

No. 652,648.

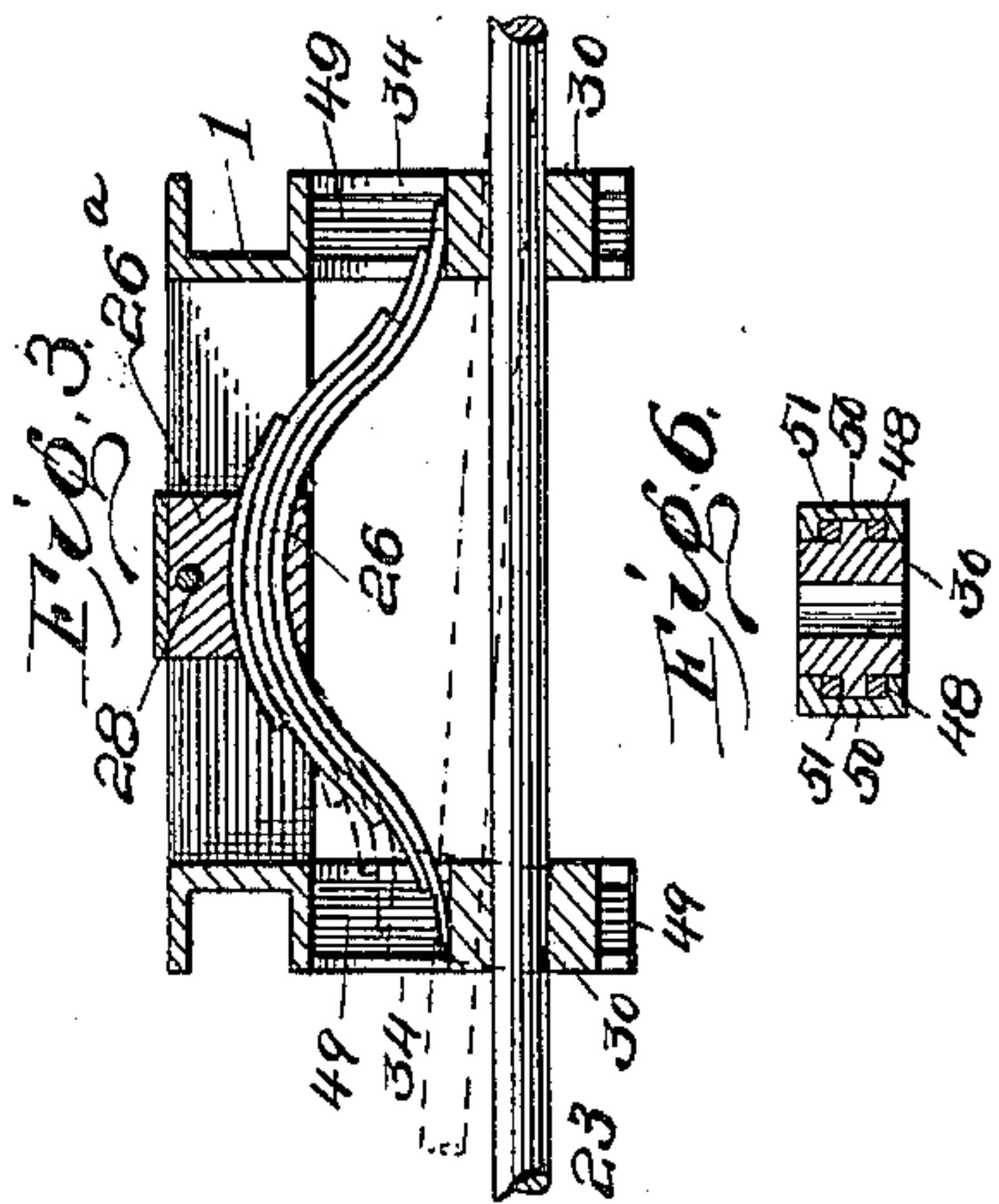
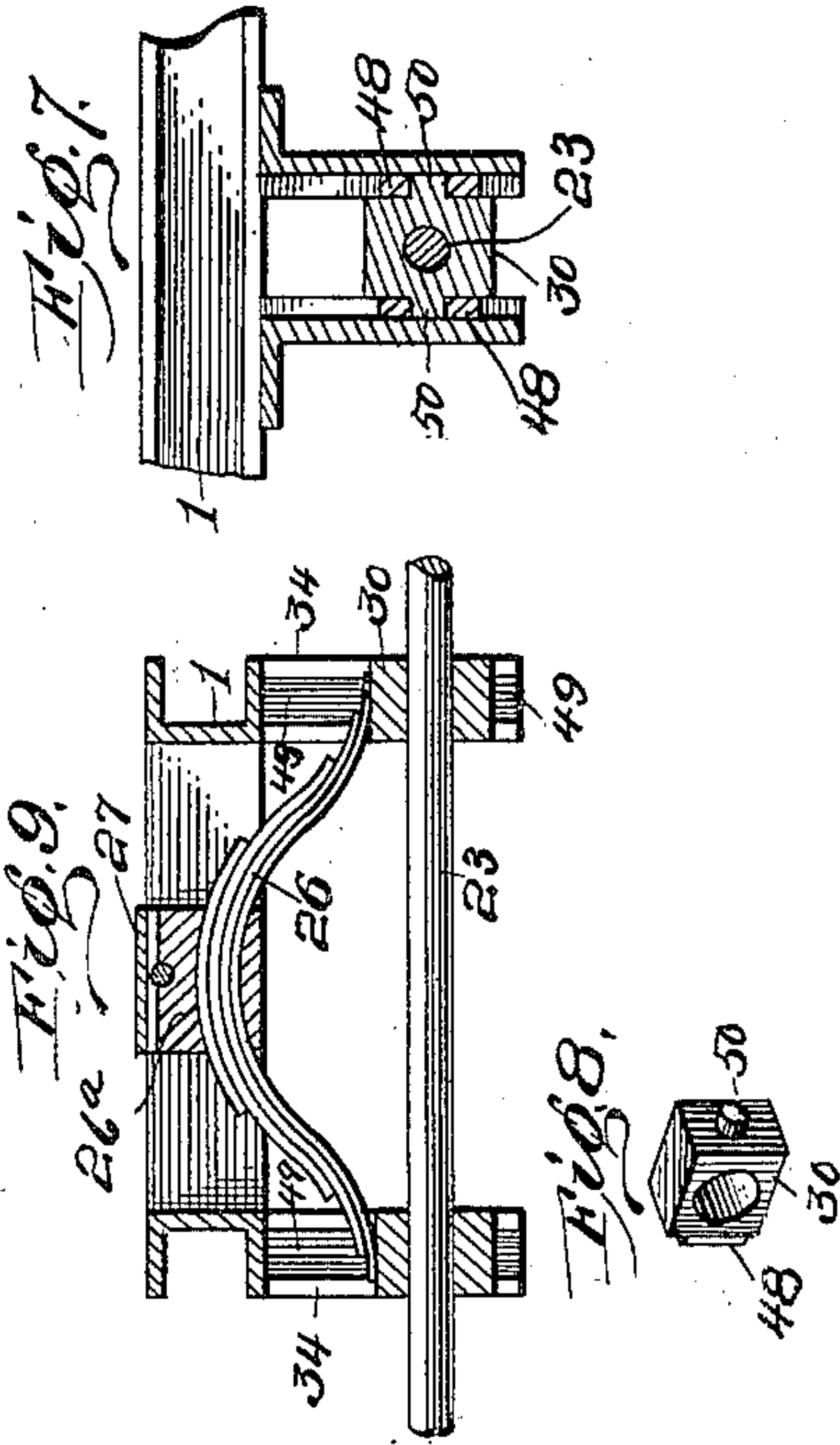
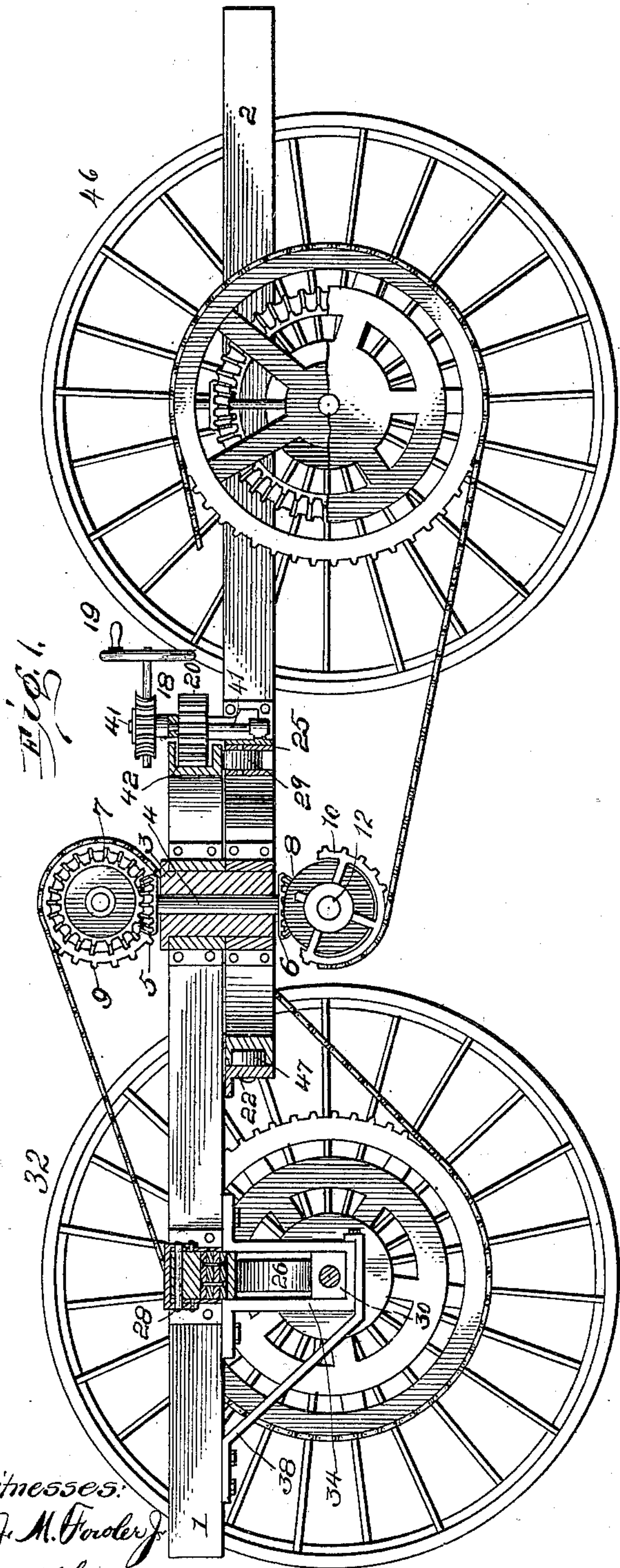
Patented June 26, 1900.

F. SOMMER.
TRACTION ENGINE.

(Application filed Feb. 1, 1900.)

(No Model.)

3 Sheets—Sheet 1.



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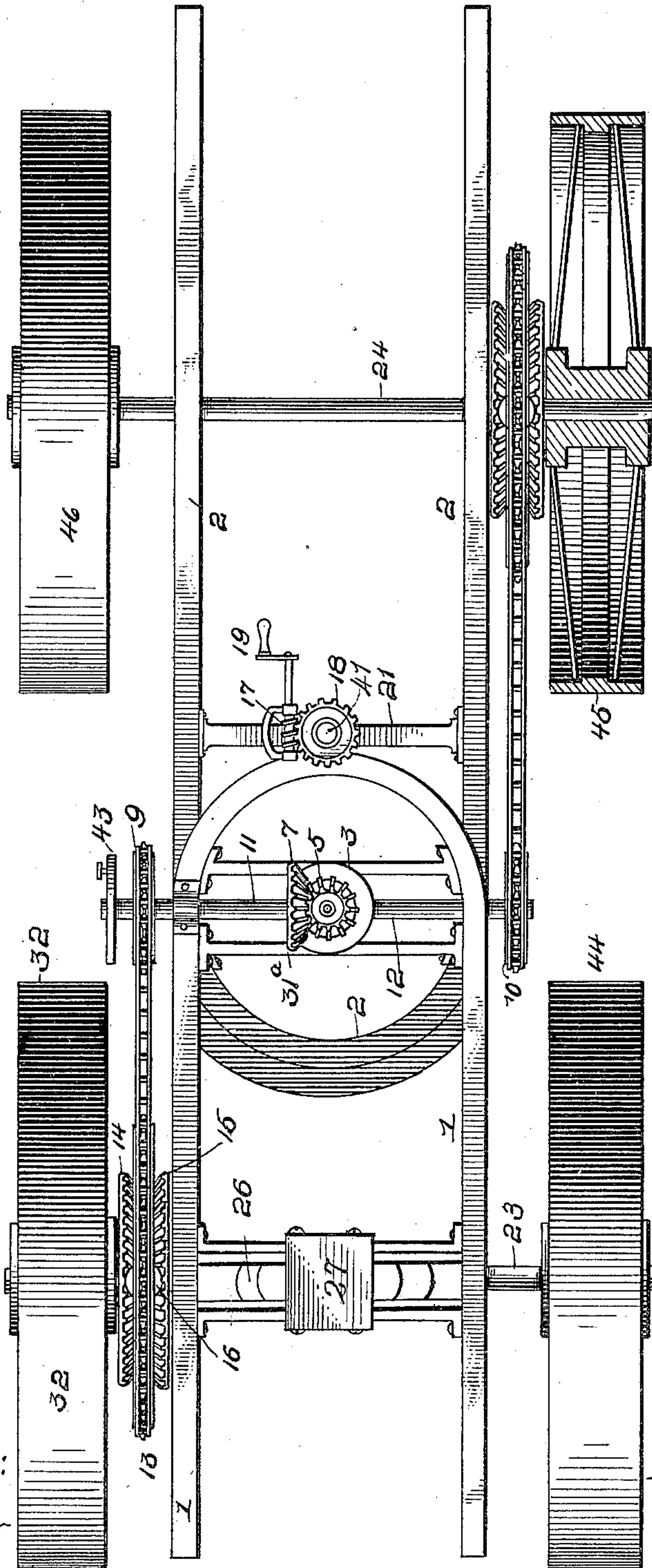
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(Application filed Feb. 1, 1900.)

(No Model.)

3 Sheets—Sheet 2.

Fig. 2



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Fig. 5.

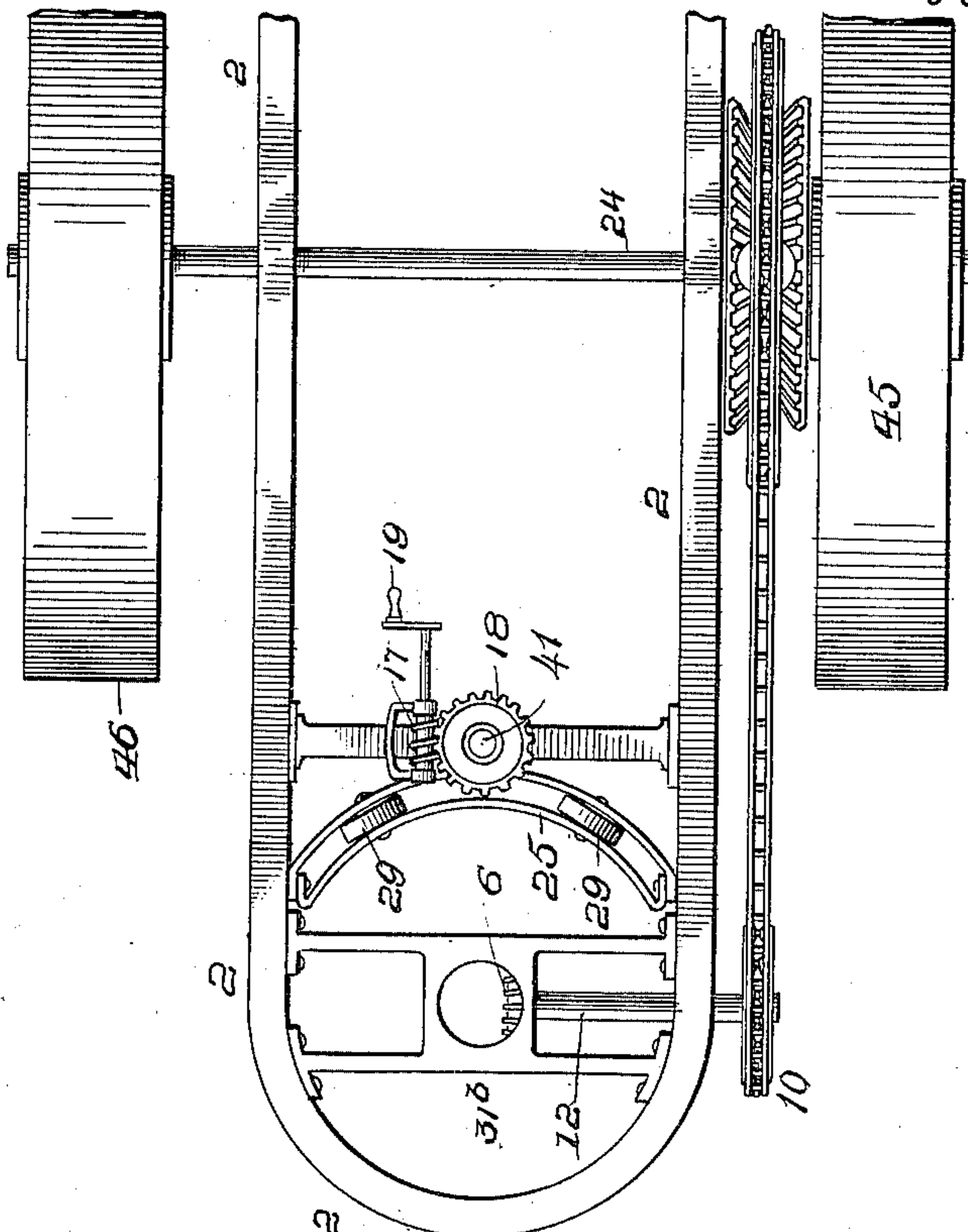
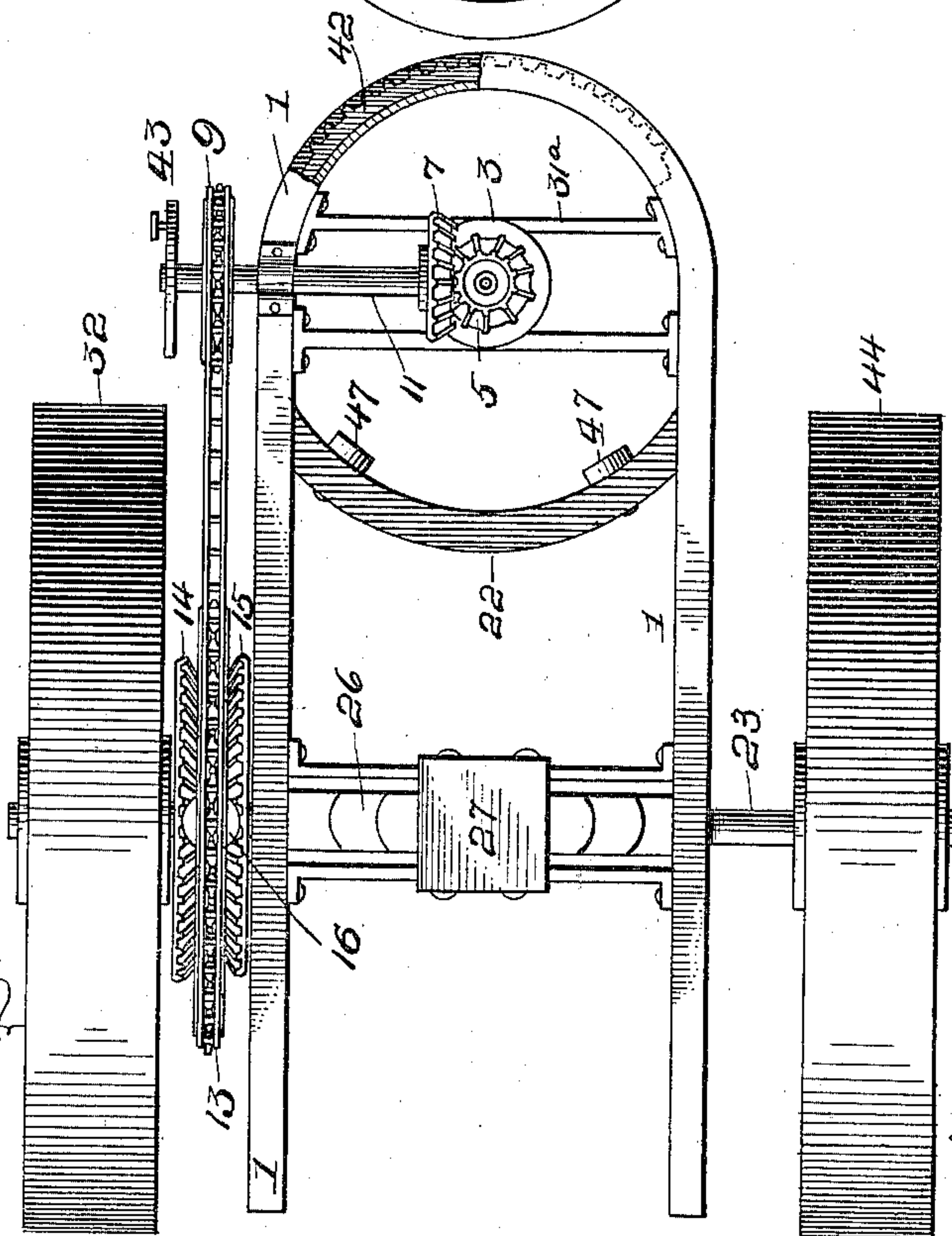


Fig. 4.



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UNITED STATES PATENT OFFICE.

FRANK SOMMER, OF NEW YORK, N. Y.

TRACTION-ENGINE.

SPECIFICATION forming part of Letters Patent No. 652,648, dated June 26, 1900.

Application filed February 1, 1900. Serial No. 3,573. (No model.)

To all whom it may concern:

Be it known that I, FRANK SOMMER, a citizen of the United States, residing at New York city, in the county of New York and State of New York, have invented certain new and useful Improvements in Traction-Engines or Motor-Vehicles; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in motor-vehicles—such as are commonly known as “traction-engines,” “road-engines,” “automobiles,” &c.—designed for running on the common roads or public highways.

The objects of my invention are to provide for a strong and durable frame for connecting the front and rear axles of the main or road-bearing or driving wheels, to provide an efficient and simplified construction for steering the machine, to afford a compact arrangement of connecting-gear between the motor and the driving-wheels and improved means for supporting the main framework on springs over one or more of the axles, and to provide a special construction of parts, as will hereinafter be particularly described.

The invention consists in various parts, constructions, and combinations embodied in the claims.

Figure 1 is a side elevation of my motor-vehicle, partly in section. Fig. 2 is a top plan view thereof. Fig. 3 is a transverse sectional view, with parts in elevation, taken on the line *xx* of Figs. 1 and 2. Figs. 4 and 5 are top plan views of the front and rear frames detached. Fig. 6 is a horizontal sectional view through the pedestal-housing of one of the front axle-boxes. Fig. 7 is a vertical section of the same. Fig. 8 is a perspective view of a detached axle-box. Fig. 9 is a transverse sectional view showing a modification of the construction shown in Fig. 3.

The main-frame part of my motor-vehicle is comprised of two parts, the front frame part passing horizontally over the front axle at a sufficient distance above to admit of the interposition of a spring or springs between the same and the axle-boxes of the front supporting or driving wheels of the vehicle, and

the rear frame part passing likewise over the rear axle and axle-boxes, &c. The front frame part preferably overlaps the rear frame part at or near a midway point between the axles, and hence the front frame part is sometimes mentioned as the “upper” frame part and the rear frame part as the “lower” frame part, and the said two parts are coupled together at their meeting, bearing, or overlapping ends by an arrangement of parts having a special construction whereby to afford a strong and durable coupling well adapted for preventing sagging under weight of machinery and of freight or passengers, or all combined, carried thereon, and a coupling-platform and joint capable of facile sidewise or lateral movements for steering the vehicle. The main-frame part, therefore, is composed of two parts having a hinged or pivotal connection, and the parts extending from adjoined ends are respectively connected by means of housings containing springs with the main front-wheel axle 23 and the main rear-wheel axle 24, on which are placed the supporting-wheels of the vehicle, which wheels are preferably in my motor-vehicle all of the kind known as “driving-wheels.” The main frame, comprised of two parts coupled together, may obviously be applied to other than motor-vehicles, and said main frame need not necessarily extend in a straight or horizontal plane, but may be varied therefrom to suit any variations that may be found desirable because of a difference in the heights of the front and the rear axles of a vehicle. Side movements or lateral deflections of the pivoted connections, because of the parts of the frame extending therefrom to the front and rear axles 23 and 24 and being connected therewith by housings or pedestals, cause said front and rear axles to be deflected in unison, carrying one of the wheels forward and the other backward on each axle, and thus guiding or steering the vehicle. Any suitable means may be provided other than the one I have shown for swerving or deflecting the joint of the parts of the main frame, but preferably a kind should be adopted for accomplishing the steering while the vehicle is being propelled along a road. In the drawings I have shown a construction comprised of a segmental rack and spur-wheel gear-

ing together with a worm-wheel gearing and a hand-wheel as a means of operating by hand-power by an attendant upon the main-frame platform for operating the joint of the frame parts, sometimes termed the "circular turn-table," to move said joint from side to side as desired in steering the vehicle. The shaft 41, carrying the spur-wheel 20 and worm-gearing 17 and 18 with hand-wheel 19, as contrived by me is mounted on the rear or lower frame part 2 of the main frame, the spur-wheel being arranged to mesh in the segmental rack 42 of the rear part of the upper or front frame part 1 of the general frame. Through the jointed or pivotally-connected parts forming the joint proper, or, more specifically speaking, through the centrally bored king-pin 3, a shaft 4 of the general driving mechanism is passed and therein located for rotation. The upper end of said shaft is provided with the bevel-wheel 5 and the lower end thereof with the bevel-wheel 6, and each of said bevel-wheels is connected with a similar train of gearing, the one for operating the front driving-wheels and the other the rear driving-wheels. By this means the power derived from the motor as applied to the motor-power crank-wheel 43 is carried to the front driving-wheels 32 and 44 from a point above the upper frame part, and the power for driving the hind driving-wheels 45 and 46 is carried from a point below the lower frame part, the vertical shaft 4 revolving in bearings formed in the center bore of the king-pin 3, the arrangement connecting the two trains of gearing and causing them to operate in unison. I make use of differential gearing in connection with the front and rear axles for operating the driving-wheels, this being a common and well-adapted species of mechanism for that purpose.

Antifriction-wheels 47 are used in connection with the joined parts of the frame 1 and 2 to facilitate the working thereof and to assist in supporting said parts in their normal positions and especially to prevent the jointed part of the main or entire frame from sagging down under stress of weight. Springs are placed above the axle-boxes of the front and the rear axles, those of ordinary pattern being in this instance used on the rear axle-boxes and a rocking or cradling spring or set of leaf-springs 26 of a special construction being used on the front axle-boxes 30.

The frame as an entirety, serving as a coupling and also in the nature of the framework of a platform for carrying a superstructure for passengers and freight and on which frame is to be mounted the propelling-motor, is made in two parts, each part preferably comprised of channel-shaped iron and the said frame part lengthwise being shaped like the letter U, these meeting ends of the frame parts being preferably lapped the one over the other. As shown in the drawings, the upper or forward part, called the "front" frame part 1 of the frame, overlaps the lower or rear part

called the "rear" frame part 2, around the place of jointure at a point midway, or nearly so, between the main axles of the motor-vehicle. As shown, these two meeting ends of the frame parts 1 and 2 are so placed, the one over the other, as to form a circle—in other words, a sort of circular turn-table when secured together pivotally by a king-pin 3, passing through bearings formed in the central portions of the castings or cross-braces 31^a 31^b. Under the upper or front frame part 1 is formed or attached thereto a semicircular piece 22 with antifriction-wheels 47 attached thereto, which wheels fit securely and somewhat closely into the recess or channel in the forward end of the lower frame part 2. Another and nearly-similar semicircular piece 25 is attached to the lower or rear frame part 2, to which other antifriction-wheels 29 are attached, and on the said wheels the rear end of the upper frame part 1 bears, thereby facilitating the turning of the one part on the other. These connections form with the cooperating mechanism of frame parts 1 and 2 the circular turn-table.

In the center of the turn-table the stout king-pin 3 is supported in bearings formed in the two pieces or castings 31^a 31^b, each piece being made fast to its respective frame part of the frame parts 1 and 2, and when the rounded ends of the said frame parts are in true position the round king-pin 3 enters vertically in the bearings formed in the said pieces or castings 31^a 31^b, and thus the said king-pin assists in forming a coupling of the frame parts 1 and 2, while the antifriction-wheels on the semicircular pieces 22 and 25 also assist in locking the frames 1 and 2 together and supporting the joint. By reason of the aforesaid construction and arrangement of parts the entire frame—that is, the main body-frame, composed of the two frame parts 1 and 2 and including the circular turn-table—will stand should the king-pin be removed. Should it be desired to part the frame, simply remove the king-pin and pull back the rear part, thus releasing the friction-wheels from the recess of lower frame part 2.

To the lower frame part 2 is attached a suitable yoke 21 to hold the upright shaft 41 of the steering-gear. In the recess or channel of the upper frame part 1, on the rear end, is a semicircular section of spur-gear or a segmental rack with which a spur-gear pinion 20 engages. Such spur-gear pinion is secured on the steering-shaft 41, to the top of which is fastened a worm-wheel 18 for operation by a worm-spindle 17, secured on the stem of steering-wheel 19. By turning the hand steering-wheel the worm-spindle engages the worm-wheel and turns the steering-shaft, rotating its pinion engaging a segmental rack in the rear part of frame part 1, thereby turning the said frame part 1 at angles to the frame part 2, they turning on the king-pin 3, and being facilitated in the turn-

ing by the slight resistance or lessened friction resulting from the use of the antifric-
tion-wheels 47 and 29. On the top of the
axle-boxes 30 an elliptical spring or set of el-
5 liptical springs 26 is arranged to rest, se-
cured by a center brace or piece 27, partly in-
closing the same, and by a bolt 28, thus al-
lowing the spring or springs to cradle or rock
10 one or the other may rise or fall.

As shown in Fig. 3, the top leaf of the set
of elliptical springs 26 is surmounted with a
top brace-piece 27 26^a, having a bolt 28 pass-
ing through a hole therein, on which the
15 spring or set of springs may rock; but the
bolt may be placed to rest in a notch in top
of the brace at a midway or central point
thereof. (See Fig. 9.) A single strong el-
liptical spring might be used in motor-vehi-
20 cles of light construction, but generally a set
of elliptical leaf-springs is preferred. The
said axle-boxes are pivotally connected to
gibs 48, located in guideways 49 of the axle-
box housings or pedestals 34. The said hous-
25 ings or pedestals 34 when separately formed
are made fast to the under part of the front
frame part 1.

Preferably each of the front axle-boxes is
provided with projecting dowels or journals
30 50, one on each of the two opposite sides
thereof, which enter apertures 51 in the gibs
48, one on each of the two opposite sides of
the axle-box, which gibs are free to slide up
and down in the guideways 49 of the hous-
35 ings or pedestals 34. This sliding action of
the axle-boxes held in the guideways of the
pedestals by the gibs sliding therein allows
either end of the axle and its axle-box to
slide up or down independently of the other,
40 and the pivotal connection between the axle-
boxes and the respective sliding gibs allows
said axle-boxes to tilt from side to side, as
shown in dotted lines in Fig. 3. This keeps
the axle-box bearings in true line with the
45 axles, and the rocking or cradle action of the
spring allows it to accommodate the pressure
of its ends to the varying positions of the
axle-boxes. The long bearings of the cast-
ings 31^a and 31^b (of frame parts 1 and 2)
50 maintain the stout king-pin 3 in its verti-
cal position to join and pivot the frame
parts 1 and 2 together, and the king-pin's
centrally-bored opening receives the upright
shaft 4, to which bevel-gears 5 and 6 are
55 attached, both the same size—one, 5, on top,
the other, 6, on the other end. The upper
shaft 11 runs in bearings attached to the up-
per part of frame 1. Attached to the said
shaft is the bevel-gear 7, engaging with bevel-
60 gear 5 on the top of upright shaft 4. On the
other end of shaft 11 is attached a sprocket-
wheel 9, over which runs a link chain com-
ing in contact with sprocket-wheel 13 of the
differential gear. The bevel-gear 14 of the
65 differential gear is secured to the large front
wheel 32, it being loose on the axle, and the
oppositely-located front wheel 44 being se-

cured to the axle. The other bevel-gear 15 is
attached to the axle, and both bevel-gears 14
and 15 engage the bevel-pinions 16, which are 70
doweled in suitable recesses of the sprocket-
wheel 13 of the differential gear.

The lower shaft 12 runs in bearings at-
tached to the lower part of frame 2. On the
lower shaft 12 is attached a bevel-gear 8 and 75
a sprocket-wheel 10 in the same manner as
those on the upper shaft. A link chain from
sprocket-wheel 10 extends to the sprocket-
wheel and differential gear on the rear main
axle, which is diagonally across from the dif- 80
ferential gear of the front main axle of the
motor-vehicle.

On the under part of frame 1 of the bottom
of the pedestal runs a pedestal-brace 38, which
secures the boxes from leaving the pedestals— 85
that is, from going down too far and out. The
axle-boxes on the lower or rear frame 2 may
cushion on spiral springs in suitable recesses
of the axle-box housings. (Not here shown.)
Each frame part of the two frame parts 1 and 90
2, together with its rigidly-fixed parts, might
be made of a single casting and not depart
from the essential features of its construc-
tion—for instance, the frame part 1, with its rig-
idly-fixed semicircular parts 2, and the trans- 95
verse brace-piece 31^a, having its central bear-
ing for receiving the king-pin, together with
the pedestals or housings 34, to be cast in one
piece; but I prefer to make them in parts and
secure them together, as heretofore described, 100
and shown in the drawings. Each frame part
may be made of any suitable strong material;
but I prefer to make it of iron and use chan-
neled iron for the U-shaped parts of the main
frame, as heretofore described and shown. 105

Having thus fully described and illustrated
my invention, I claim the following:

1. In a vehicle a frame comprised of two
parts pivoted to each other and forming a
coupling-frame and the front and rear axles 110
secured thereto, in combination with a tilt-
ing spring between the frame and one of the
axles, substantially as described.

2. A two-part coupling-frame, having piv-
otal connection of its parts, each with the 115
other, provided with antifric-tion-wheels and
their bearings, and having yielding or spring
connections with the main axle, substantially
as and for the purpose described.

3. A vehicle motor-frame, consisting of two 120
parts joined together by a pivotal connection,
one part of which has attached thereto a semi-
circular piece and antifric-tion wheels or roll-
ers, substantially as and for the purpose de-
scribed. 125

4. A vehicle motor-frame, composed of two
parts joined together by a pivotal connection
and each having attached thereto a semicir-
cular piece, in combination with antifric-tion
wheels or rollers, substantially as and for the 130
purpose described.

5. The frame 1 having the supporting
brace-piece 31^a provided with an opening for
the king-bolt, in combination with a king-

bolt having a central opening, substantially as and for the purpose described.

6. The frame-pieces 1 and 2, each having a brace-piece and a king-pin joining them, in combination with semicircular pieces and antifriction-wheels, substantially as and for the purpose described.

7. The frame-pieces 1 and 2, having the brace-pieces 31^a and 31^b and a centrally-bored king bolt or pin 3, passing through said openings in the brace-pieces, substantially as and for the purposes described.

8. An axle and axle-boxes and an upright spring bearing on the said boxes, in combination with a frame of the vehicle bearing on said spring, substantially as and for the purpose described.

9. An axle and axle-box and a pedestal or housing, the latter having guideways in combination with gibs having a pivotal connection with the axle-box, substantially as and for the purpose described.

10. A tilting spring having a horizontal bearing, in combination with a frame and vertically-movable axle-boxes, the ends of the said spring bearing on the axle-boxes, substantially as and for the purpose described.

11. The frame-pieces 1 and 2 having the brace-pieces 31^a and 31^b, provided with openings, and a centrally-bored king-pin 3 passing through said openings, in combination with a shaft 4 passing through the central bore of the king-pin and having a pinion and train of gearing at each end, substantially as and for the purpose described.

12. The coupling of the two-part frame-pieces 1 and 2, having a shaft 4 in bearings therein, and a pinion on one end of the shaft connecting by a train of gearing with a driving-wheel, substantially as and for the purposes described.

13. A central shaft 4 and means to revolve it and provided with wheel 5, the shaft 11 having pinion 7 and a sprocket-wheel, in combination with a link chain passing from the latter to a sprocket-wheel of a differential gearing on a driving-wheel, substantially as and for the purpose described.

14. The main frame of the vehicle having a vertical shaft 4, and a pinion and a train of gearing extending from each end of said shaft, the one train passing to the front driving-wheel, and the other to a rear driving-wheel,

substantially as and for the purpose described.

15. The main frame of a vehicle having a vertical shaft passing therethrough provided at each end with a pinion, a train of gearing from one of said pinions passing to a front driving-wheel, and a train of gearing passing from the other to a diagonal rear driving-wheel, substantially as and for the purpose described.

16. A vehicle-frame having a part thereof provided with a segmental rack, in combination with a steering-gearing having a pinion engaging in said segmental rack, the shaft carrying said pinion being provided with a worm-wheel gearing and a hand-wheel, substantially as and for the purpose described.

17. The frame 2, having a yoke 21, secured thereto and holding a shaft 41, provided with a pinion 20, a worm-wheel 18, a worm-spindle 17, and a hand steering-wheel 19, in combination with the frame 1, having a semicircular section of tooth-gearing, substantially as and for the purpose described.

18. The frame 2 provided with a shaft 41 and worm-gearing and with a pinion 20, in combination with a frame part 1, having a segmental rack, substantially as and for the purpose described.

19. The frame part 2, provided with a shaft 41 and worm-gearing and with a pinion 20, in combination with frame part 1, having a semicircular section of tooth-gear, located in a channel or recess therein, substantially as and for the purpose described.

20. Two frame parts of a vehicle overlapping and pivotally connected at a point intermediate of the axles in a manner to allow lateral movements of the joint, one frame part being provided with a shaft having a pinion as part of a steering-gear and the other frame part being provided with a segmental rack in which said pinion engages, whereby the joint may be deflected from side to side, substantially as and for the purpose described.

In testimony whereof I affix my signature in presence of two witnesses.

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Witnesses:

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PHILIP PREYENZEN.