

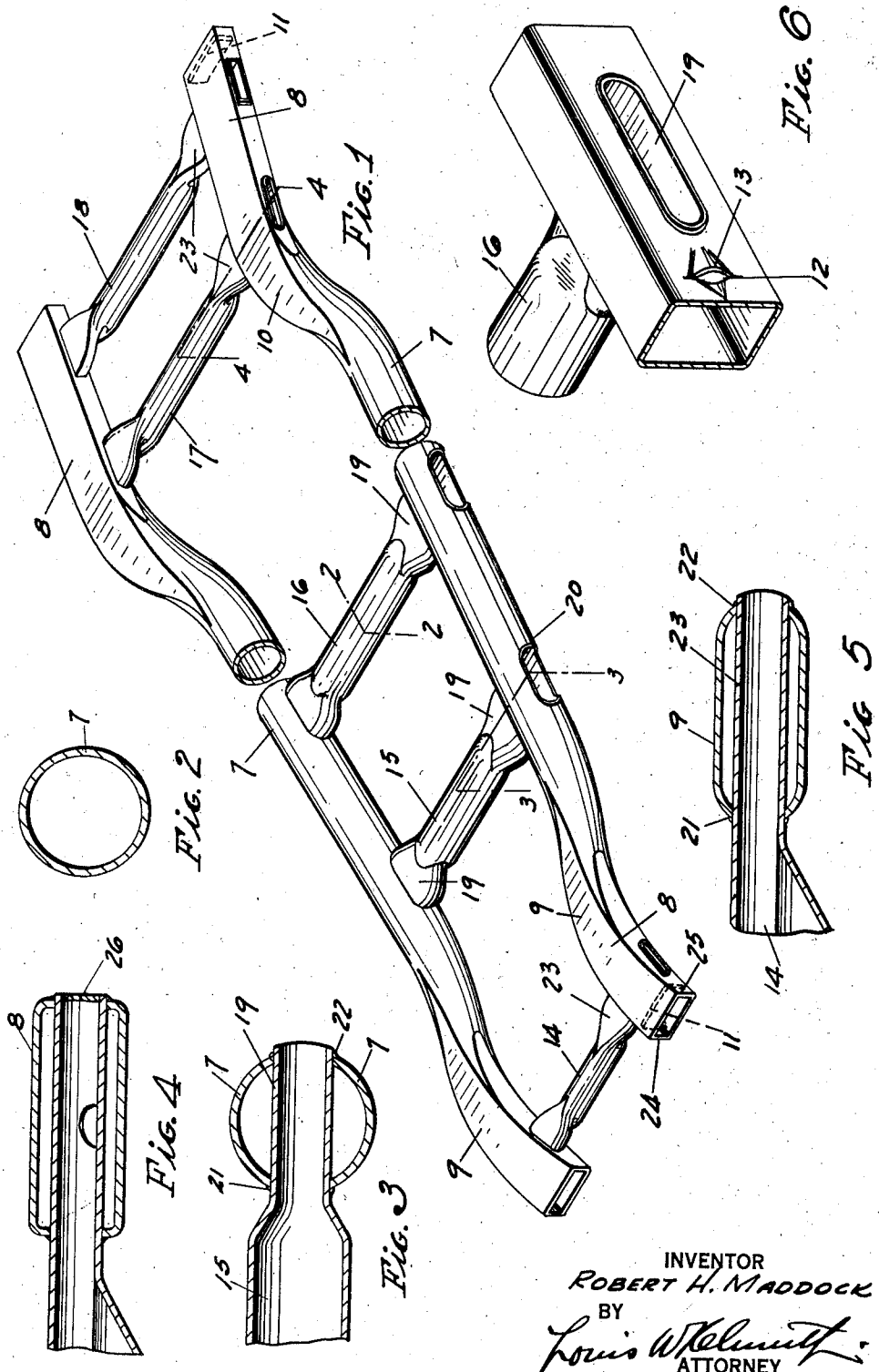
Feb. 8, 1938.

R. H. MADDOCK

2,107,382

VEHICLE FRAME

Filed Nov. 27, 1933



INVENTOR
ROBERT H. MADDOCK
BY
Louis W. Kellogg
ATTORNEY

UNITED STATES PATENT OFFICE

2,107,382

VEHICLE FRAME

Robert H. Maddock, Cleveland, Ohio, assignor to
The Midland Steel Products Company, Cleve-
land, Ohio, a corporation of Ohio

Application November 27, 1933, Serial No. 699,822

10 Claims. (Cl. 280—106)

This invention relates to new and useful im-
provements in motor vehicle frames.

An important object is to provide a frame for
motor vehicles which can be constructed from
5 very light gauge metal and yet will be stronger
and more rigid than conventional frames em-
ploying heavier gauge channel shaped side rails.

Another important object of the invention is
to provide a frame having side rails provided with
10 kickups or offset portions in a manner which will
further lower the center of gravity of the body
mounted thereon without requiring expensive
blanking operations or elaborate apparatus for
effecting the edgewise bending of strips to obtain
15 the requisite kickup portions in the side rails.

A further object of the invention is to provide
torsionally strong cross members which have com-
paratively wide ends for extension through the
box section side rails and attachment to oppo-
20 site webs of each rail, thereby cutting down on
the tendencies for the frame to weave.

A still further object of the invention is to pro-
vide a frame having its side rails and cross mem-
bers all formed of complete box cross section to
serve in the capacity of storage compartments for
25 fuel, oil or the like, or may be employed for the
conduct of exhaust gases from the power unit or
for the conduct of air to and from the body of the
motor vehicle for ventilating or heating purposes.

30 Other objects and advantages of the invention
will become apparent during the course of the
following description.

In the accompanying drawing forming a part
of the description and wherein like numerals are
employed to designate like parts throughout the
35 several views,

Fig. 1 is a perspective view of the new form of
frame assembled,

Fig. 2 is a transverse section of one of the cross
40 members taken on the line 2—2 of Fig. 1,

Fig. 3 is a section taken along the line 3—3 of
Fig. 1,

Fig. 4 is a similar view taken on the line 4—4
of Fig. 1,

45 Fig. 5 is a similar view, illustrating a modified
form or cross section for the offset portions of the
rails, and

Fig. 6 is a perspective view of a fragment of the
frame illustrating the modification of the cross
50 sectional shape of the side rail.

Referring now more particularly to the drawing,
the numeral 7 designates a pair of like side
rails which are of closed box cross section and
preferably circular cross section so that they can
55 be made out of seamless or welded tubing of very

light gauge. However, if desired, these side
rails may be formed into the desired cross section
from flat blanks suitably contoured to impart
the requisite final shape and after being formed
up into closed box cross section may have their
5 longitudinal edges secured together as by welding
or other equivalent means.

The front and rear ends of each side rail are
flattened as at 8 to form them into substantially
10 rectangular cross section, the flattening of these
ends being in a plane normal to the vertical plane
of the rail, which enlarges them laterally while
reducing their depth. After the flattening step
or during the same, the front and rear ends of
15 each side rail are offset as at 9 and 10 to provide
the same with kickup portions for lowering the
frame over the axles. By reason of flattening
the ends of the substantially uniform cross sec-
tion side rail, the flattened ends will be of sub-
stantially the same section modulus as the inter-
20 mediate portions of the rail. Opposite ends of
this box section side rail, if desired, may be closed
with suitable plates 11 welded into place for mak-
ing a compartment throughout the length of the
rail or for any desired fraction of its length. In
25 the event these hollow side rails are employed for
the conduct of outside air or for the discharge
of exhaust gases from the internal combustion
engine of the vehicle, the rear plates 11 can be
eliminated or positioned so as not to interfere
30 with this function. If desired, the cross section
of these hollow side rails can be square as shown
in Fig. 6, rectangular, oval or otherwise and the
walls of this hollow section may be provided with
35 openings 12, opposite margins of which are de-
flected or bent in opposite directions as at 13 so
as to admit atmospheric air during forward
movement of the vehicle to set up a Venturi ac-
tion within the tubular rail and create suction
40 through the same or in any portion thereof to
draw air out of the body or any other part. This
effect may be employed in more rapidly exhaust-
ing the hollow rails or for setting up differential
pressures therein on opposite sides of a diaphragm
45 or piston mounted therein and used for the op-
eration of brakes, clutch or the like it being un-
derstood that atmospheric air pressure in con-
trolled amounts can be admitted to the rail
through a valve on the high pressure side of the
50 diaphragm.

These side rails are connected together by
means of a plurality of cross members 14, 15, 16,
17, and 18, all of which are preferably of closed
box section and tubular as shown in Fig. 2 for
55 the torsion resisting ability of such section and

its adaptability to attachment to the side rails. The two intermediate cross members 15 and 16 have opposite ends flattened in a medial, horizontal plane of the cross member and normal to its vertical plane to provide opposite ends of the cross member with laterally extended flattened ends 19 of substantially oval or non-circular section of a size to extend through corresponding openings 20 in opposite sides of the side rail to be welded thereto at points 21 and 22.

In the case of the cross members 14, 17, and 18 which join the flat ends of the side rails, they have their ends flattened to extend through correspondingly shaped apertures in opposite side walls 24 and 25 of the flattened portions to be welded to both. The flattening of the ends of these cross members is performed so that the upper surfaces of the flattened ends will be in substantially the same plane with the top of the intermediate portion so as not to interfere with the attachment of the body or other adjuncts of the motor vehicle. As shown in Fig. 4, the ends of these cross members may be closed with plates 26 welded in the ends so that the cross members can be employed in the capacity of sealed containers and in case it is desired to communicate the space within any cross member with the enclosed space of the side rails, openings may be provided in the flattened ends of the cross members within the confines of the side rail cross section. Due to the provision of non-circular ends on the cross members, the latter form good torsion resisting joints with the side rail and form the strongest known cross members with the least amount of fabricating effort. These cross members, like the side rails may be formed from seamless or welded tubular stock or they may be formed from flat blanks and subsequently welded to form the closed box section. They may also have bends or offset portions to avoid other parts of the vehicle. The exhaust manifold of the internal combustion engine mounted upon said chassis or pipes from the interior of the body may be tapped into the side rails or cross members and vented out through the rear end of one or both side rails, in which case the rear end plates 11, will of course be omitted and suitable openings provided in either the ends of the rear cross members or the side rail for the escape of the burned gases or air. Or, if desired, the entire rear ends of the side rails and two rear cross members 17 and 18 may be employed as storage space for fuel or lubricating oils by suitably closing off the rear ends of the rails with partitions or by means of the ends of the cross members completely closing off the space between the two rear cross members.

I claim:

1. A tubular frame member for automotive vehicles having each end offset in a vertical plane and flattened in a plane normal to the vertical plane thereof and said offset portion being extended laterally beyond the sides of the intermediate portion.

2. A tubular member for vehicle frames having its ends wider than its intermediate portion and offset in a vertical plane and of closed box section throughout its length.

3. A metal side rail for automotive vehicles, said side rail being of tubular cross section and having varied cross section at predetermined points and of substantially the same perimeter throughout.

4. A side rail of closed box section throughout

its entire length and having ends of decreased vertical section and increased horizontal section as compared with the mid-section and offset in a vertical plane.

5. A motor vehicle frame including tubular side rails, each having an end flattened in a plane normal to the vertical plane thereof and curved vertically, and a cross member having flattened ends extending through the flattened ends of the rails.

6. In a motor vehicle, means for reducing the extent to which a longitudinal member of an automobile frame must be curved vertically to form kickups of sufficient degrees to establish the required axle clearance and low center of gravity, including a longitudinal member having its ends curved vertically and made flatter horizontally than the mid-section of said longitudinal member to reduce the degree of kickup below that required to curve rails without said flattened portions.

7. In a motor vehicle, means for reducing the extent to which side rails of automobile frames must be curved vertically to form kickups of sufficient degrees to establish the required axle clearance and low center of gravity of the automobile comprising tubular or box section side rails having its ends curved vertically and flattened horizontally to spread the kickup portions laterally beyond the vertical sides of the intermediate portions of the rails to reduce the degree of kickup below that required to curve rails without said flattened portions.

8. In a motor vehicle, a means for reducing the extent to which side rails of automobile frames must be curved vertically to form kickups of sufficient degrees to establish the required axle clearance and low center of gravity of the automobile comprising tubular or box section side rails having its ends curved vertically and flattened horizontally to spread the kickup portions laterally beyond the vertical sides of the intermediate portions of the rails to reduce the degree of kickup below that required to curve rails without said flattened portions, and cross members connecting the two rails in spaced relationship and welded to both vertical side walls of each flattened section adjacent the kickup portions.

9. In a motor vehicle, means for reducing the extent to which side rails of automobile frames must be curved vertically to form kickups of sufficient degrees to establish the required axle clearance and low center of gravity of the automobile comprising tubular box section side rails each having its ends curved vertically and flattened horizontally to spread the kickup portions laterally beyond the vertical sides of the intermediate portions of the rail to reduce the degree of kickup below that required to curve rails without said flattened portions, and tubular cross members connecting the rails in spaced relationship, the ends of said cross members being tubular and flattened horizontally to substantially equal the cross section of the kickup portion of the rails and said ends being extended through opposed walls of each flattened section of the rails adjacent the kickup portions and welded thereto.

10. A tubular member for vehicle frame having its ends wider than its intermediate portion and of substantially elliptic section, and the lower walls of said ends being arranged in planes elevated above the plane of the lower wall of the intermediate portion.

ROBERT H. MADDOCK.