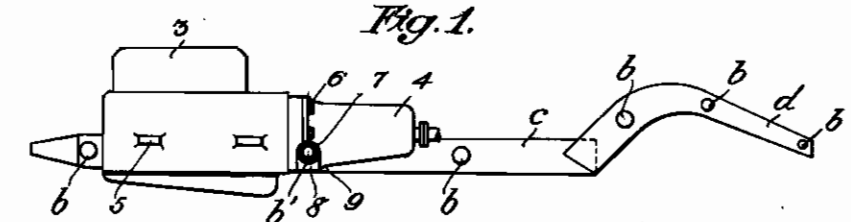
PUBLISHED
MAY 25, 1943.
BY A. P. C.

M. WAGNER
CHASSIS ESPECIALLY FOR MOTOR VEHICLES
Filed March 22, 1939

Serial No.
263,333

Fig. 1.



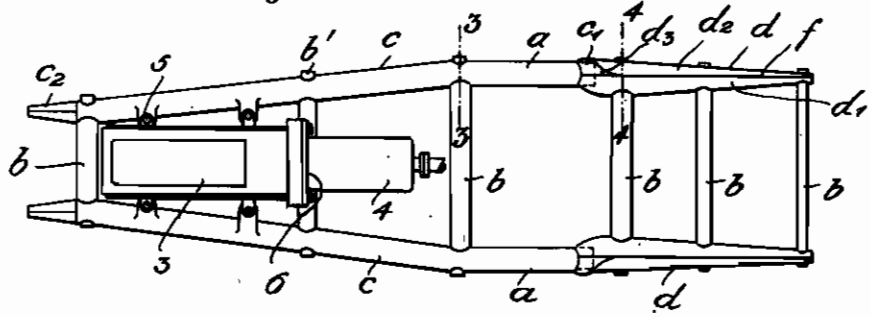


Fig. 2.

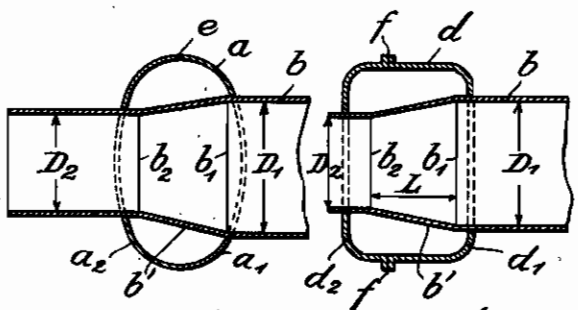


Fig. 3.

Fig. 4.

INVENTOR:
MAX WAGNER
BY Haseltine, Lake & Co.
ATTORNEYS

Published May 25, 1943

Serial No. 263,333

ALIEN PROPERTY CUSTODIAN

CHASSIS ESPECIALLY FOR MOTOR VEHICLES

Max Wagner, Stuttgart, Germany; vested in the Alien Property Custodian

Application filed March 22, 1939

This invention relates to improvements in the construction of chassis for vehicles, especially for motor vehicles. It consists essentially in that the longitudinal members of the chassis comprise on the one hand a practically straight (straight or only slightly outwardly bent) section of one-piece tubular cross-section and on the other hand of a cranked section (especially in the region of the rear axle) the cranked section being formed by at least two pressings which are welded together by longitudinal seams to form a closed cross-section.

Experience has shown, that such chassis built-up of several sections, contrary to first expectations, are in no way weakened by the subdivision, but, on the contrary, possess considerable advantages not only as regards the process of production but also as regards strength.

Owing to the fact, that the straight or substantially straight portion of the frame is formed of a tube of one-piece cross-section, a considerable simplification and cheapening of the chassis is attained. On the other hand, as the rear cranked part is not made also of such one-piece tubes, the objection is obviated that a complicated shaping of the tube is necessary which would also be detrimental for the strength of the chassis.

Moreover owing to the fact that merely that part of the frame which is sharply bent or has a changing cross-section, is composed of several sheet metal pressings, the objection is avoided that the sheet-metal pressings are of very large dimensions, which would require exceptionally large shaping forces and very large machines and pressing dies. With the relatively small dimensions used according to the invention the pressings can be produced without difficulty and advantageously. By suitably welding the pressings and suitably connecting the different sections of the longitudinal chassis members very high strength properties are obtained.

The invention combines the advantage of easy production with the advantage of great strength of the chassis, without the disadvantages of complicated and expensive shaping of tubes and the disadvantages of large pressings.

The invention also relates to a particularly advantageous connection of the two longitudinal member sections resisting bending and torsional stresses.

The invention furthermore relates to a joint between longitudinal and cross chassis members of closed, for example, box-shaped or tubular cross-section, especially for motor vehicles, and insofar consists substantially in that at least one member (particularly a cross member) extends through at least one other member (particularly a lateral longitudinal member) and is reduced in cross section between the two walls of the latter in such a manner that it possesses a larger passage cross section on the side subjected to the heavier load, that is on the inner side, than on the side subjected to the lighter load, that is on the outer side. The penetrating chassis member is welded on its entire periphery to both walls of the chassis member through which it extends.

The object of the further invention is, to increase the strength and stiffness of the connection of the chassis members without the pierced chassis member being weakened by unnecessarily large holes for the passage of the other chassis member. At the same time the reduction in cross-sectional area of the penetrating chassis member represents a saving in weight and material.

The invention finally consists in the provision of tunnel-like passages in these parts of the vehicle which are in the way of the cross-members, for example the chassis members located within the range of the engine and change gears viz. the casings of the driving parts of the engine pass through these. The housing of a driving aggregate consisting of engine and change gear is preferably provided with tunnel-like passages at the joint between the engine and the change-gear flanged thereto through which passages the chassis cross members extend freely. The tunnel-like passages are preferably closed at the bottom by a supporting bridge for the gear case.

This arrangement possesses the advantage that the chassis members need not be bent in proximity to the driving aggregate so that their torsional resistance is fully preserved. This is of particularly great advantage for tubular chassis members. Furthermore, the height at which the bearings of the engine and change gear are located is in no way influenced by the girders, and moreover no vibrations are transmitted from the drive directly to the chassis tubes, and inversely the housing of the drive is protected against the torsional stresses of the chassis.

It is of course also possible to combine the shown combination of the parts of the longitudinal members with the provision of the tunnel-like passages for the cross members with the passing of at least one member, preferably a cross member, through at least one another member, preferably a lateral longitudinal member, especially as shown above for this latter feature.

Other features and advantages of the invention

are disclosed in the construction hereinafter described by way of example with reference to the accompanying drawing, in which:

Fig. 1 shows a chassis in side elevation,

Fig. 2 is a top plan view of Fig. 1,

Fig. 3 is a cross-section on line 3—3 of Fig. 2,

Fig. 4 is a cross-section on line 4—4 of Fig. 2.

The chassis consists of two longitudinal members *a* and of tubular cross members *b*. Each of the longitudinal members is built up of a front section c of oval cross-section and extending substantially straight from its front end to near the rear wheels of the vehicle and of a rear section *d* which extends over the rear wheels in a strong bend.

The cross members, as shown particularly in Figs. 3 and 4, extend through the longitudinal members and are welded thereon on both their passage cross-sections b_1 and b_2, the passage cross-section b_1 on the inner side of the longitudinal member being larger than the passage cross-section b_2 on the outer side thereof.

The front section *c* of the longitudinal chassis member is formed from a plate rolled into a tube of oval cross-section, the abutting edges of the rolled tube being welded together by a longitudinal seam *e* (Fig. 3).

The rear, strongly bent section *d* is formed by two U-shaped pressings d_1 and d_2 each having short flanges *f* by which they are welded together by means of a lower and upper longitudinal seam in such a manner that they form members with a closed substantially box-shaped cross-section.

The front member section c is connected to the rear member section *d* in such a manner that the tubular end c_1 of the member section c is introduced obliquely and laterally into the abruptly rising portion of the rear section. To enable this, the front ends of the two pressings d_1 and d_2 are bent apart so that they grip the ring-shaped end c_1 of the front section on both sides; the wedge-shaped gap thus formed between the two ends of the pressings d_1 and d_2 is covered by a filling plate d_3 which is welded both to the pressings d_1 and d_2 and to the tubular end of the member *c* to form a closed cross-section.

Moreover, the rear end of the front section *c* is welded at the contact edges to the pressings d_1 and d_2 of the rear section.

If desired the front tapering end c_2 of the front section of the longitudinal member may be built up from two pressings corresponding to the rear longitudinal member section, so that the one-piece longitudinal member section *c* is of uniform cross-section along its entire length.

Two embodiments of the further improvements are illustrated in Figs. 3 and 4.

Through the longitudinal member a tubular cross member *b* extends having on the right, inner side a^1 of the longitudinal chassis member a passage cross-section D1 and on the left, outer side a^2 of the longitudinal chassis member a smaller passage cross-section with a diameter D2. The cross member *b* tapers from the D1 to D2 along the section *b'* between the two passage cross-sections.

In Fig. 4 the tubular cross-member *b* tapers in outward direction from the diameter D1 to the outer smaller cross-section D2 along the intermediate section *b'*. The length L of the tapered section *b'* is shorter than the distance between the side walls d_1 and d_2 of the longitudinal chassis girder, so that the connection of these side walls of the longitudinal chassis member with the cross-member takes place at the cylindrical portions of the latter.

In both instances the cross-chassis member is welded to the walls of the longitudinal chassis member on its entire periphery at the passage points, so that a very stiff joint is obtained.

In a corresponding manner the cross-chassis member is connected with another longitudinal chassis member arranged symmetrically on the opposite side of the longitudinal central plane of the vehicle.

If, for example the cross chassis member is loaded on its middle portion (with diameter D1) the load will be taken up chiefly by the inner wall a^1 or d_1 of the longitudinal chassis member, whereas the outer wall a^2 or d_2 will be less heavily loaded.

For this reason the passage cross-sectional area of the outer wall a^2 or d_2 of the longitudinal chassis member may, as mentioned above, be smaller than the passage cross-sectional area of the inner wall a^1 or d_1.

Near the front end of the chassis (Figs. 1 and 2) the driving engine 3 and the change gear 4 are arranged, the change gear being unsupported and flanged to the engine 3, and the engine itself is rigidly connected with the longitudinal chassis members by lateral lugs 5. According to the invention the housing of the driving aggregate 3, 4 has, at the point 6 between the engine and gear cases, a tunnel-like passage 7 (Fig. 1) through which the chassis cross member *b'* located at this point extends freely. The tunnel-like passage 7 is closed at the bottom by a bridge 8 which supports the gear case 4 on the engine case 3. The bridge 8 is separately fitted and bolted (9) between the engine and gear cases. It may, however, be made in one piece either with the engine case or with the gear case.

The invention may be applied in such a manner that the chassis cross-member extends through a tunnel-like passage in the engine case, provided the constructional shape of the crank shaft and sump will allow.

MAX WAGNER.