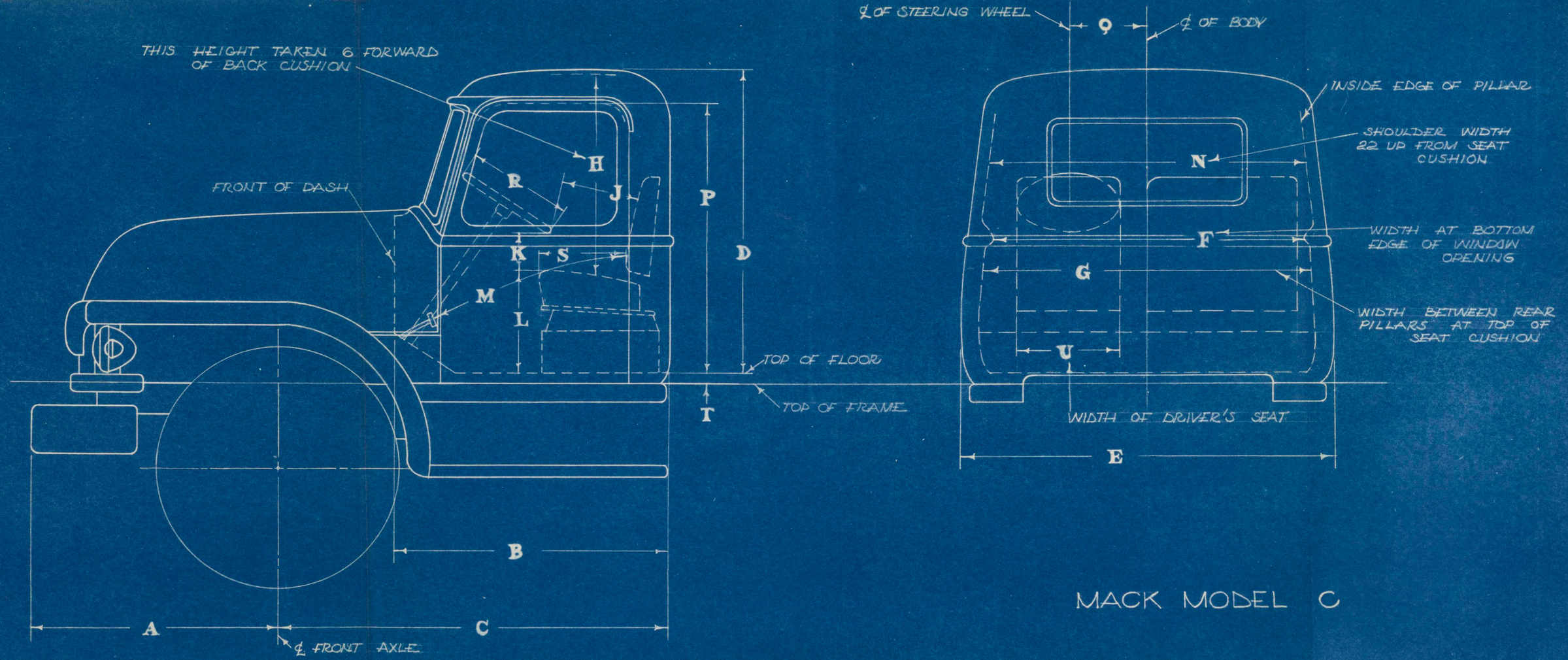
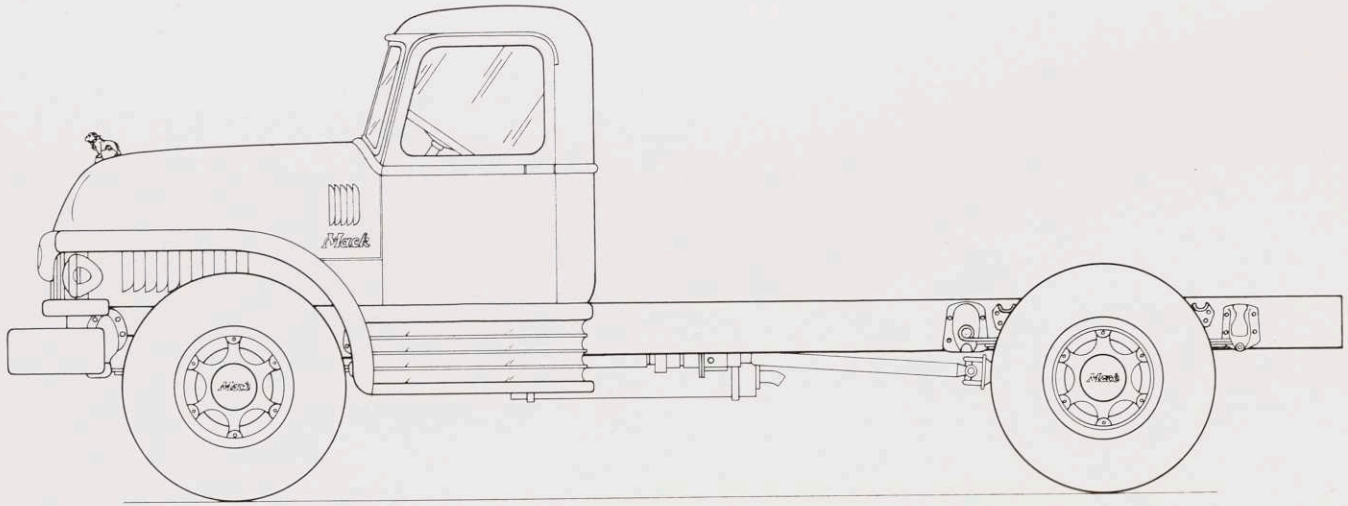

THIS HEIGHT TAKEN 6 FORWARD OF BACK CUSHION
FRONT OF DASH
H
R
J
K
S
M
L
P
D
T
TOP OF FLOOR
TOP OF FRAME
B
A
C
℄ FRONT AXLE
℄ OF STEERING WHEEL
Q
℄ OF BODY
INSIDE EDGE OF PILLAR
SHOULDER WIDTH 22 UP FROM SEAT CUSHION
N
F
WIDTH AT BOTTOM EDGE OF WINDOW OPENING
G
WIDTH BETWEEN REAR PILLARS AT TOP OF SEAT CUSHION
U
WIDTH OF DRIVER'S SEAT
E

MACK MODEL C

	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	U
MACK MODEL C	46 1/2	51 3/4	74 1/2	57 1/2	71	60	62 1/2	38	15	8	19	37 1/2	62	50 3/4	15	22	18 1/8	2 1/4	18
MACK MODEL L	46 1/8	56 1/2	74	57 5/32	68	61 1/2	61 1/2	37	15	6 1/4	18 3/4	37 1/2	61 1/2	49 11/16	15	22	17 3/8	2 1/16	17 1/2
MACK MODEL EQ	35 0/16	51 13/16	74	50 23/32	60	53 3/8	53 3/4	36 1/2	13 3/8	8 1/4	14 3/16	33 1/4	53	44 1/2	10 7/8	20	18 1/8	1 13/16	
FORD	38.T	56	73.9	53.6	65 1/2	56 1/2	58 1/2	37 1/2	12 1/2	6 3/4	14 1/2	33 1/4	55 3/4	47 1/2	11 1/2	20	18	.9	
CHEVROLET	38	59 1/4	77	51 5/16	69	57 7/8	61 1/2	36	13	6 3/4	14	33	56 1/2	43	13 3/8	18	11 3/4		
DODGE	36 3/8	58 3/8	68	54 1/2	68 5/8	58 3/8	58 5/8	37 1/2	16 1/8	9	13 3/4	34 1/2	57 3/4	44	13 1/2	18	17		
STUDEBAKER	33 7/8	52	72	52	67 1/16	54	59 1/2	37 3/4	14 1/4	7 3/8	14 7/8	33 1/4	53	42	14 1/4	17	17 1/2		
GMC AC-850	38 3/4	52	76	51 5/16	69	57 7/8	61 1/2	36	13	6 3/4	14	33	56 1/2	43	13 3/8	18	17 3/4		
INTERNATIONAL	39 5/8	56 5/8	77	51 1/4	60 1/4			36	13 1/8	6 5/8	15 1/4				11 15/16	20		2 1/4	
WHITE	40 15/16	51 1/2	74																
DIAMOND T	37 1/2	55 1/4	70 3/4	51 5/8	64 15/32										11	20		1 3/4	
AUTOCAR	29 0/16	56 7/16	80	54 5/8	63									46 1/2				5/8	
REO	41 7/8	54 5/8	64 3/8	55 5/16	63 1/4				12-14	6 1/4	14				13 7/32	20		0	
STERLING	30 1/8	54 3/4	81	57 1/2	64											22			
FEDERAL	36	59 11/16	78 3/4	52 3/4	64 1/2	60	63 1/2				13 1/2			43		20		4	
BROCKWAY	46 1/2	53 11/16	72	52 1/2	60	52 1/2	52 1/2			9 1/2	14		52 1/2	46 3/8	11 3/16	20		3 1/2	24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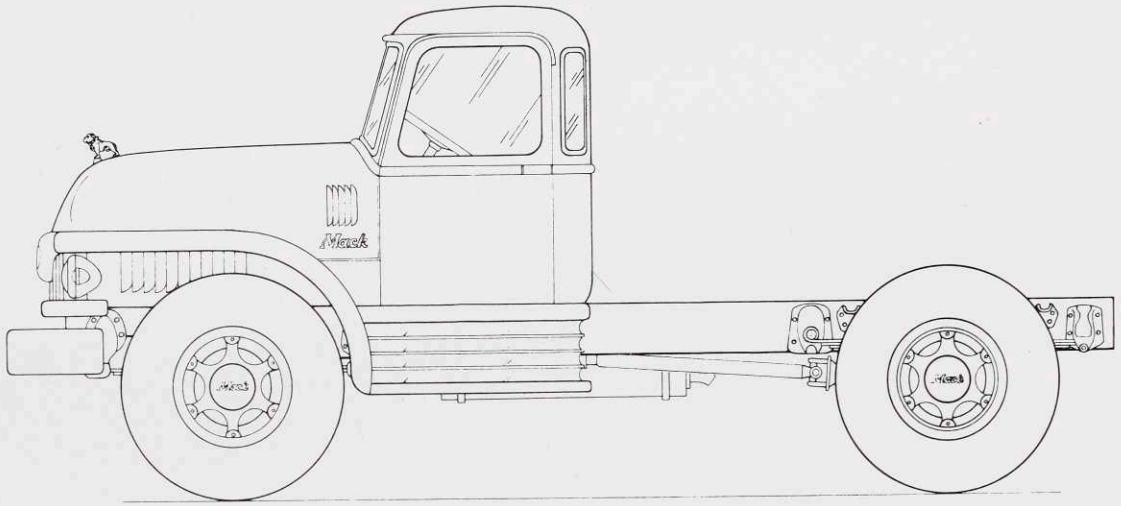
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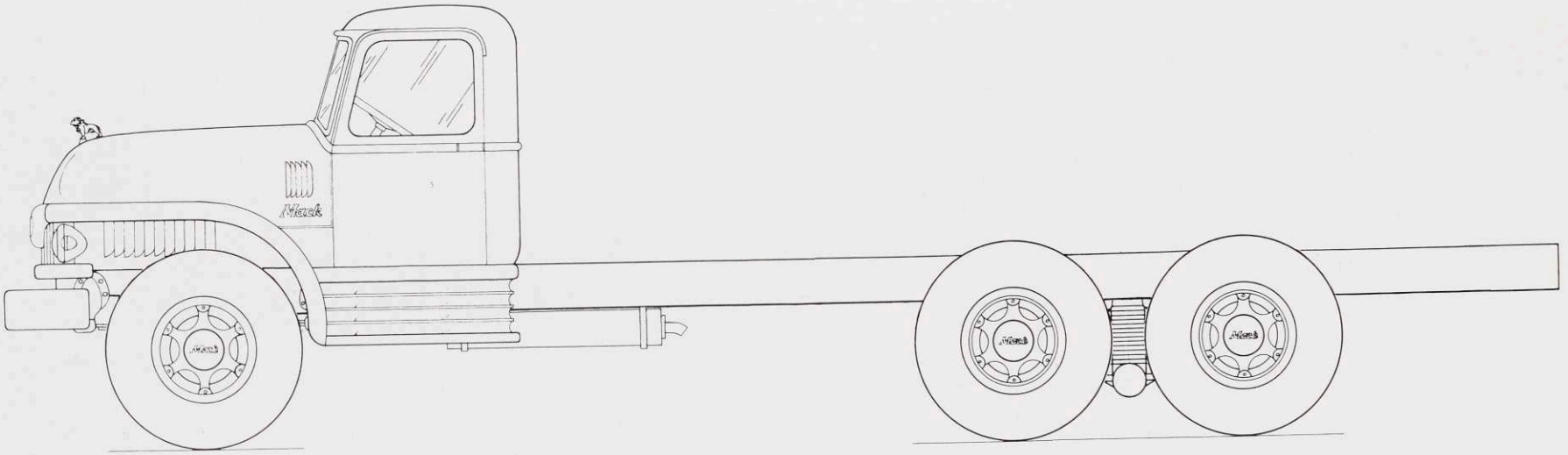
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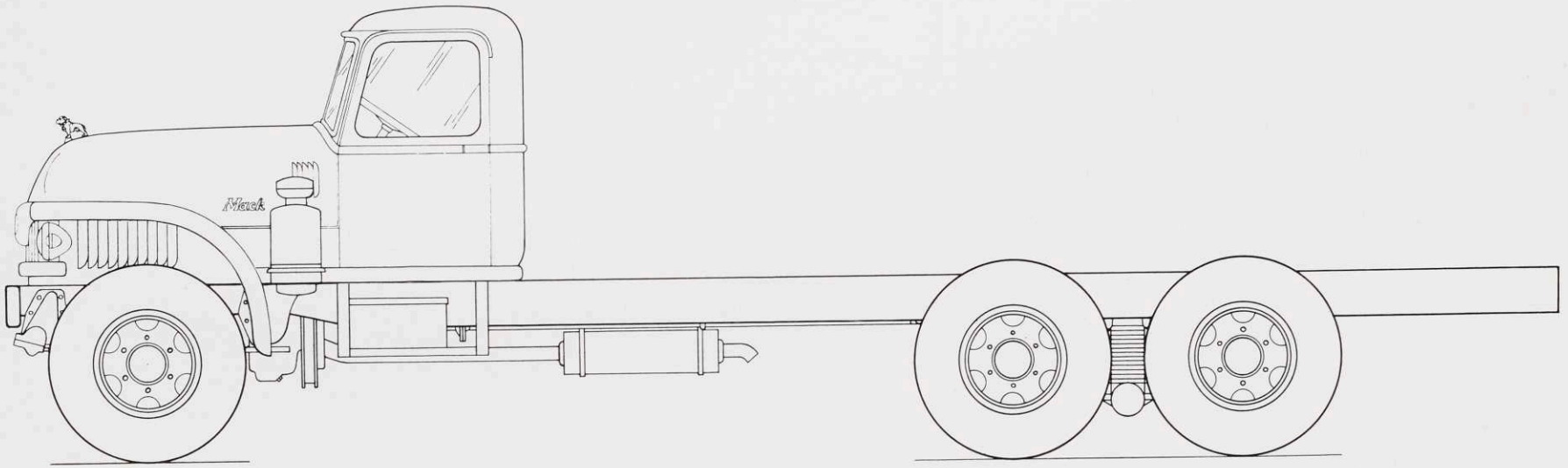
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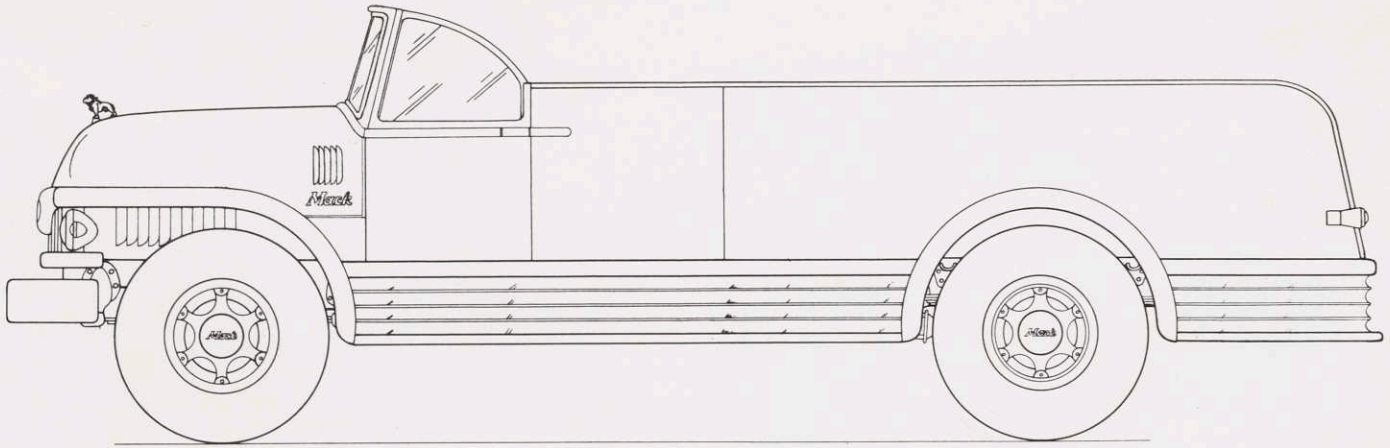
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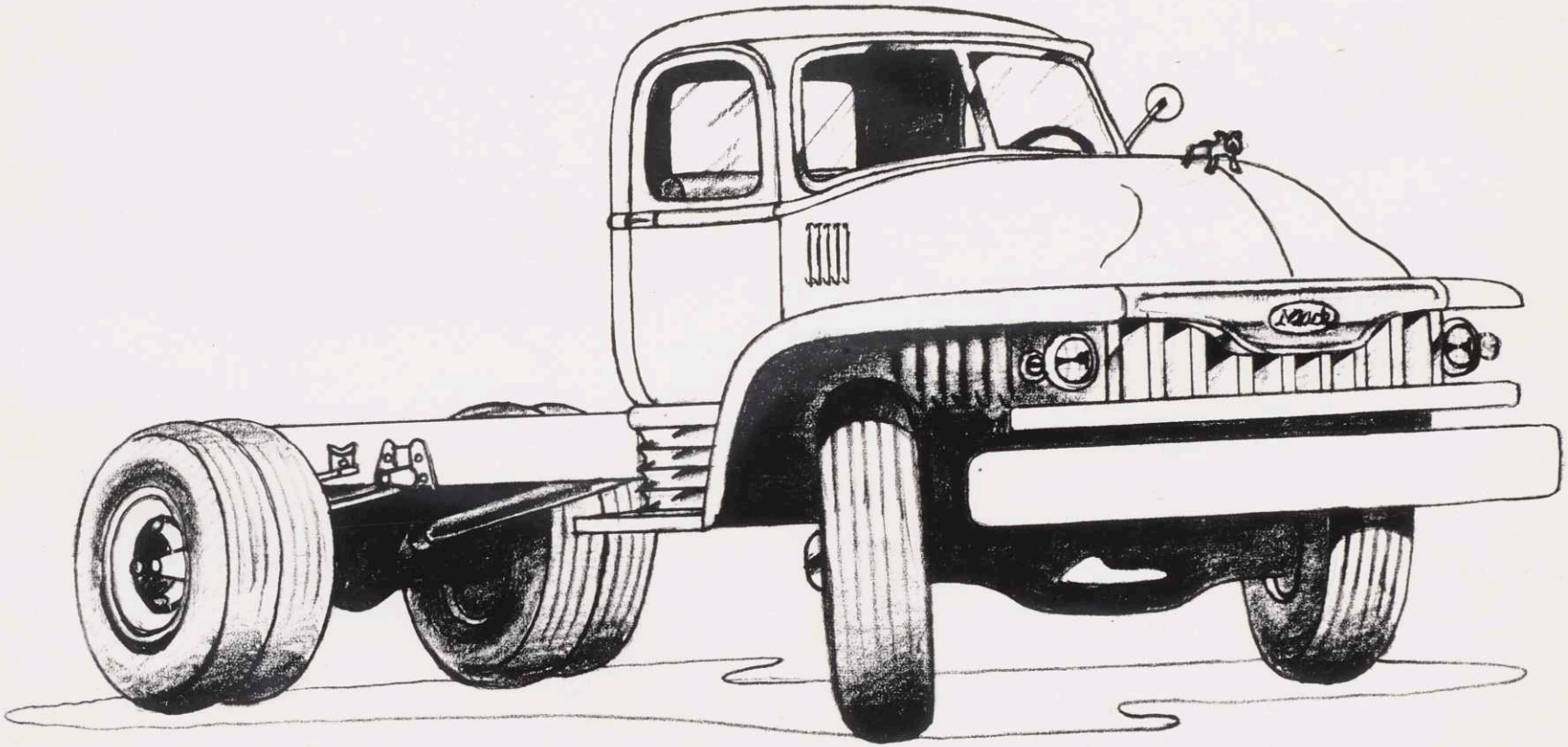

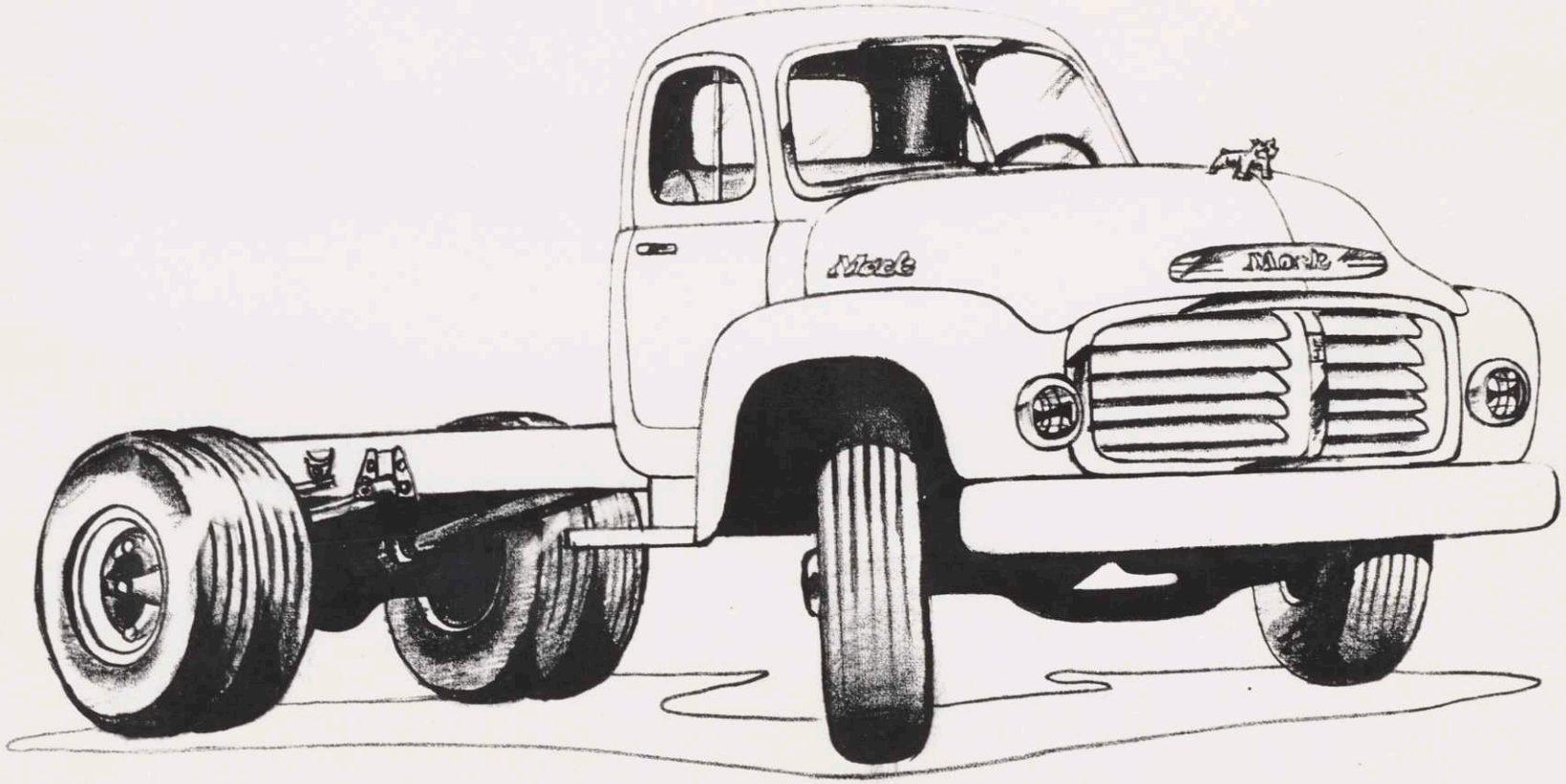
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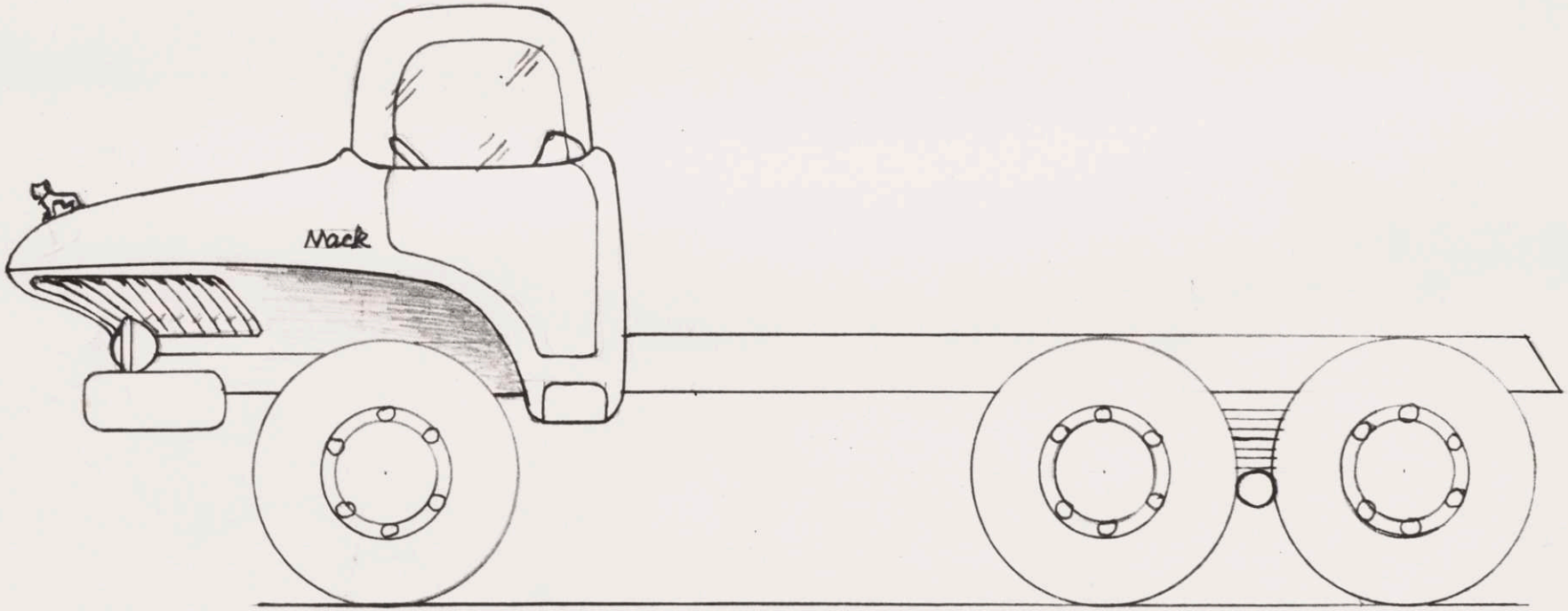
CIRCLE: PRESENT PRODUCTION BULL
DOG RADIATOR ORNAMENT.

RECTANGLES: PROPOSED BULL DOG ORNAMENT

OFFICIAL MACK NAME SCRIPT


Mack

THE FOLLOWING SERIES OF SKETCHES
LEAD TO THE DESIGN OF THE MODEL C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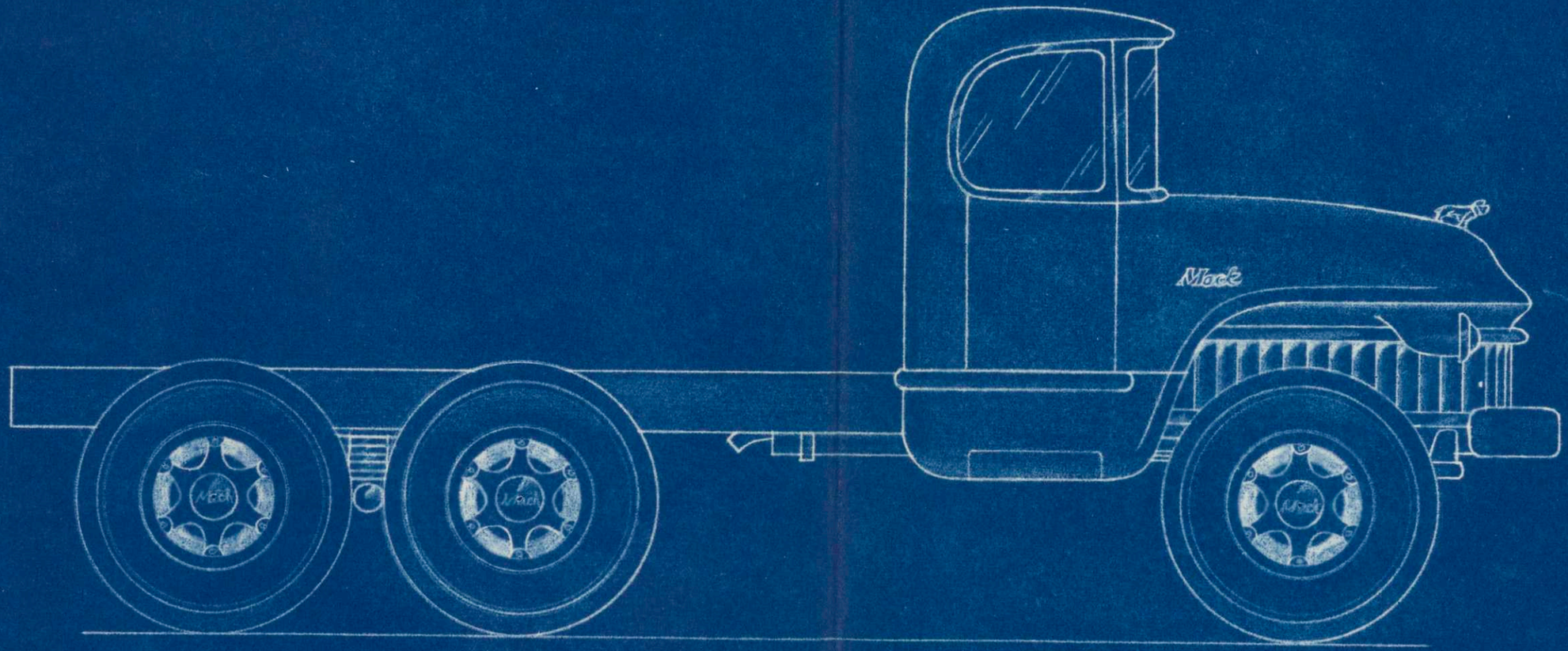
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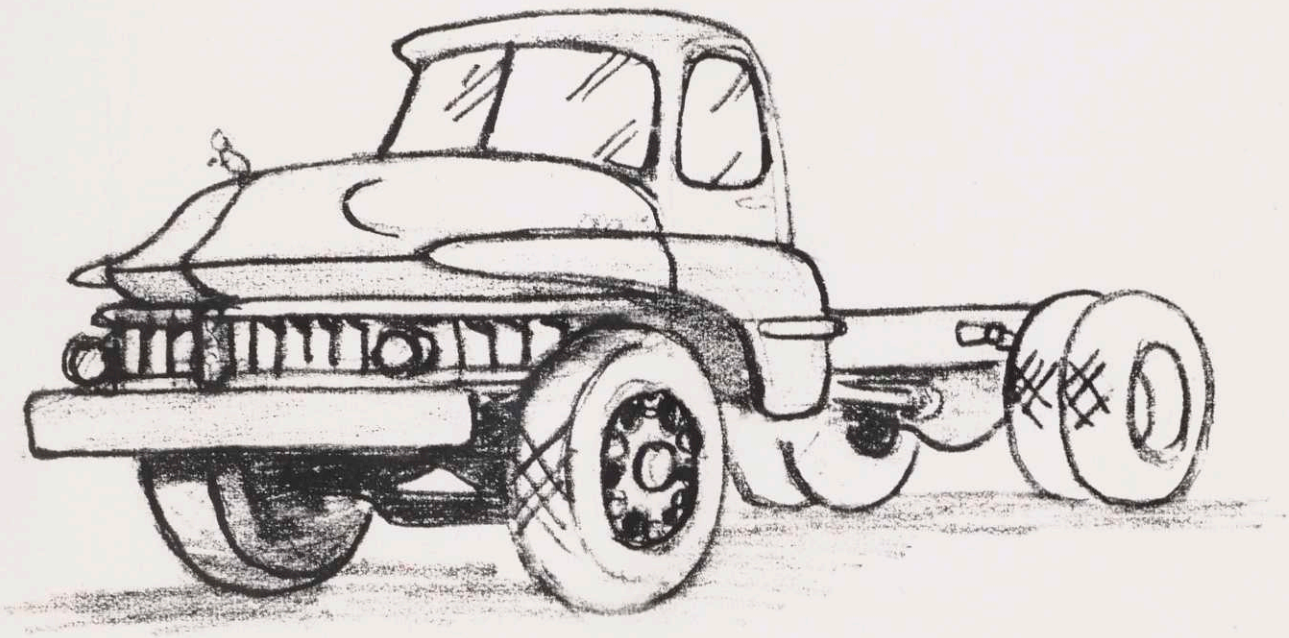

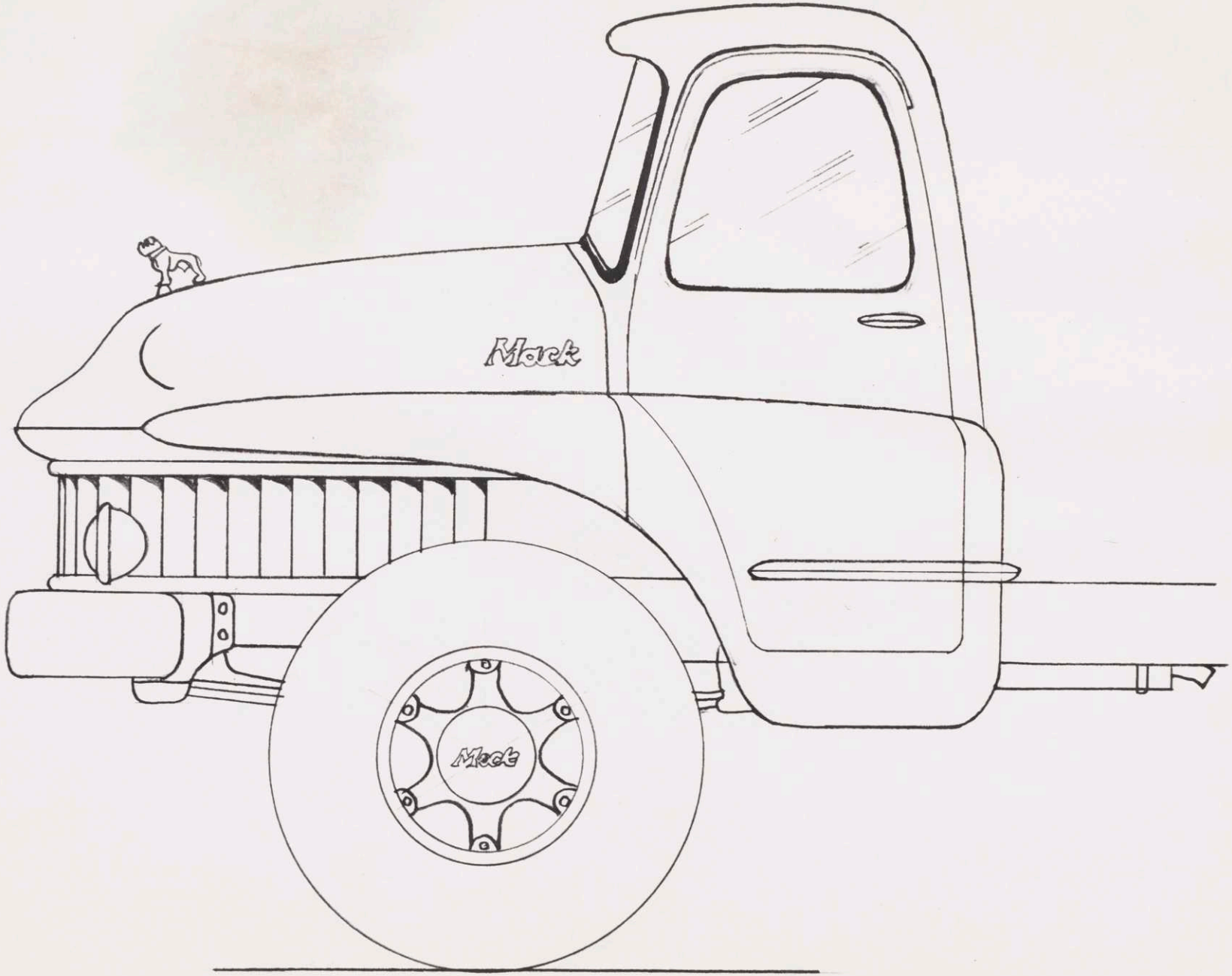
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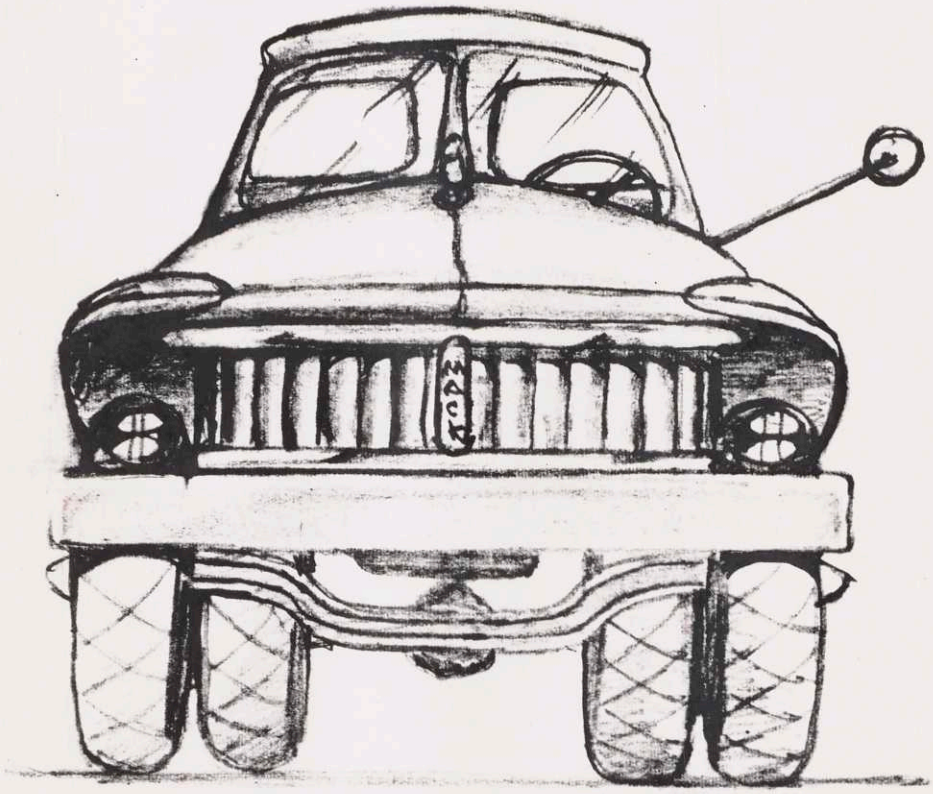


NEW SHAPES IN HEAVY DUTY
MACK TRUCK DESIGN

NEW SHAPES IN HEAVY DUTY MACK TRUCK DESIGN

In automobile design one of the most important functions of the styling section is the development of new and original shapes, forms and styling details, which come into being by relaxing limitations, making valid predictions and thinking a great distance into the future. The value of such a division in an automotive styling section is well established. Such a division "lets its hair down" and develops new ideas, new shapes, new forms with the real freedom that only exists in such a division. These designs are rarely "down to earth". There is no reason for them to be. The purpose of such planning is to let the designer go and see what new original ideas and shapes will develop. He is not aiming for a finished practical car design. That is done when it is time to start development on a program for a new model. At that time, you glean from this freedom the good ideas, shapes and styling details and bring them down to earth for a cold, practical, cost limited application. Another important function of this experimental division of a styling section is the development of "pilot" models which are usually 3/8 scale models. Such models in the automotive industry are predictions approximately ten years into the future. These designs give direction to styling in year by year progression and yield a continuity to this progression.

Another value of this division lies in the important fact that when high ranking executives come to styling in the interest of new design changes, the stylist has ideas to present to him that can be seen and discussed concretely. There have been too many cases of sad production designs resulting from the "pet ideas" of executives who know nothing about design. In many cases, this could be avoided by diplomatic suggestions and discussion by the stylist using his designs and models to explain and stress his points. When the executive views these ideas rendered in color or standing in three dimensions, he often sees things in a new light and is influenced to let the stylist do his job.

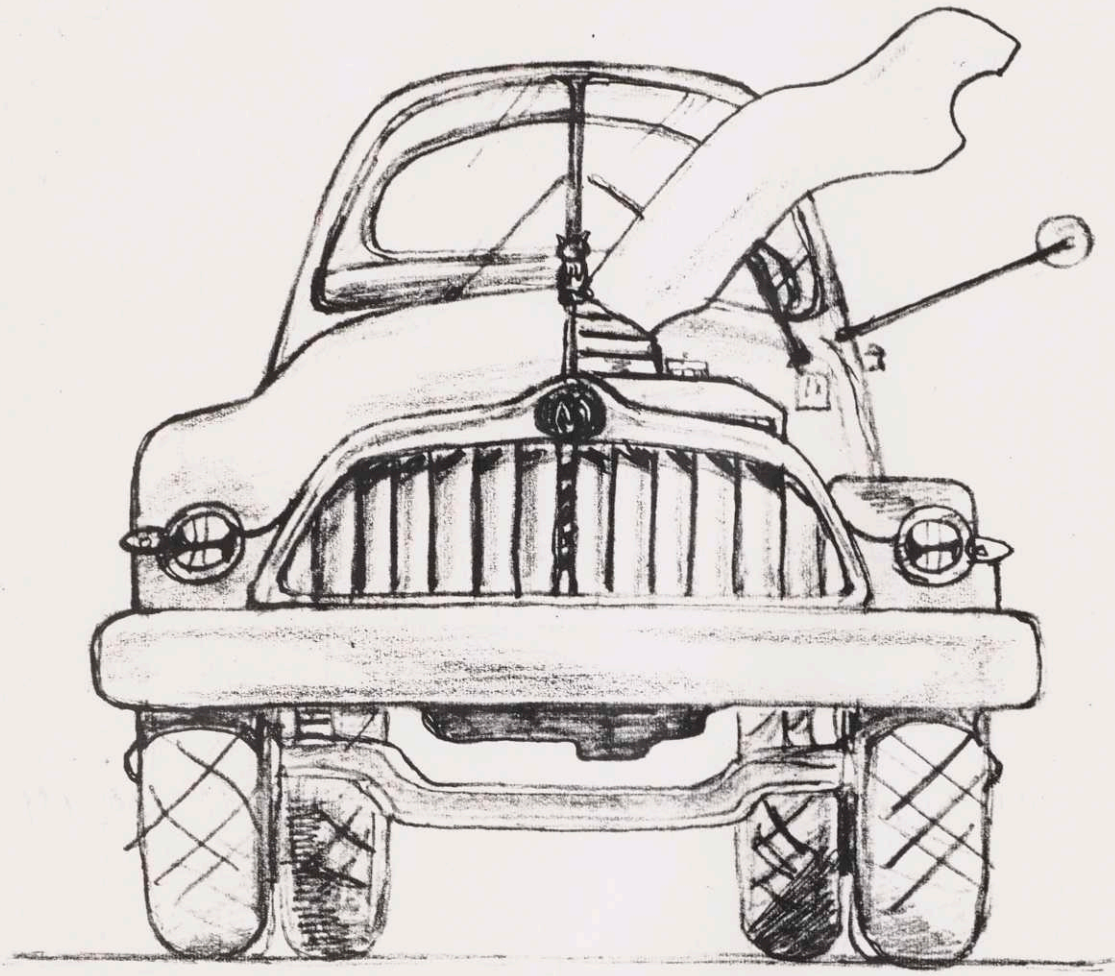
Major truck styling changes are much less frequent than automotive styling changes because of the lower volume of production which imposes strict cost limitations. Then, too, styling does not hold the importance in the truck industry that it holds in the automotive industry.

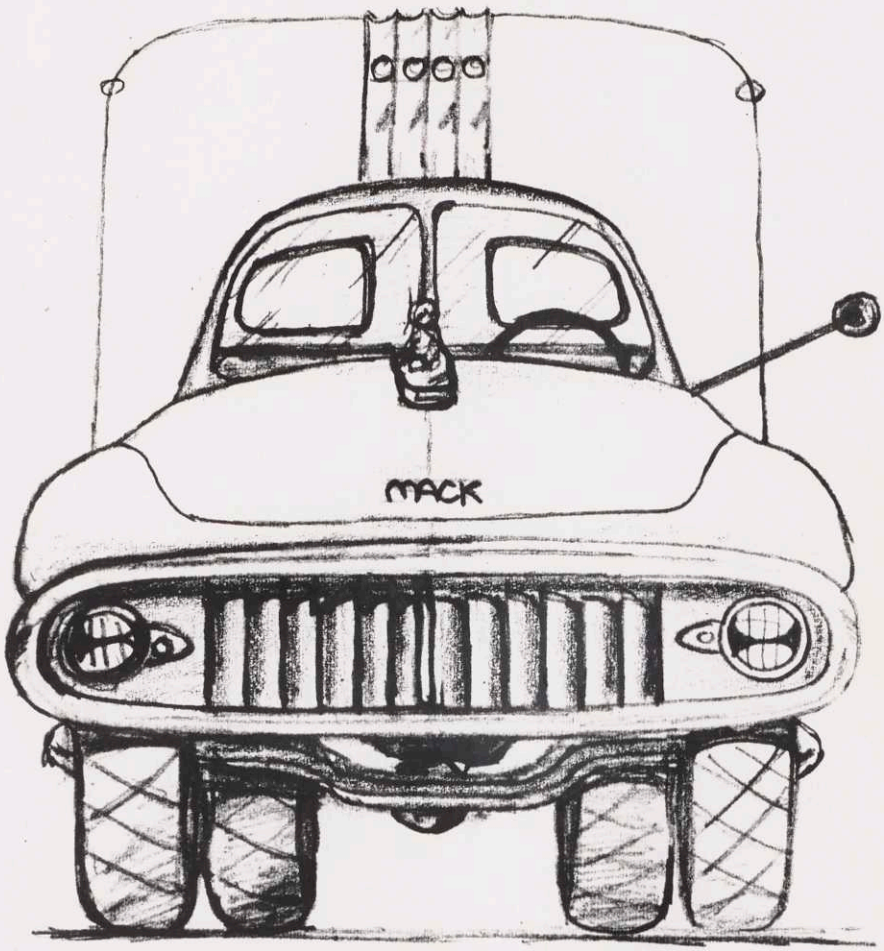
Nevertheless, the value of such looking ahead and such direction in design can not be overlooked, especially, when truck styling is becoming more and more important. Truck styling has come directly from automotive styling. Yet, the truck industry has much to learn.

At Mack, styling is done day by day. No consideration has been given to looking ahead and to the development of new shapes and new styling ideas. There is a lack of any

direction in Mack styling. It is strictly a case of designing for the moment. Mack has always been recognized as a leader in heavy duty truck originality and design. It is essential in this time of the increasing importance of styling that Mack retain this leadership. Realizing that Mack styling is extremely small and limited, we can not overlook, however, the need for thought being given to new shapes in Mack trucks, new ideas, new styling trends and several "pilot" model designs which can give direction to the day by day styling at Mack.

The purpose of this section, then, is to point out the need and present a series of new shapes and styling treatments in heavy duty Mack truck design. These are only a few ideas. The possibilities are infinite.

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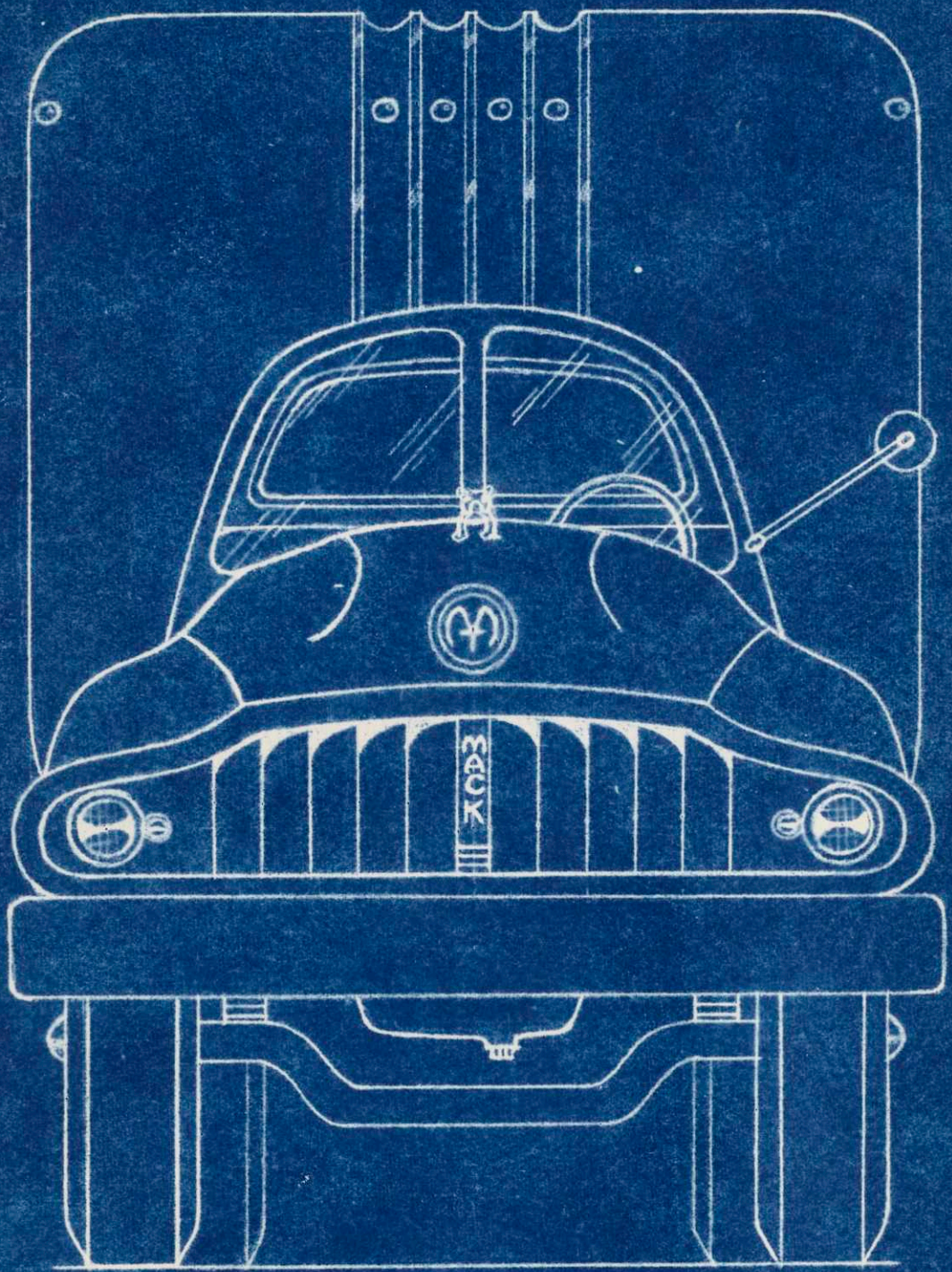
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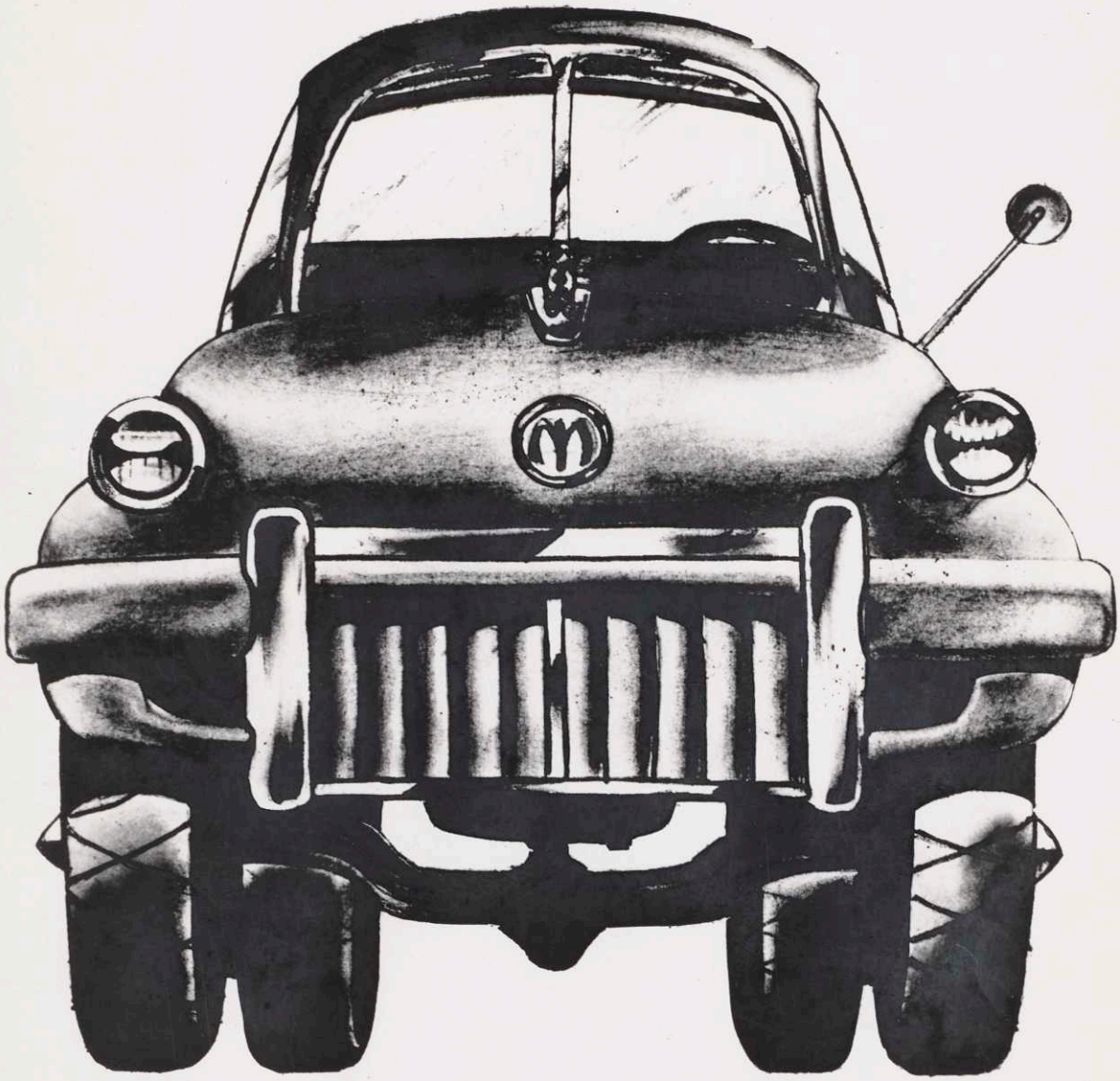

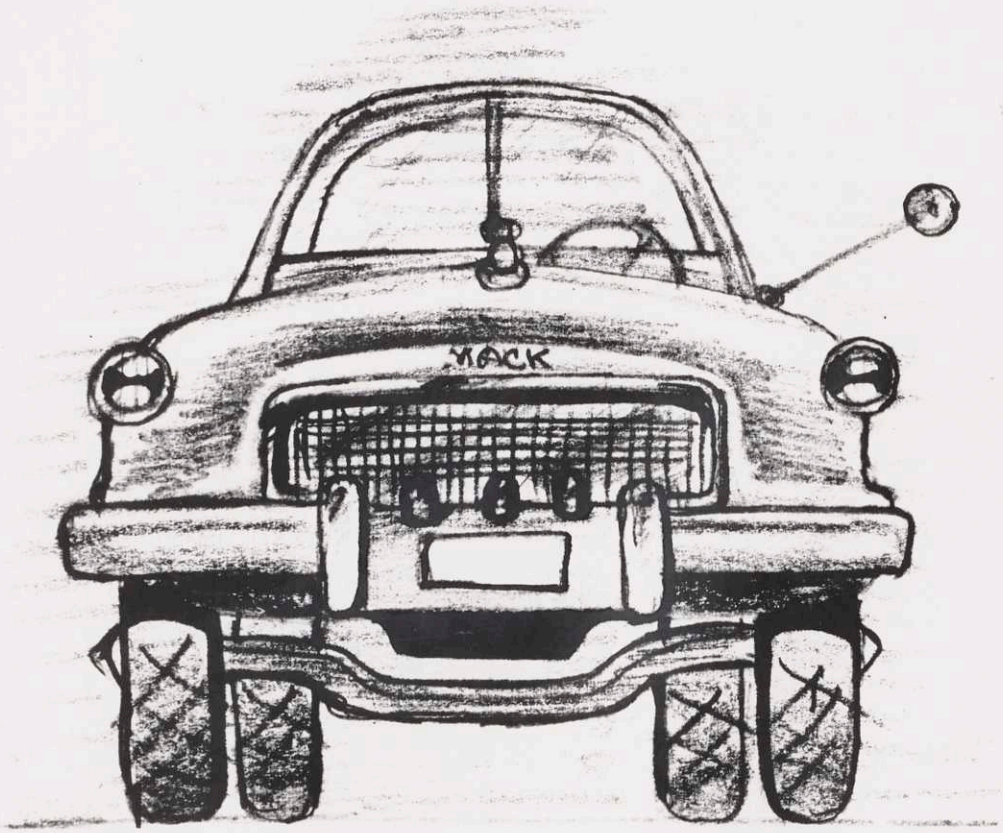
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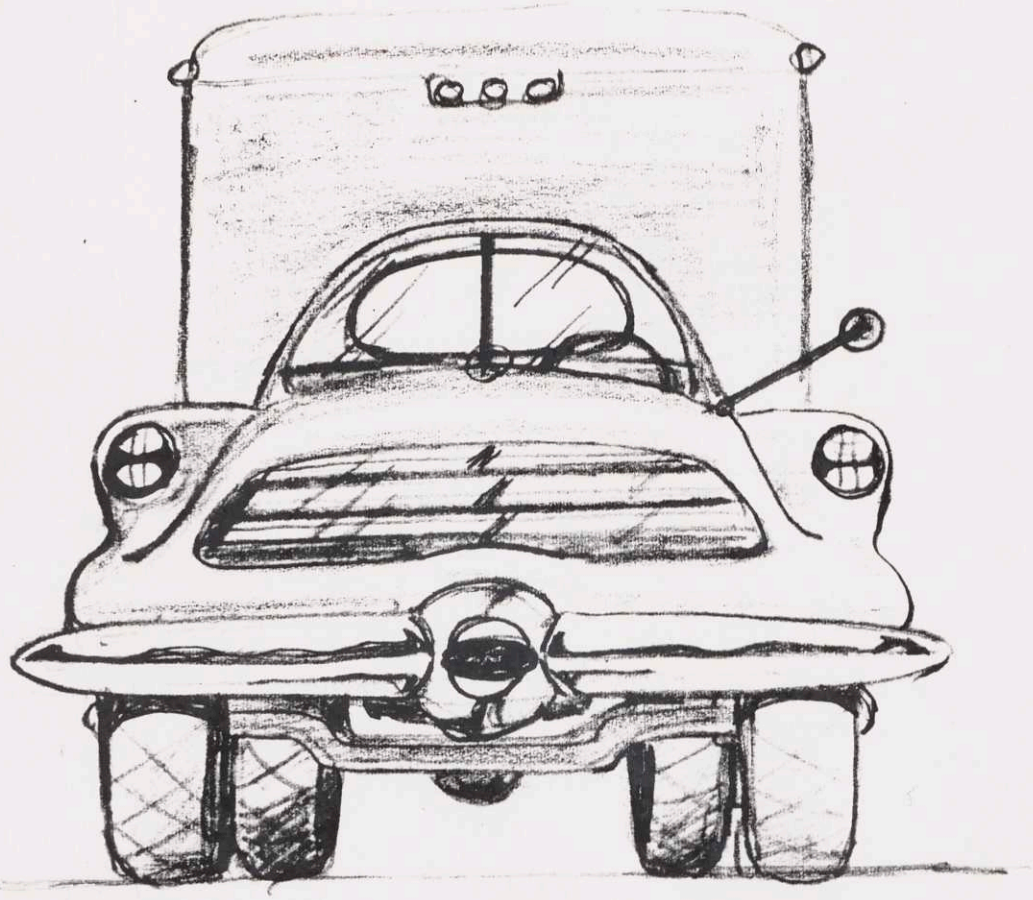

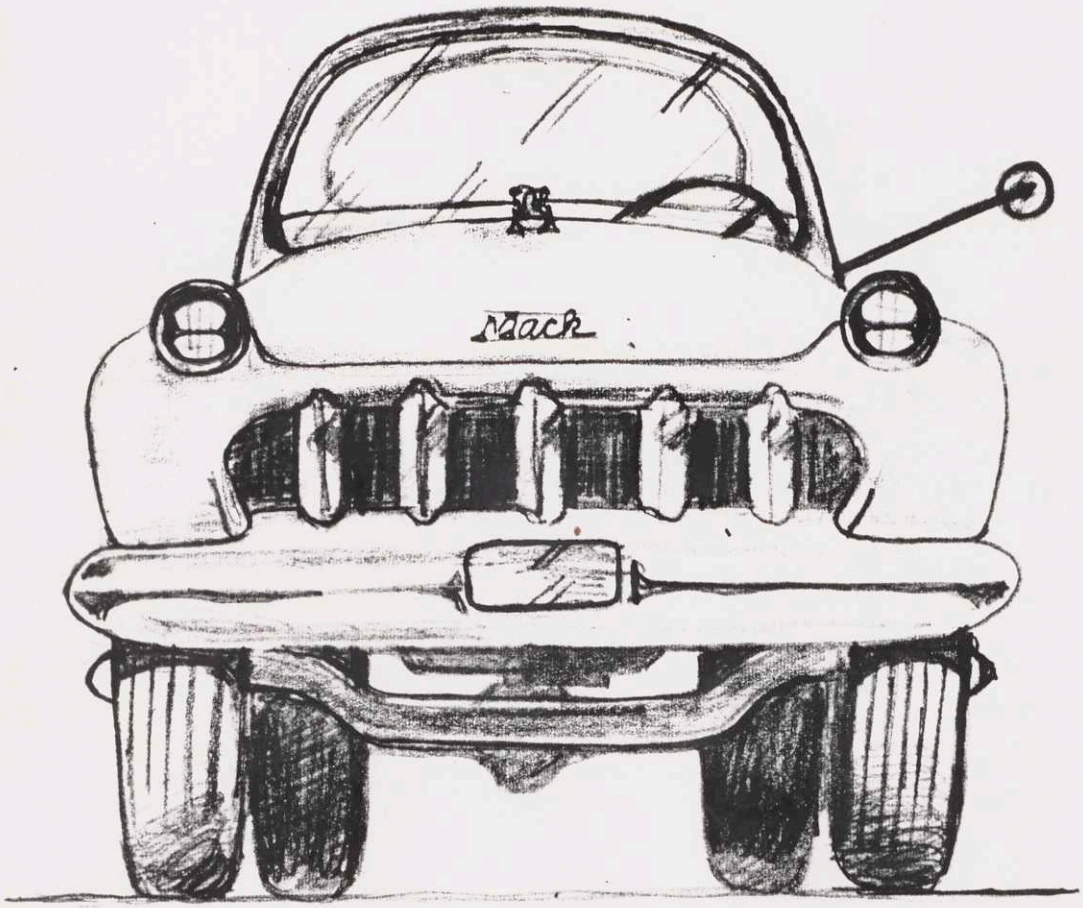
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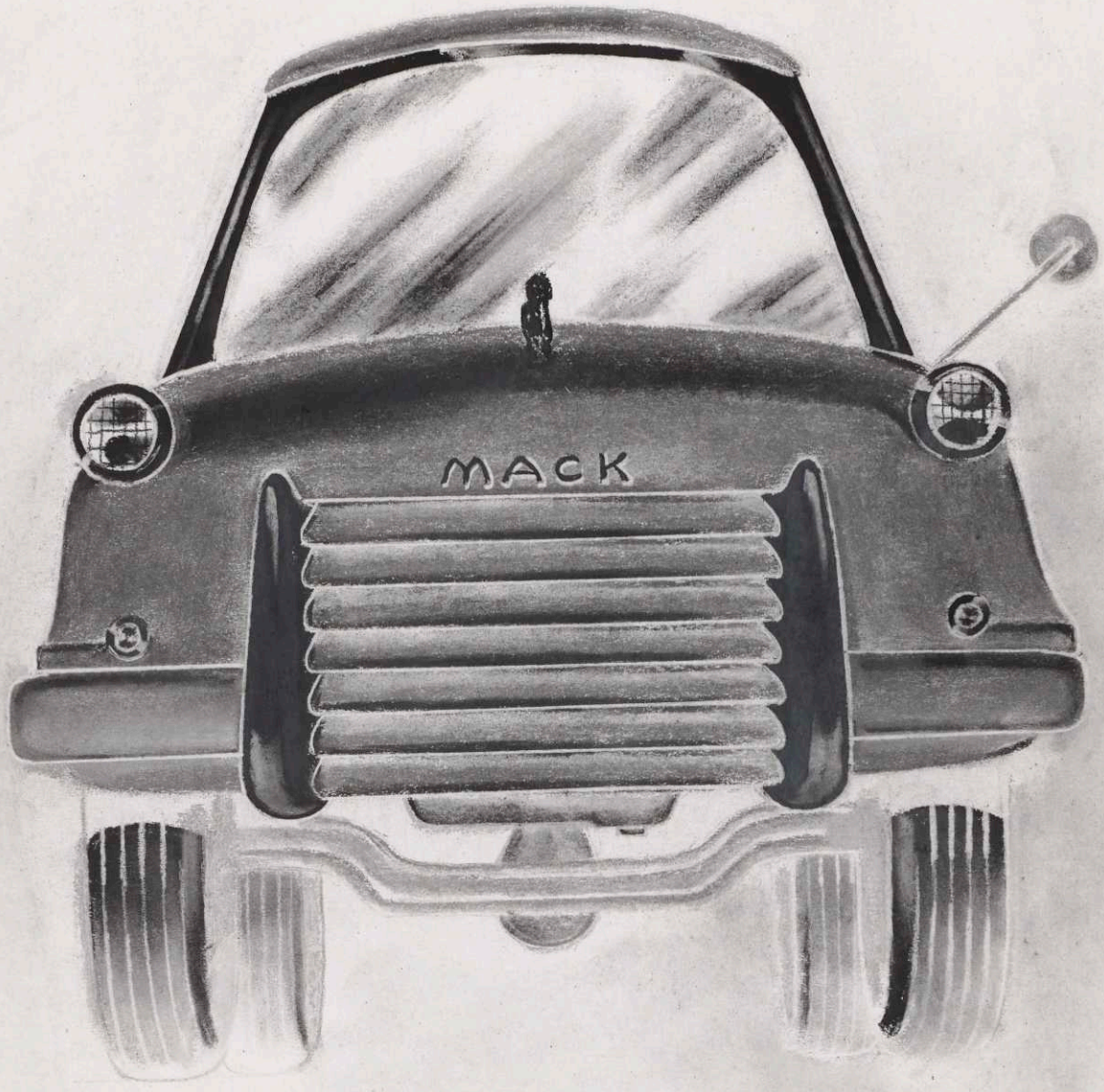
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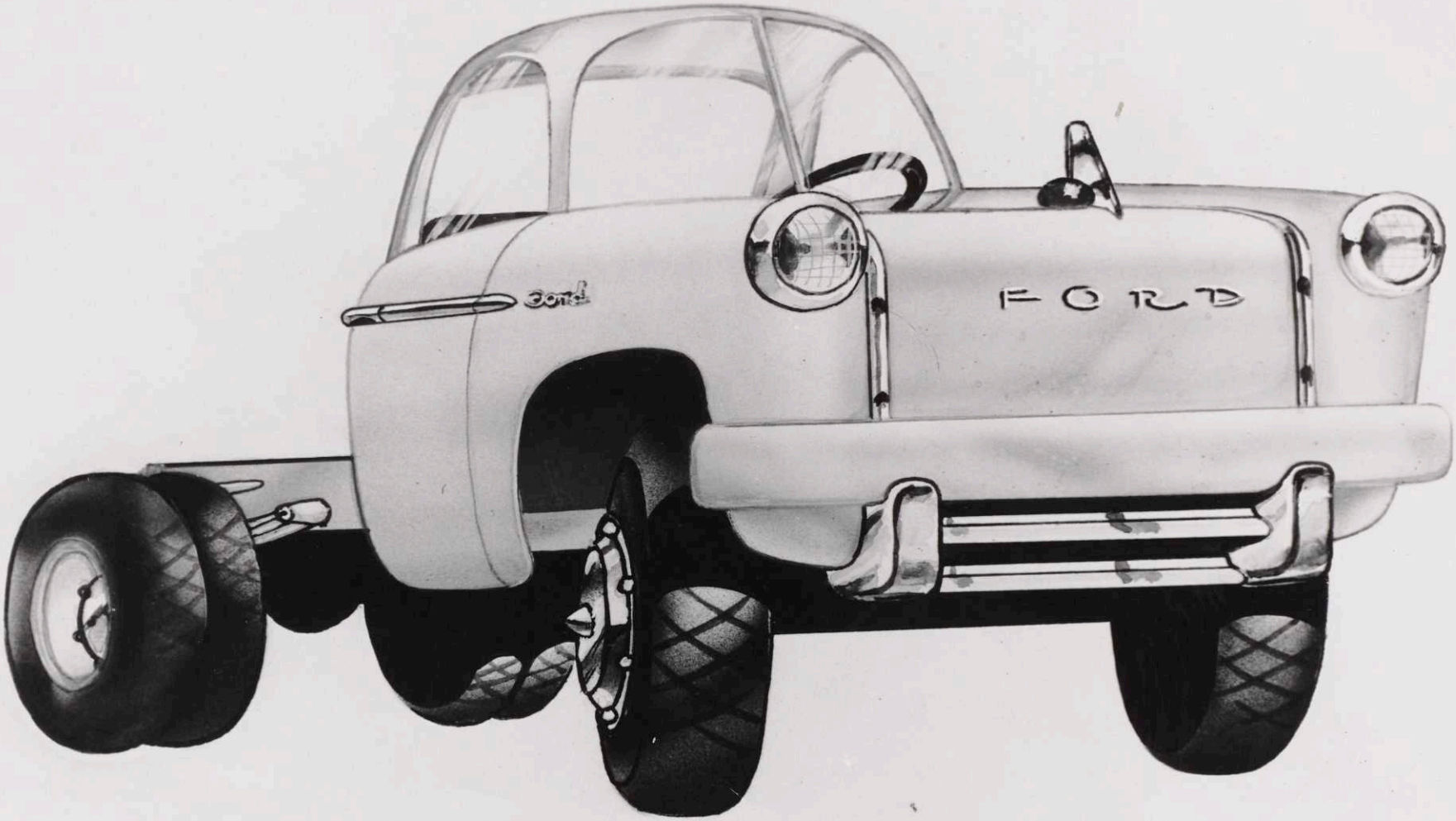
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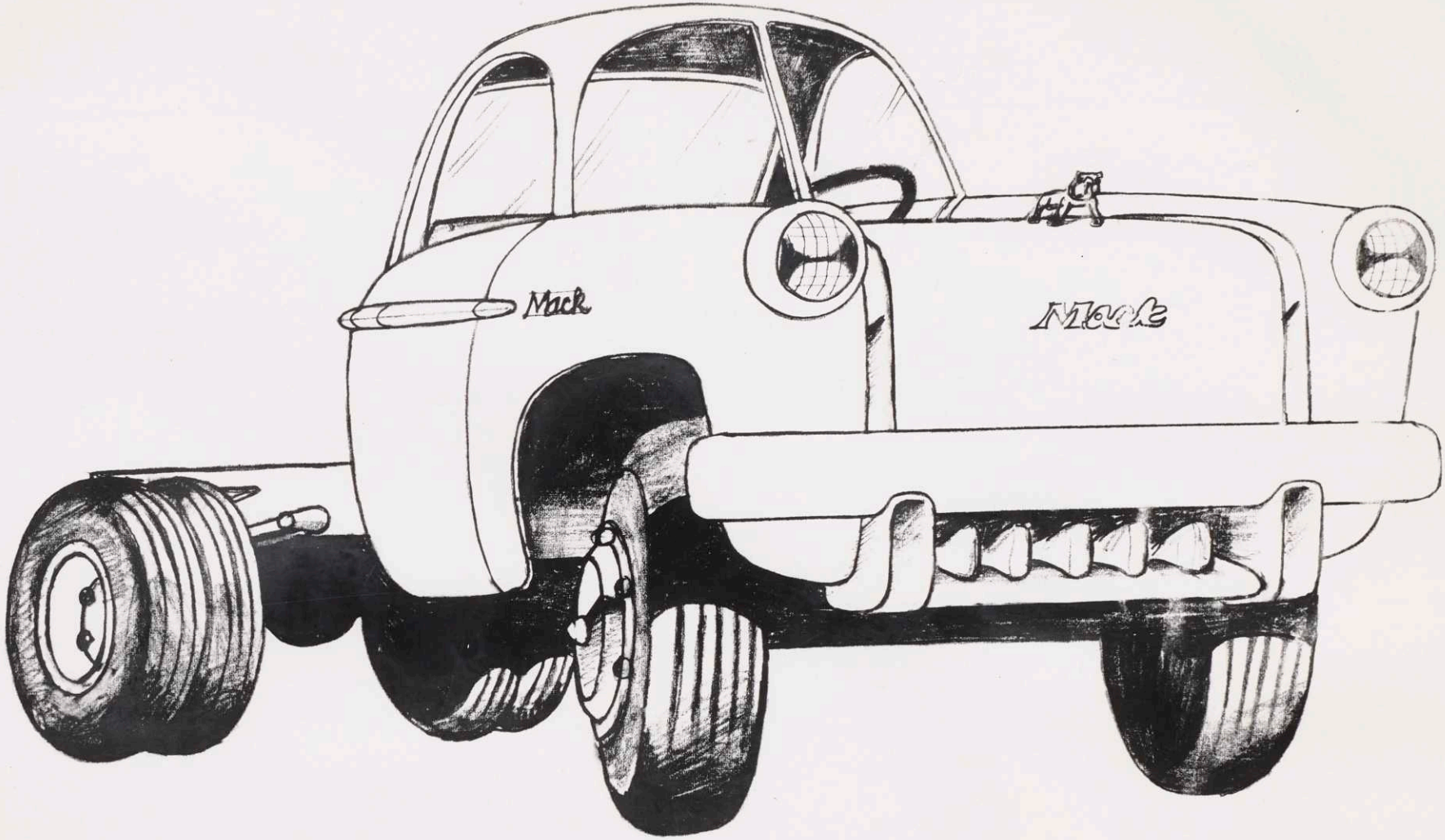
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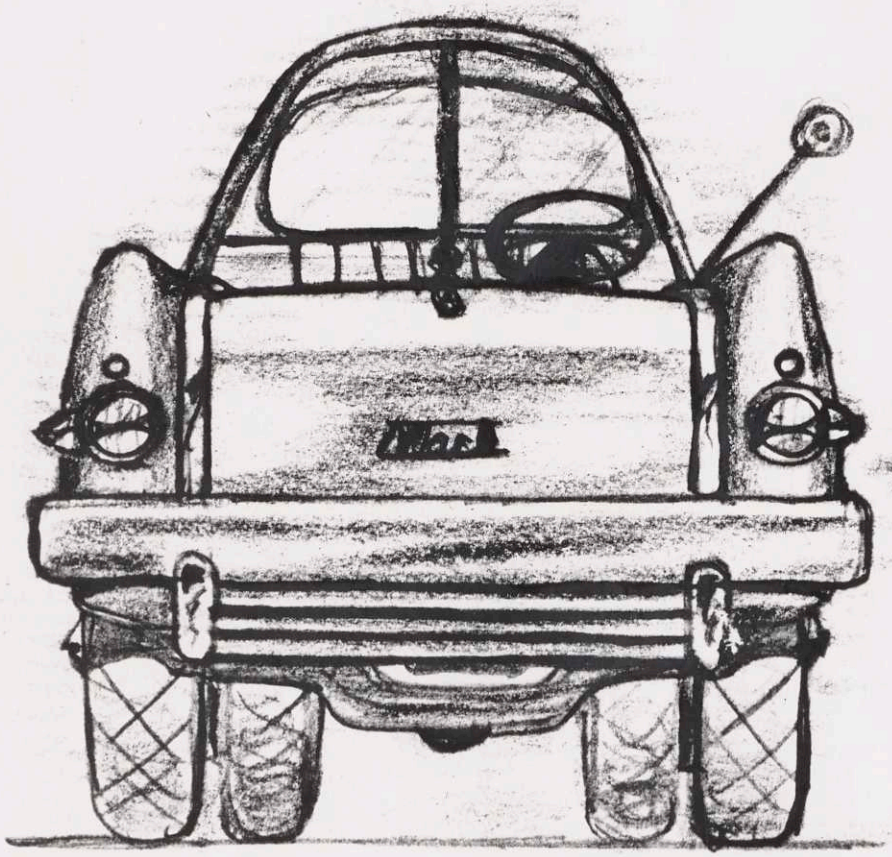

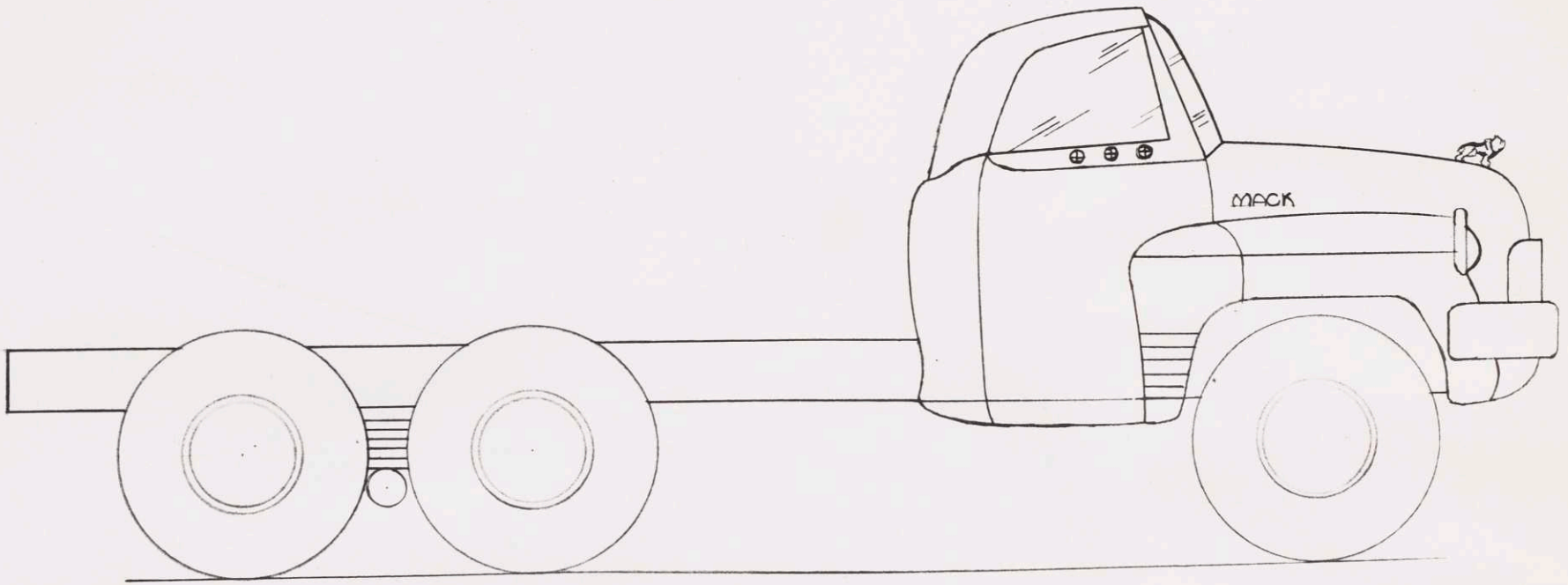
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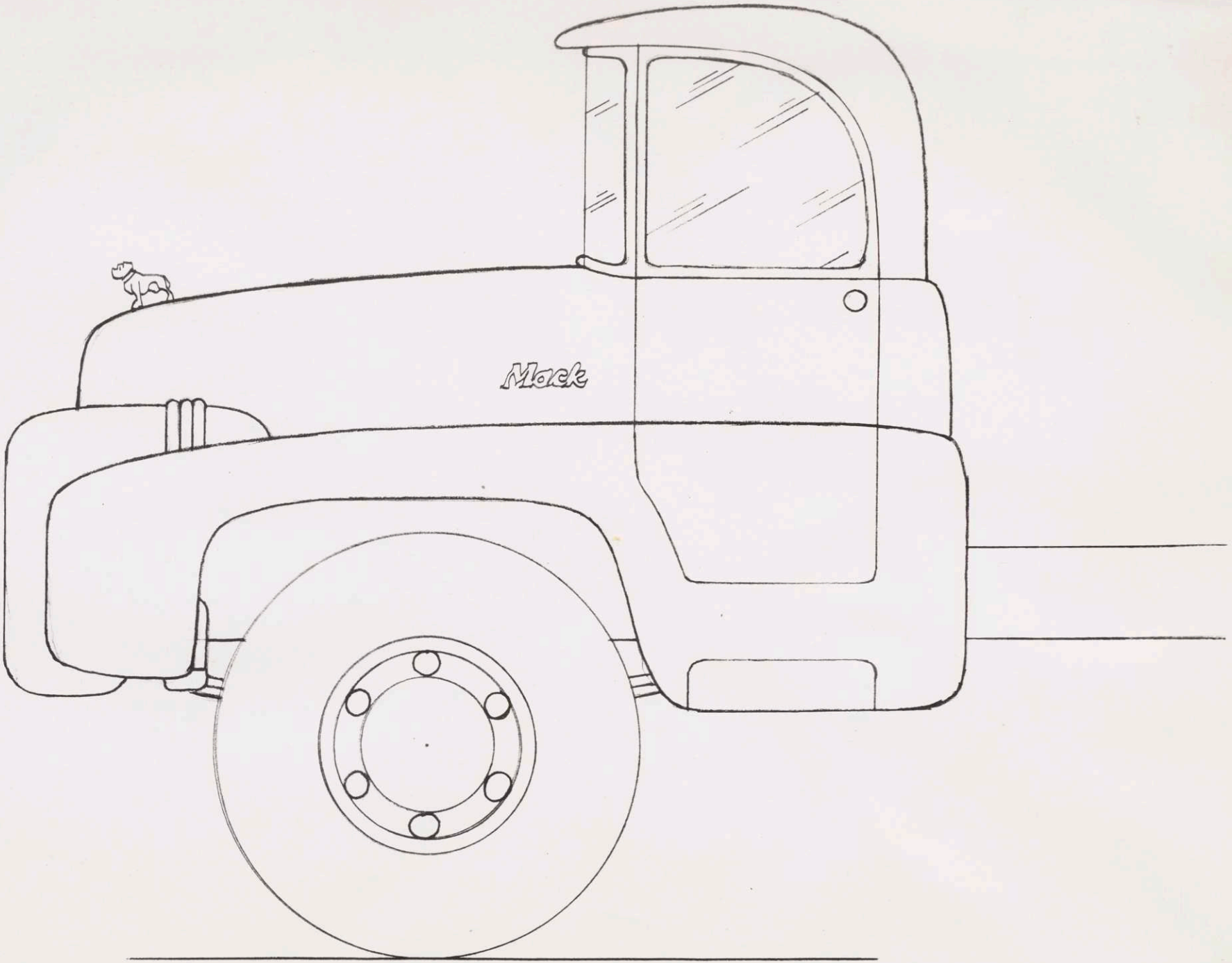
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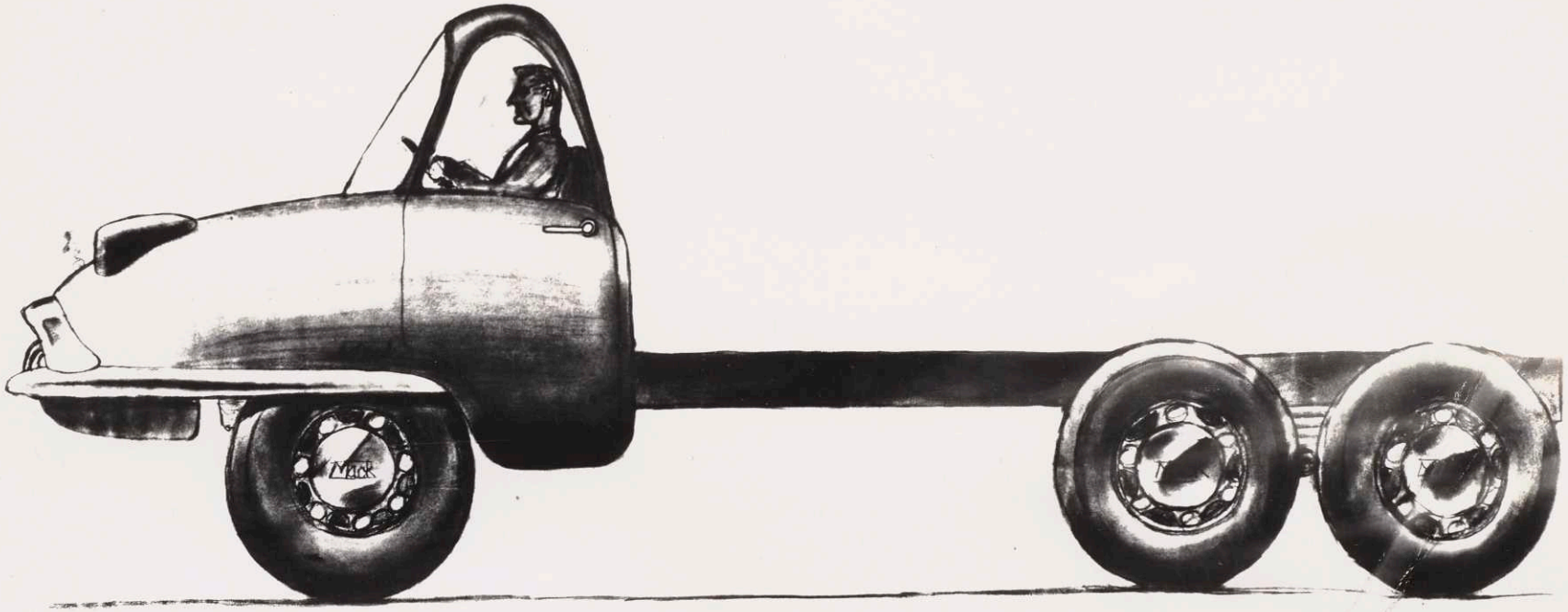
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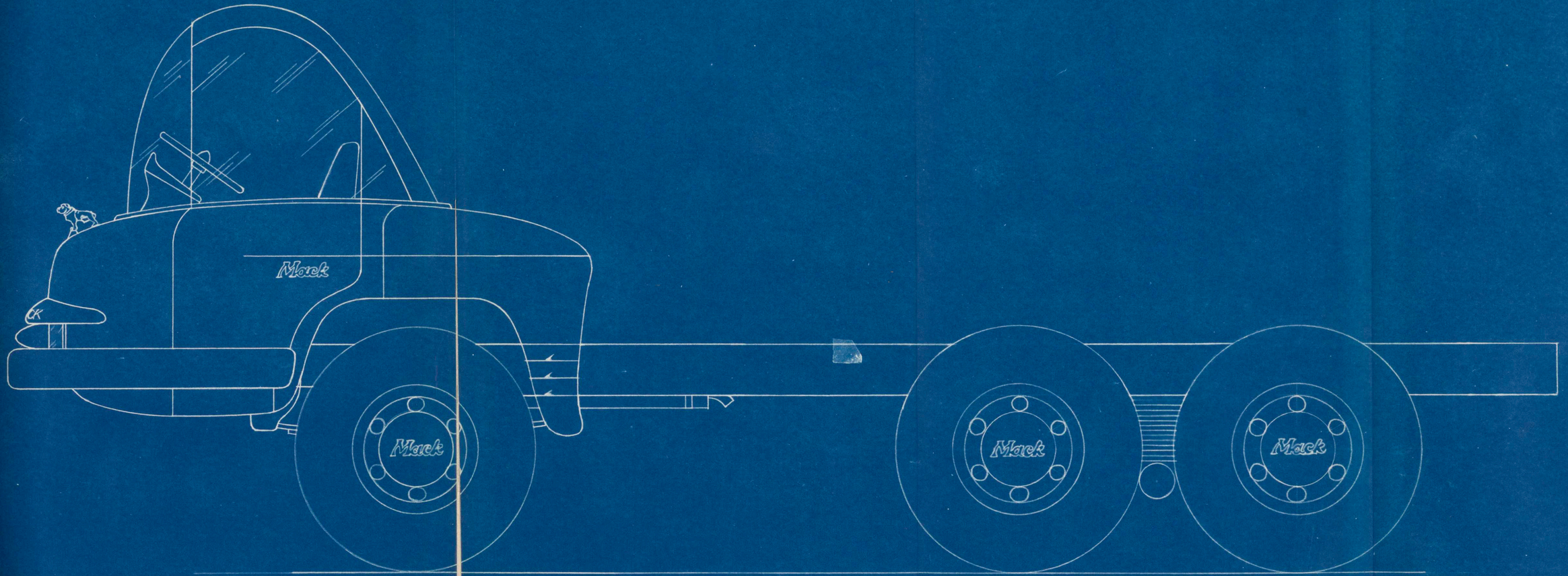
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