

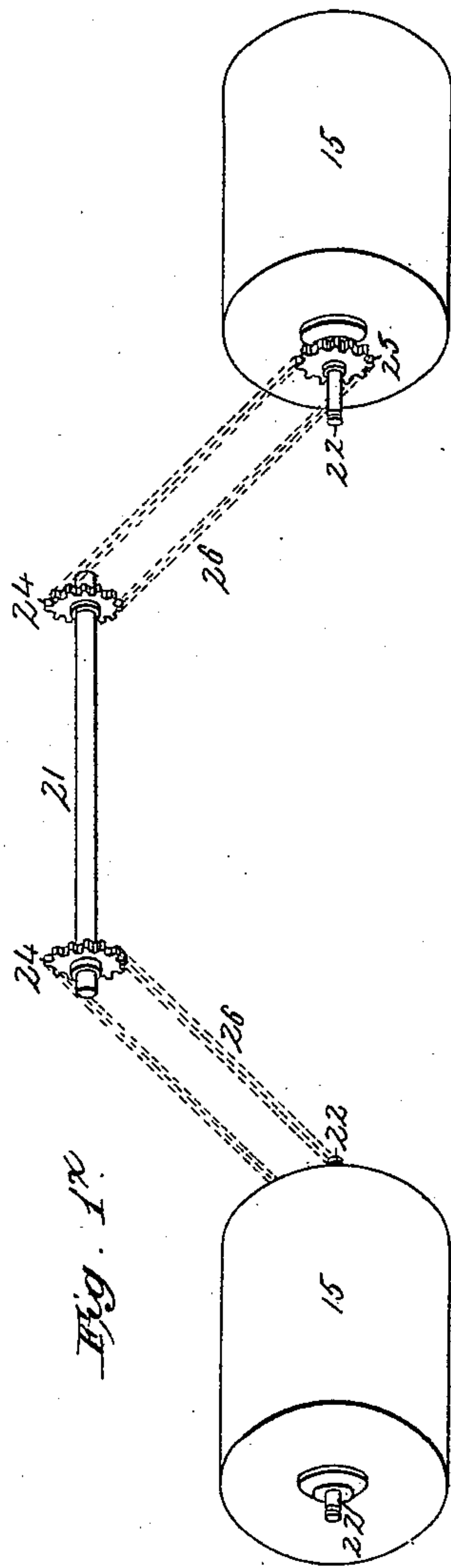
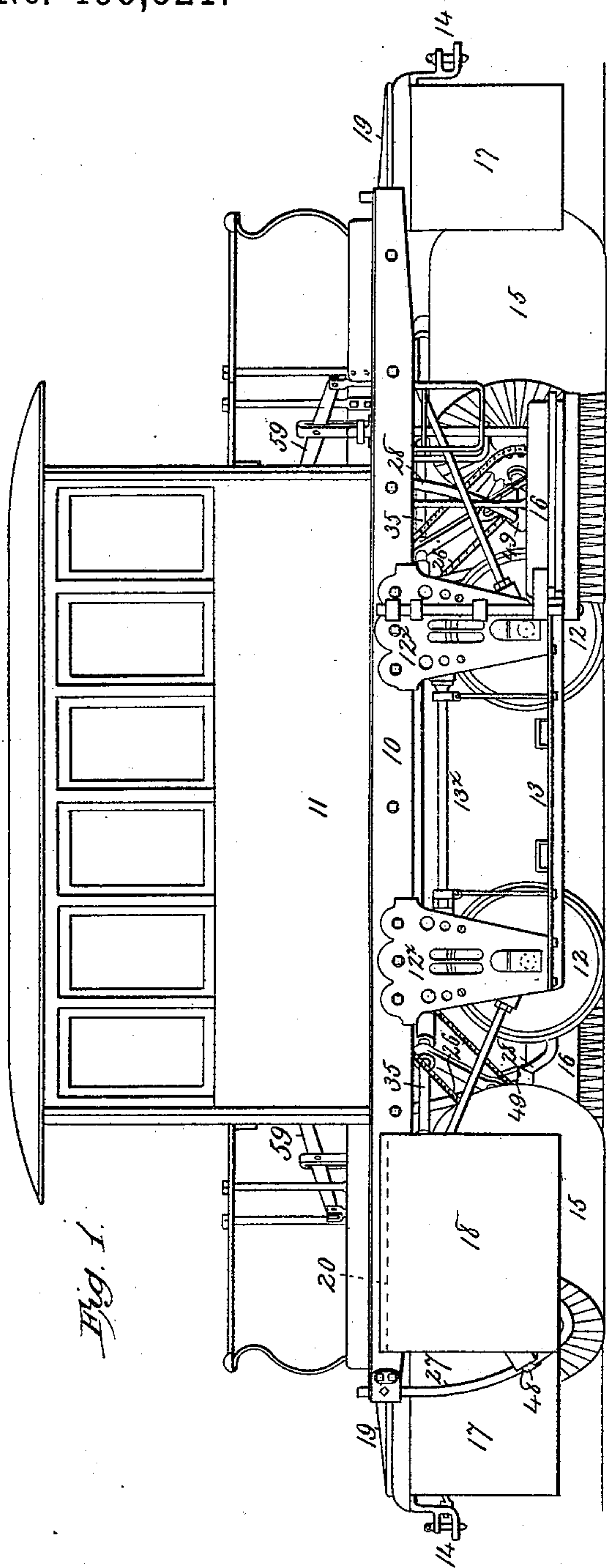
(No Model.)

9 Sheets—Sheet 1.

J. W. FOWLER & J. HUTTON.
ELECTRIC STREET RAILWAY SWEEPER.

No. 495,321.

Patented Apr. 11, 1893.



Witnesses
A. J. Schuyler
Geo. W. Whitney.

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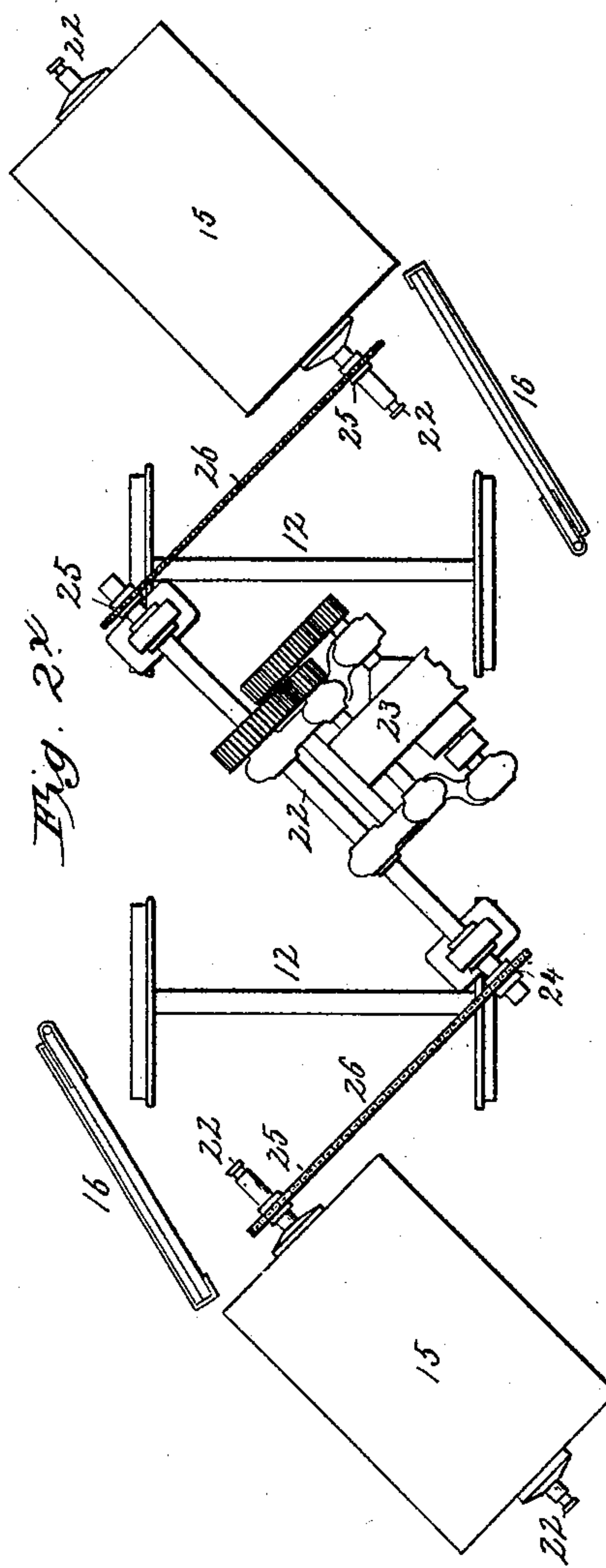
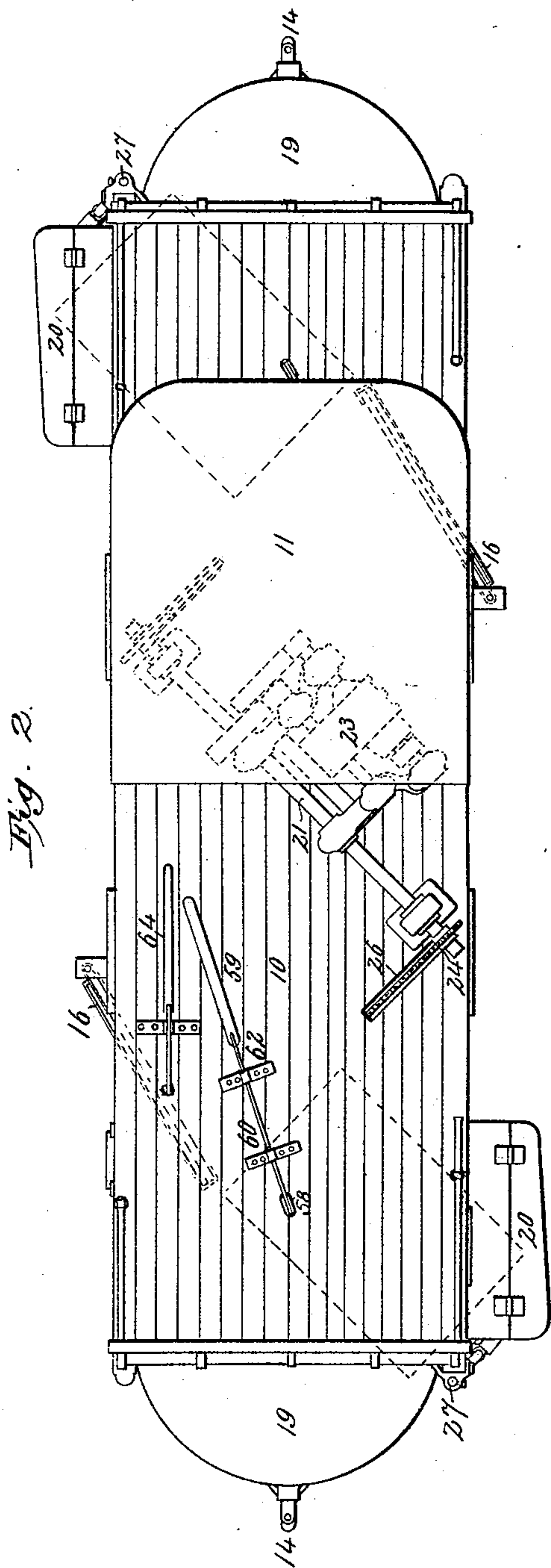
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J. W. FOWLER & J. HUTTON.
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Witnesses
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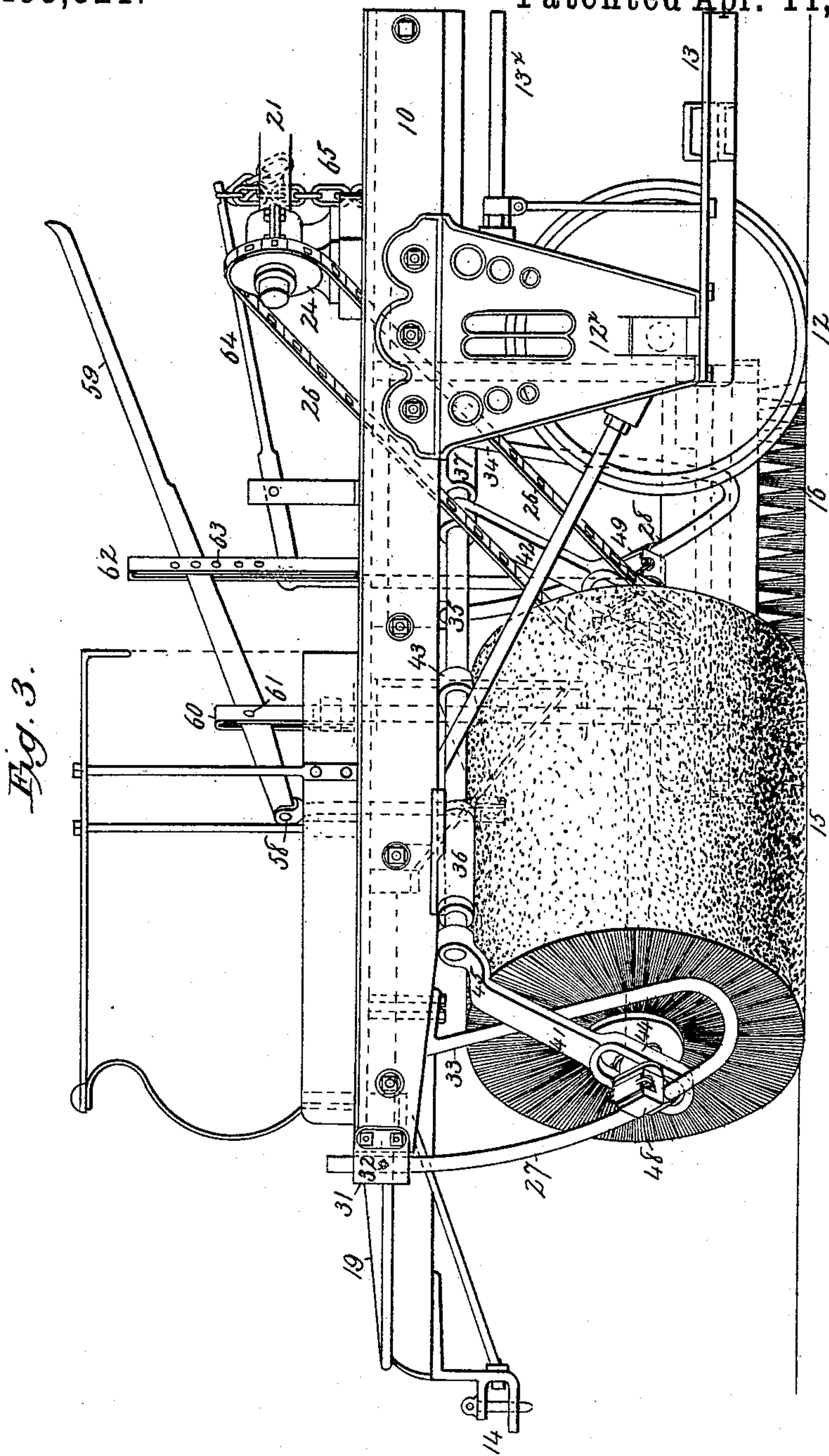
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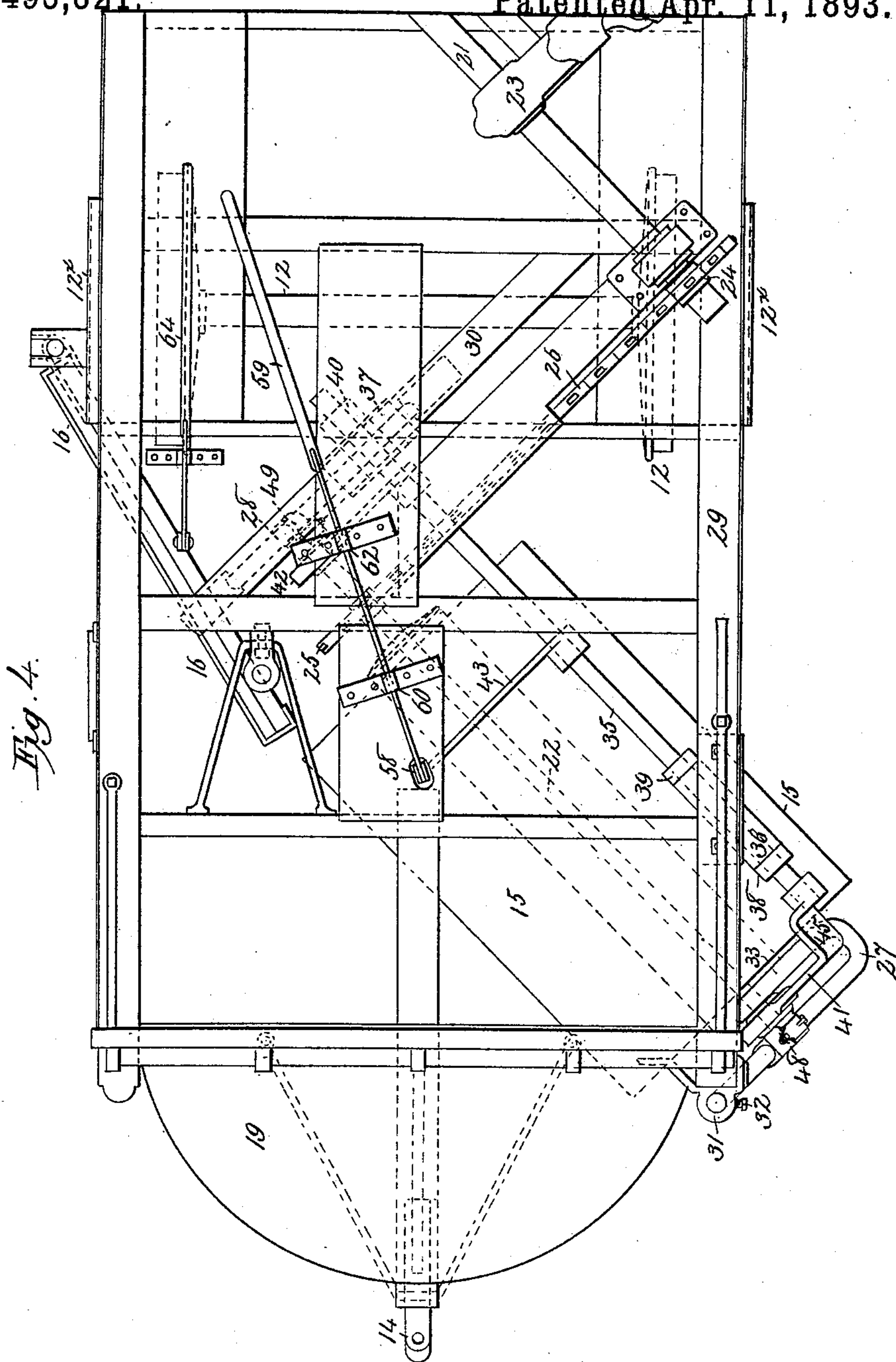
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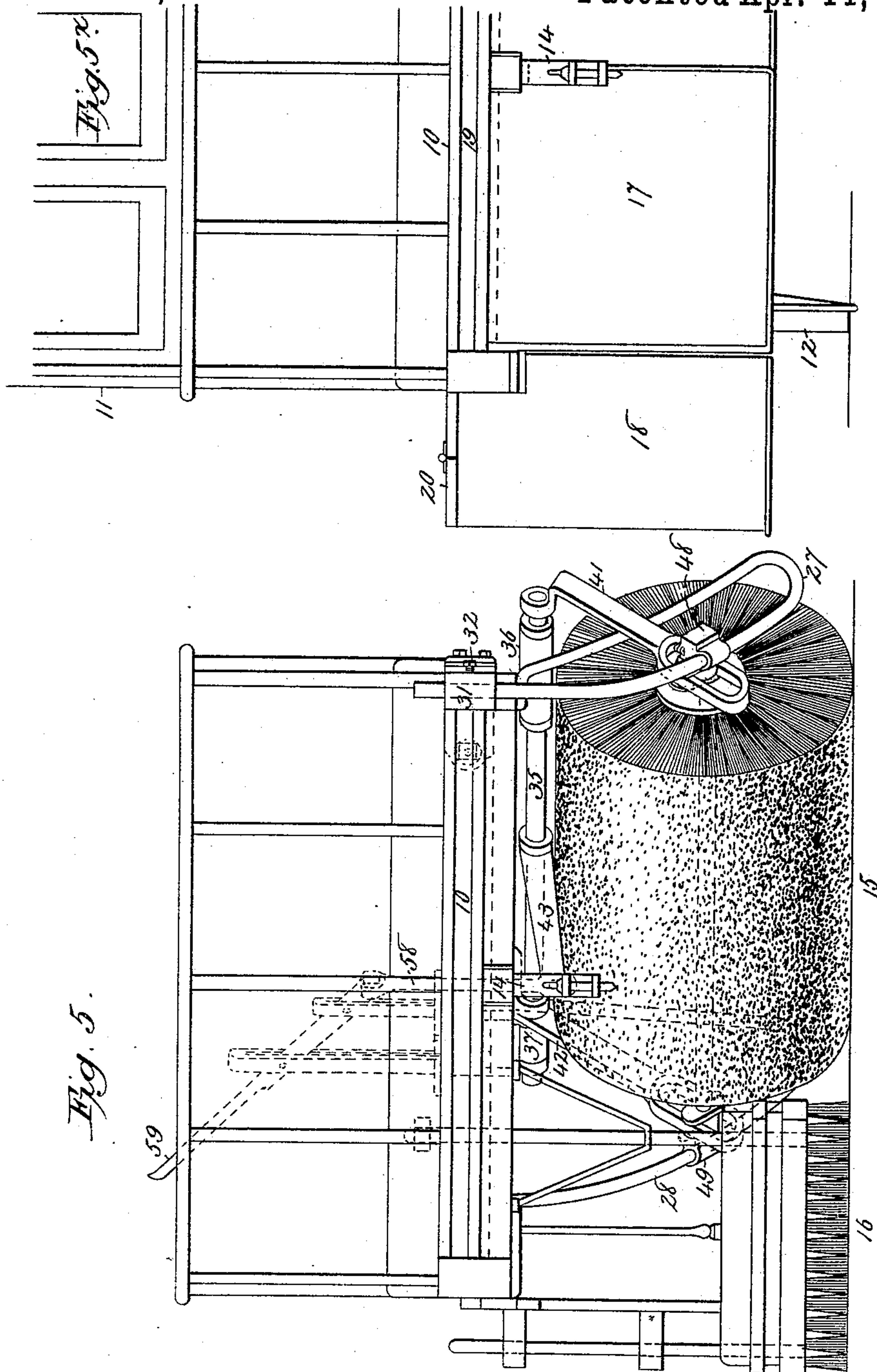
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9 Sheets—Sheet 6.

Patented Apr. 11, 1893.



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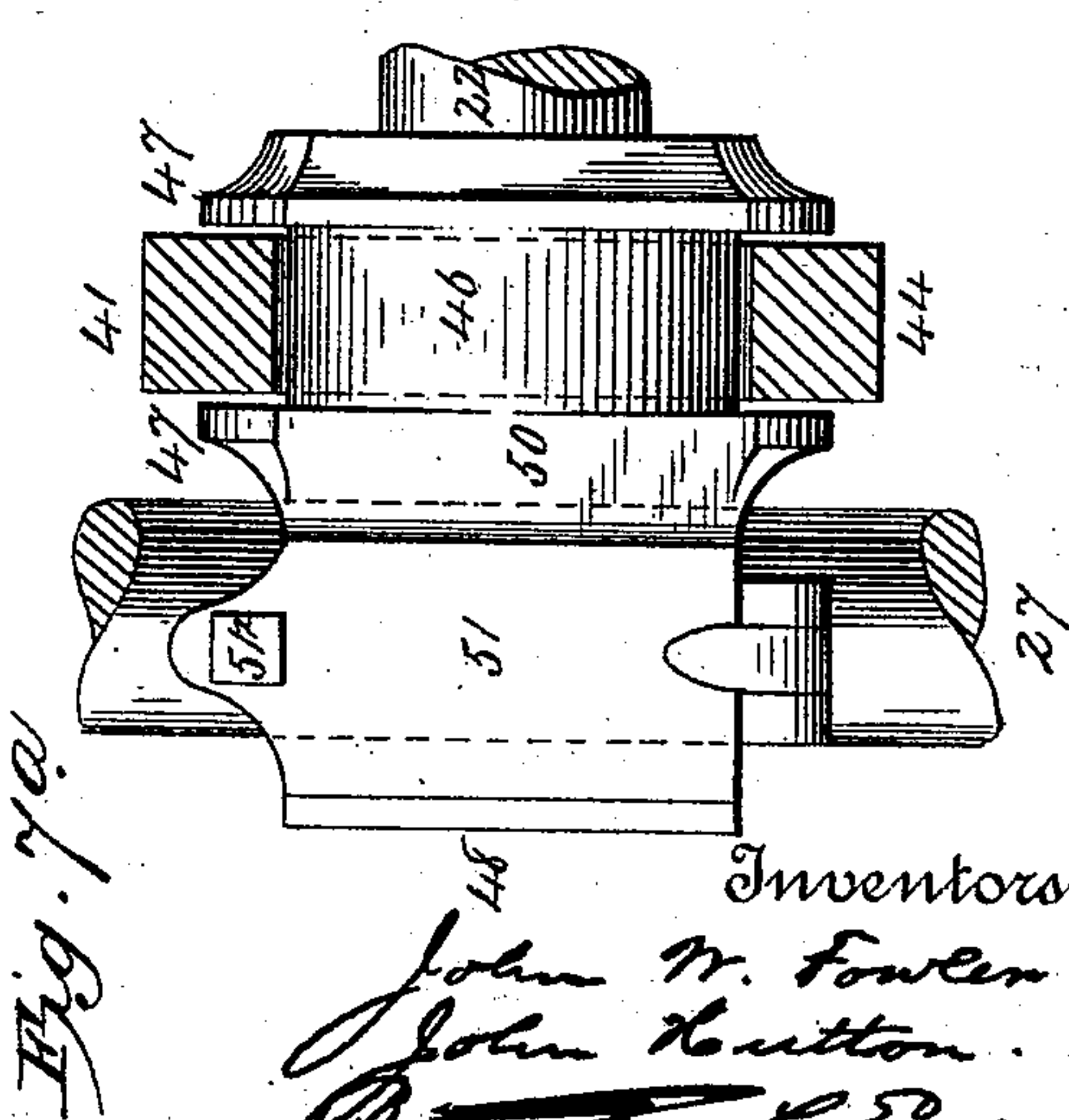
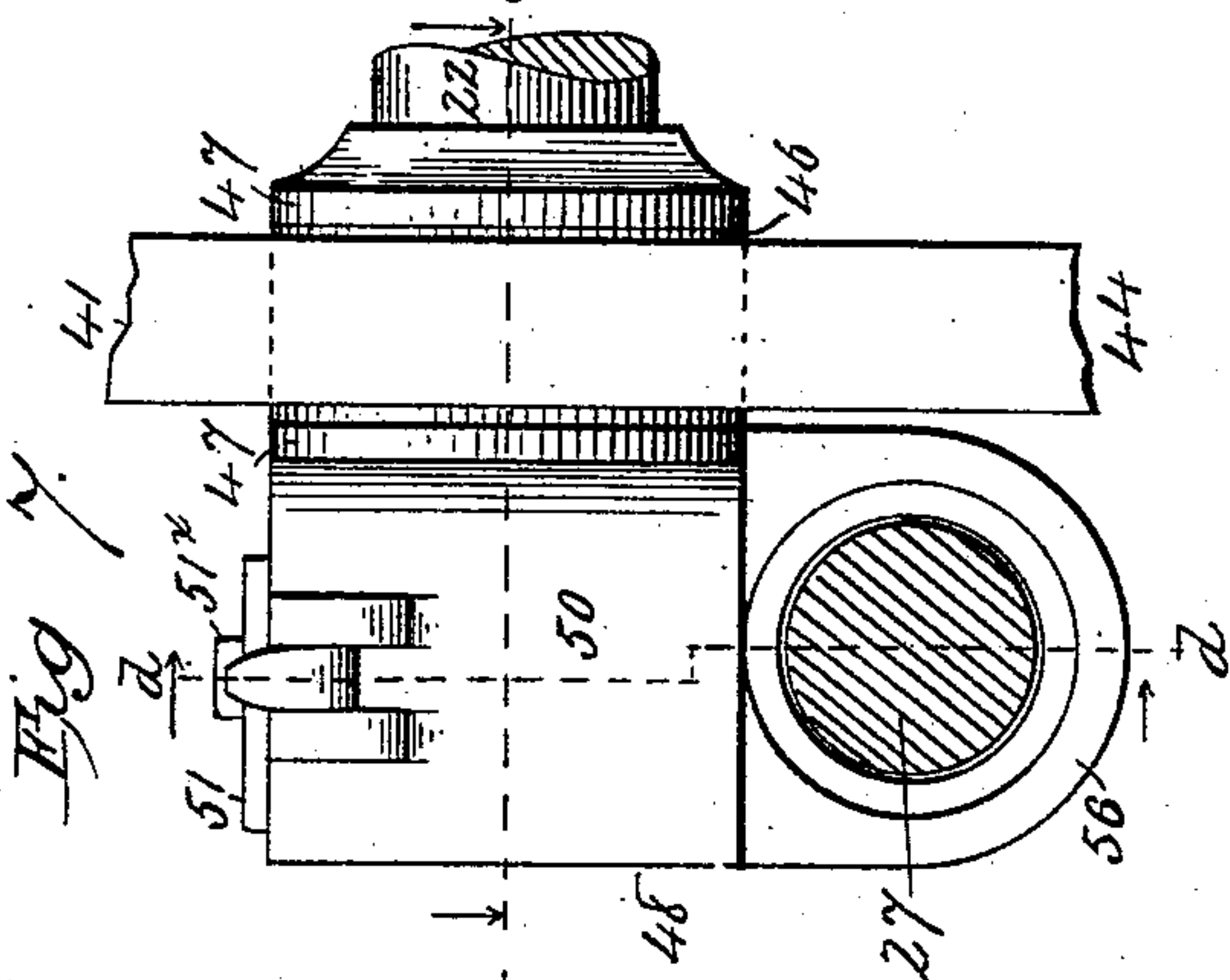
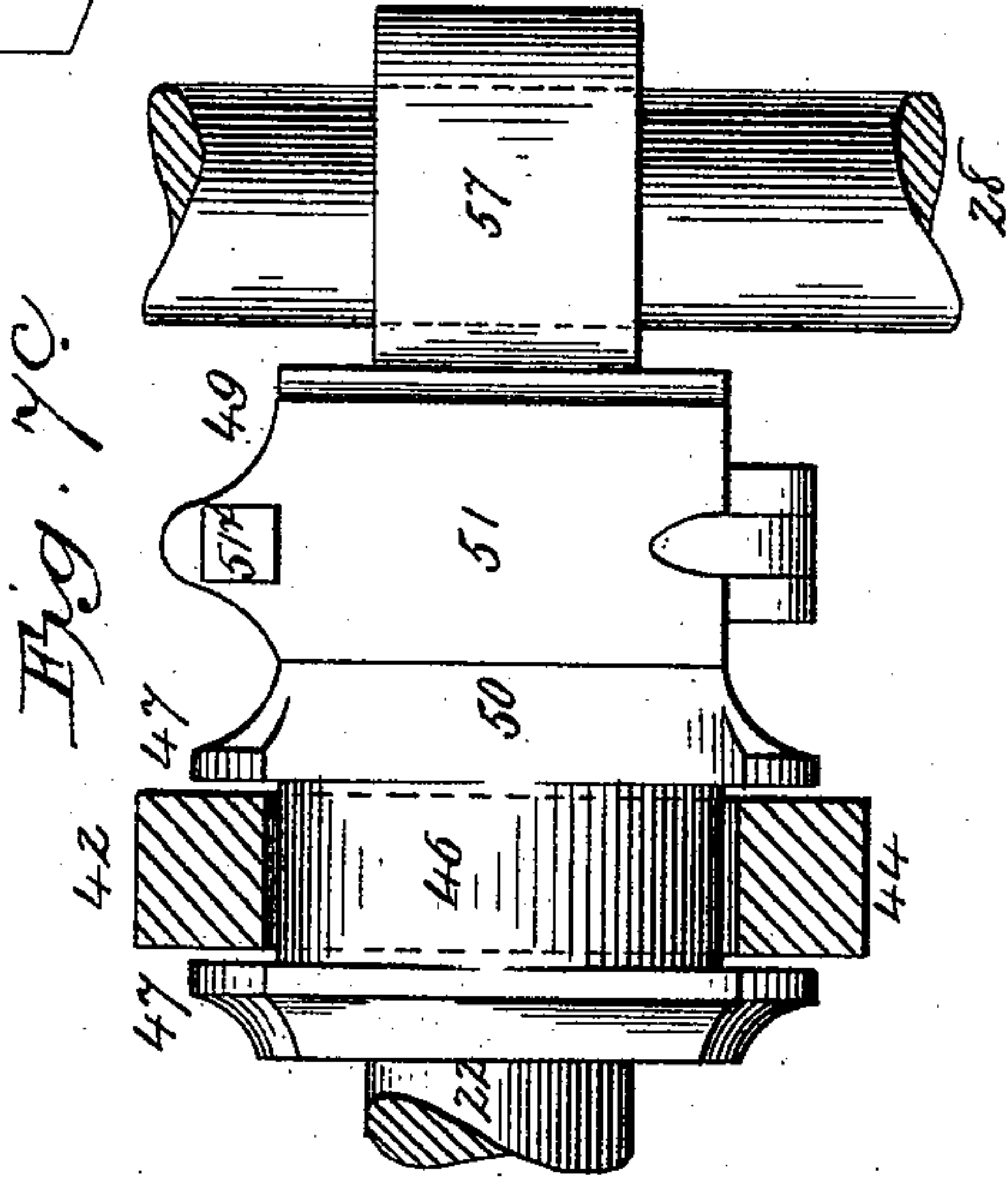
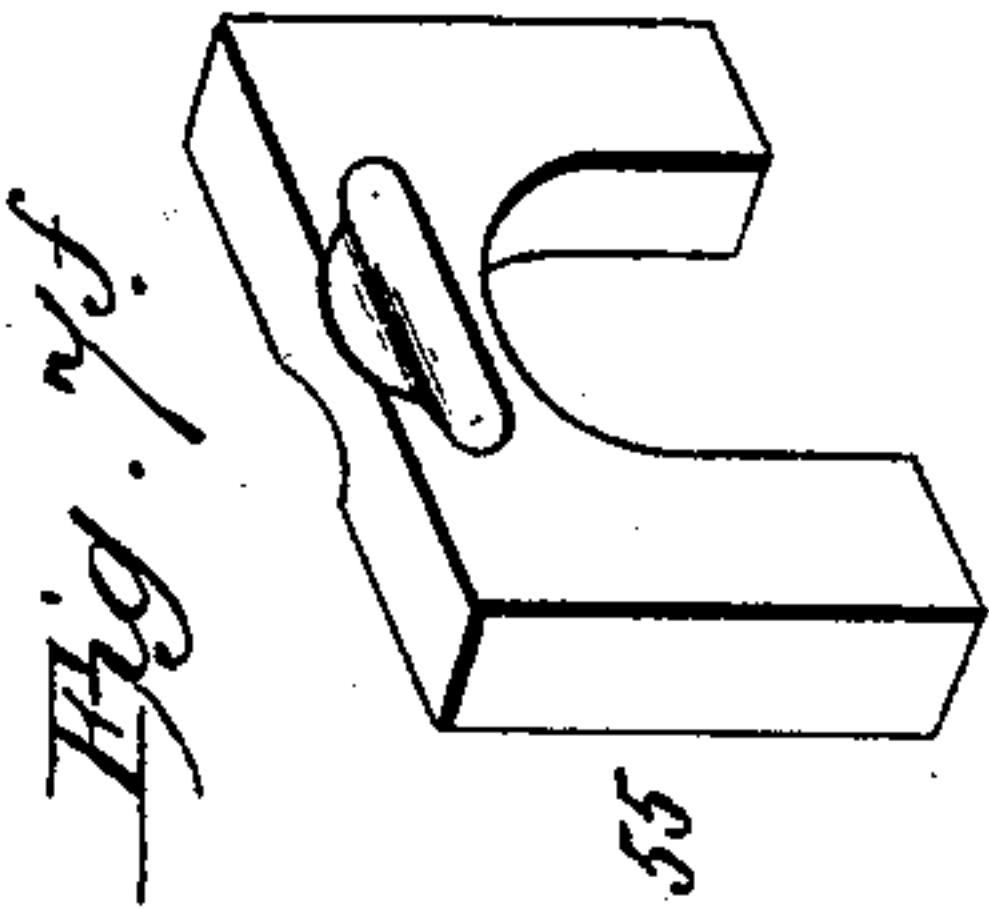
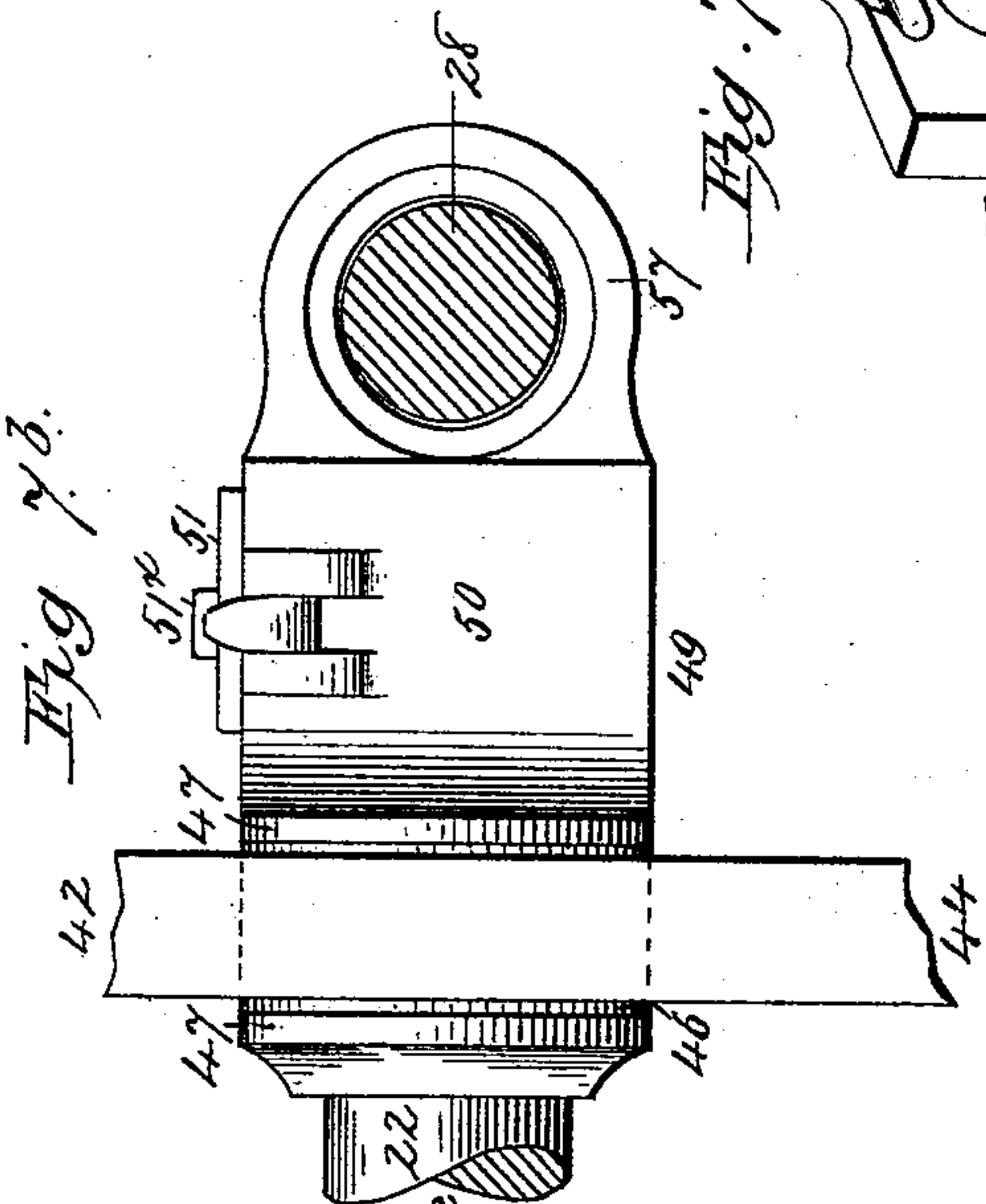
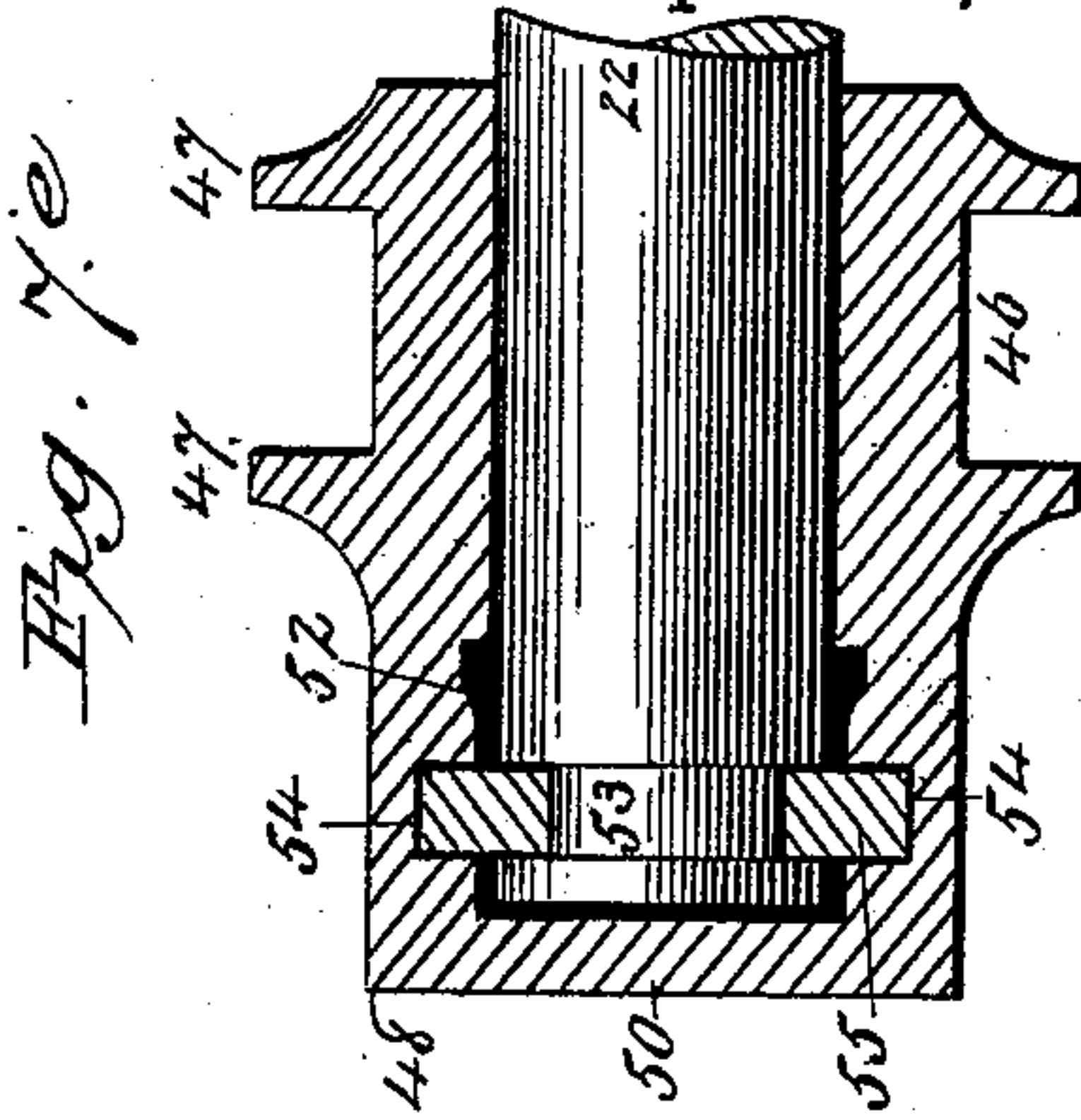
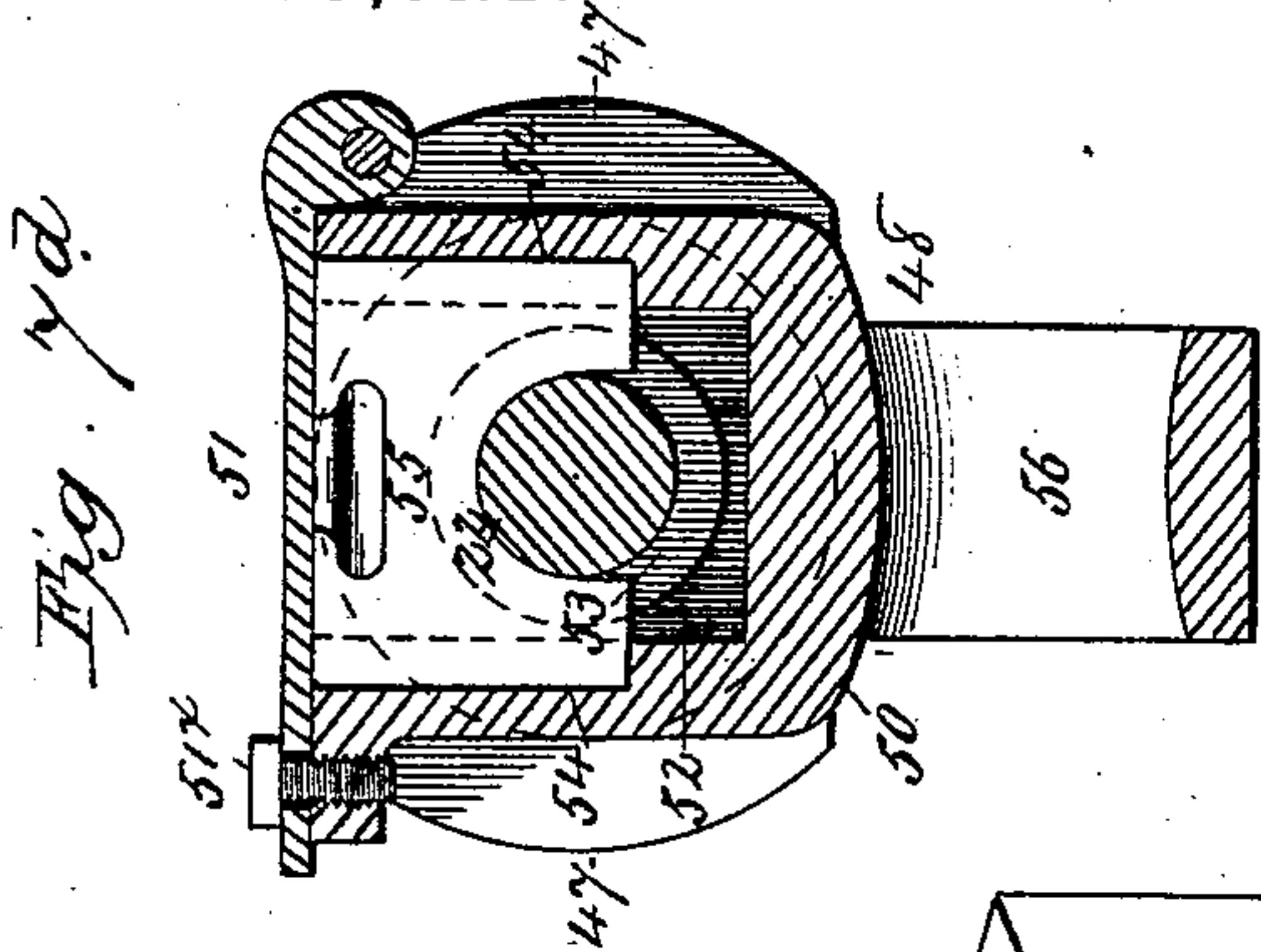
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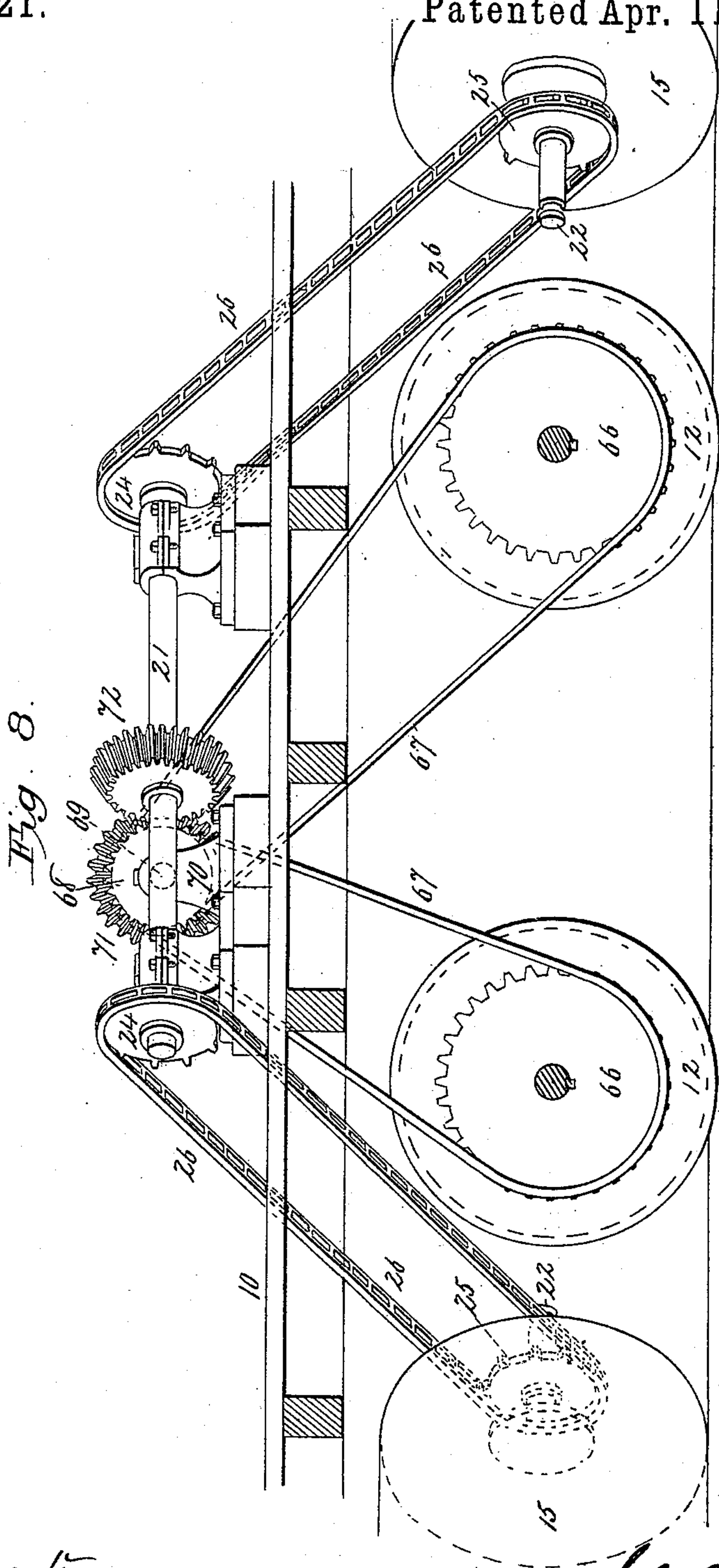
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9 Sheets—Sheet 8.

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Witnesses
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(No Model.)

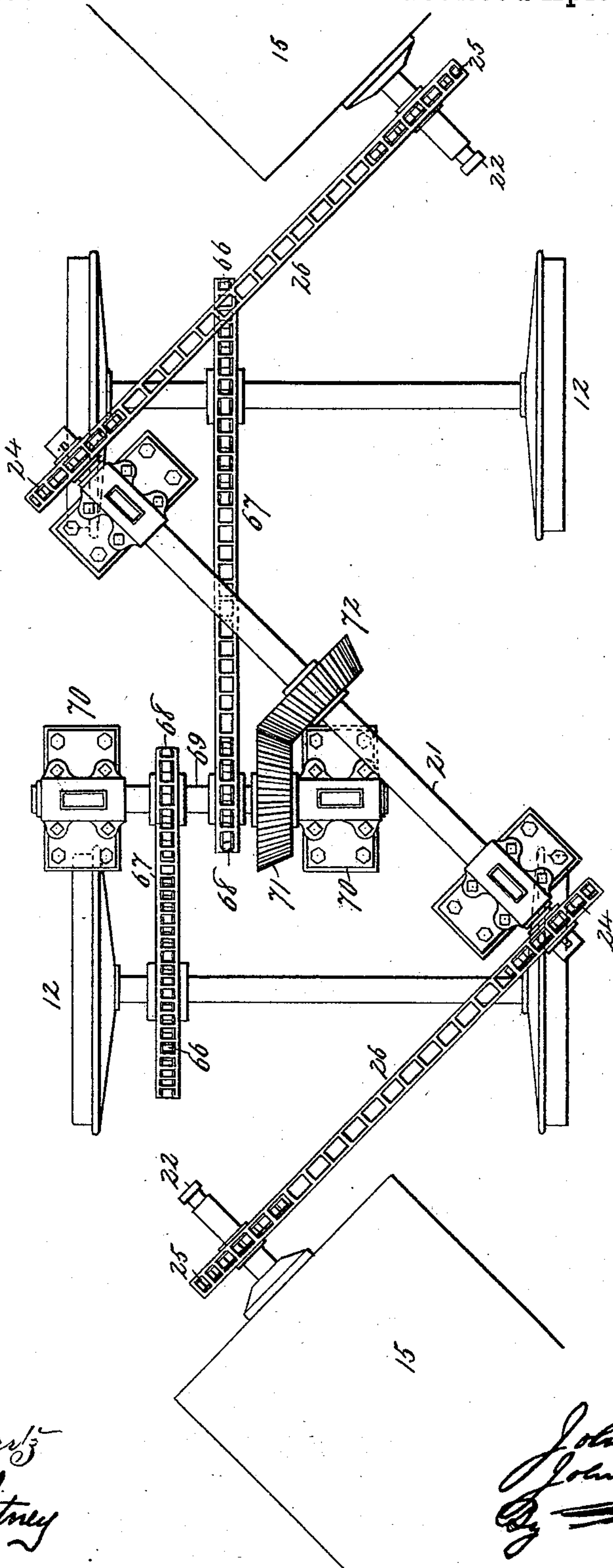
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Fig. 9.



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UNITED STATES PATENT OFFICE.

JOHN W. FOWLER AND JOHN HUTTON, OF BROOKLYN, NEW YORK, SAID
HUTTON ASSIGNOR TO THE LEWIS & FOWLER MANUFACTURING COM-
PANY, OF SAME PLACE.

ELECTRIC STREET-RAILWAY SWEEPER.

SPECIFICATION forming part of Letters Patent No. 495,321, dated April 11, 1893.

Application filed May 6, 1892. Serial No. 432,051. (No model.)

To all whom it may concern:

Be it known that we, JOHN W. FOWLER and JOHN HUTTON, citizens of the United States, and residents of Brooklyn, in the State of New York, have invented a new and useful Improvement in Electric Street-Railway Sweepers, of which the following is a specification.

This invention relates to snow-sweepers for use on street-railways, and consists in an improved sweeper especially adapted to be organized as a double-ender, working equally well when run in either direction, and to have its revolving brooms driven by electric power or in like manner independently of the propulsion of the sweeper. As thus equipped with an independent motor or motors, the sweeper may be driven slowly into a snow drift with the brooms revolving at a high rate of speed, and can thus remove a heavy drift at once, or without repeatedly attacking it.

The invention consists more particularly in certain novel combinations of parts, hereinafter described and claimed, having respectively the following objects, viz: First to provide for driving the brooms from a countershaft through the medium of sprocket-chains, and at the same time for pressing the brooms downward for the removal of adhering snow, and for keeping such chains of uniform tension whether the brooms are up or down or are new or worn; secondly to provide for effectively guiding and controlling the movement of brooms so driven; thirdly to render adjustable the guide at the outer end of each broom shaft; fourthly to provide for so driving a pair of oblique or diagonal revolving brooms from one and the same countershaft on the deck of the sweeper, by means of a motor common to both; fifthly to provide for raising and lowering the brooms, by or from their shafts, through the medium of rock-shaft arms of short radius as compared with the radius of the tension-preserving guide-bars, and so that each broom may be readily raised and lowered by one person; and sixthly to provide the broom-shafts with combined boxes and brasses common to said guide-bars and rock-shaft arms.

Nine sheets of drawings accompany this specification as part thereof, the respective sheets and the figure or figures on each sheet

being correspondingly numbered. The figures of Sheets 1 and 2 are drawn to one and the same small scale; those on Sheets 3, 4 and 5 are enlarged one diameter from those first named; those on Sheet 6 are enlarged three diameters from the same, or one diameter from the figure on the third sheet; those on Sheet 7 are enlarged eleven diameters from the figures on the first and second sheets, or two diameters from those on the sixth sheet; and the figures on Sheets 8 and 9 are of substantially the same scale as those on the third fourth and fifth sheets.

Figure 1 is a full-length side elevation of an improved sweeper embodying this invention, and Fig. 1^x is a diagrammatic elevation of the revolving brooms and broom-driving countershaft and connections, segregated. Fig. 2 is a plan view projected from Fig. 1, with the cab omitted from the left-hand half of the figure, and Fig. 2^x is a diagrammatic plan of the revolving brooms and their driving-gear, the side brooms, and the wheels and axles, segregated, illustrating more clearly the relative positions of these parts. Figs. 3 and 4 are respectively a side elevation and a plan view of the left-hand end of the sweeper as viewed in Figs. 1 and 2, with the cab aprons and flooring omitted to more fully expose to view the working parts. Figs. 5 and 5^x are respectively an end view projected from Figs. 3 and 4, with the running-gear as well as the cab, &c., omitted, and a partial end view confined mainly to the parts omitted in Fig. 5. Figs. 6 and 6^a are fragmentary side views showing respectively the outer and inner guide-bars and rock-shaft arms segregated and enlarged from Fig. 3, and Fig. 6^b is a view of the outer rock-shaft arm from in line with the rock-shaft, and a cross section of the broom-shaft and combined box and brass within its slot. Figs. 7 and 7^a are respectively edge and top views of the "outside" combined box and brass, with contiguous portions of the outer guide-bar and rock-shaft arm and the broom-shaft in place. Figs. 7^b and 7^c are like views of the "inside" box and brass, with portions of the inner guide-bar and arm and the inner end of the broom-shaft in place. Figs. 7^d and 7^e are sections respectively on the lines *d—d* and *e—e* Fig. 7, with the guide-bar and arm omitted, and Fig. 7^f is a perspective view of a

broom-shaft key detached; and Figs. 8 and 9 are respectively a mid-length partial elevation and a corresponding plan view, illustrating a modification.

5 Like reference numerals indicate corresponding parts in the several figures.

The improved sweeper is preferably in the form of a double-ended car, comprising a deck 10, which terminates at both ends in commodious platforms, and serves preferably to support the whole of the sweeper mechanism, a central cab 11, and suitable running-gear of which only the wheels and axles 12 and the pedestals 12^x are shown in the drawings to prevent confusion.

15 The sweeper can be driven by one or two electric motors of any approved make, or can be pulled or pushed by any other power. It is especially adapted and intended to be driven by electric power. A motor-supporting frame is represented at 13, and suitable supplemental supports for the same at 13^x, and suitable draw-bars with their appurtenances are shown at 14. A pair of oblique or diagonal revolving brooms 15, of suitable construction, are located beneath the respective platforms so as to project on opposite sides of the sweeper respectively, and are supplemented by a pair of side brooms or scrapers 16, which, together with all their accessories, may be of ordinary construction. Suitable aprons 17 18 and apron-supports 19 20, Figs. 1 and 2, are attached to the respective platforms at both ends of the sweeper, and at the outer ends of the revolving brooms.

35 The cab 11 is intended to inclose an independent motor or motors, for driving the revolving brooms through the medium of a countershaft or countershafts 21, supported by the deck 10 parallel with the respective broom-shafts 22; and, in the preferred arrangement, a single motor, represented at 23 in Figs. 2, 2^x, is geared to a central countershaft 21 common to both brooms. The respective ends of the countershaft 21 and the inner ends of the respective broom-shafts 22 are provided with sprocket-wheels 24 25 connected by sprocket-chains 26, as best seen in Figs. 1^x and 2^x.

50 For strongly supporting the respective revolving brooms, with the requisite provision for their elevation clear of the track, and so as to provide at the same time for keeping the sprocket-chains 26 taut under all conditions of the brooms in a new and effective way, each broom is supported at its respective ends by inner and outer guide-bars 27 28, segregated and enlarged in Figs. 6 6^a. These guide-bars are attached respectively at their upper ends to longitudinal and diagonal sills 29 30, Figs. 6 6^a, of said deck 10, (compare Fig. 4,) with the aid of a metallic corner-piece 31 Fig. 6, (shown clearly also in Figs. 3 and 4,) in which the upwardly elongated guide-bar proper of the outer guide-bar 27 is adjustable vertically by means of a set-screw 32. Said guide-bar proper of the outer guide-bar 27

and the corresponding portion of the inner guide-bar 28 are in the shape of arcs of a circle each described with a radius having its center coincident with the axis of said countershaft 21 on the deck 10. At the lower extremities of these portions, the respective guide-bars are recurved, and are extended to said deck-sills by brace-portions 33 34, which may be of any convenient or preferred shape.

75 For lifting each of the revolving brooms 15 by or from its shaft 22, and for pressing the same downward upon the track and street-paving, as above, a rock-shaft 35, which is also, in part, segregated in said Figs. 6 6^a, is supported by means of hangers 36 37, which are conveniently bolted to the same deck-sills 29 30 of the deck 10. It is supported endwise in its bearings by collars 38 39 40 Figs. 6 6^a, and is provided with three arms, two of which are shown at 41 42 in said Figs. 6 6^a and at the same numbers in other figures. The other arm is shown at 43 in Figs. 3, 4 and 5. All the arms are fast on the rock-shaft proper. Said arms 41 42 project downward and toward the end of the sweeper, and their lower ends are enlarged and slotted as shown at 44, in the several figures of Sheet 6, Fig. 6^b being in part, as aforesaid, an elevation of the outer one of the "slotted arms" as they are herein-after termed. The outer arm 41, in contrast with the inner arm 42, has a rigid bend 45 near its upper end to carry the main portion of the arm outward beyond the outer end of the rock-shaft proper. (Compare Figs. 3 and 4.) Said enlarged and slotted portion 44 of the slotted arm 41 embraces (as in Fig. 6^b) a cylindrical sleeve 46 concentric with the broom shaft 22, and is in turn embraced by pairs of lateral flanges 47, all of which form parts of an "outside" combined box and brass, of suitable brass or bronze, represented as a whole at 48 in Figs. 1 to 5 inclusive, and shown in detail by Figs. 7 7^a 7^d 7^e and 7^f. The enlarged and slotted lower end 44 of the inner slotted arm 42 engages in like manner with an "inside" combined box and brass, represented as a whole at 49 in Figs. 1 to 5 inclusive, and shown in detail by Figs. 7^b 7^c in connection with said Figs. 7^d 7^e and 7^f. Each of the combined boxes and brasses has a cylindrical sleeve-portion 46 and pairs of lateral flanges 47 as above, and both of them as regards their box-portions are of one and the same pattern. Each of these box-portions comprises a box proper 50 open at top, a lid 51 hinged at one end to said box-portion and fastened at its other end by a bolt 51^x, an oil-chamber 52 within said box-portion, coinciding with the extremity of the broom-shaft 22, which is provided with a circumferential groove 53, vertical grooves 54 in the box-portion opposite such groove 53, and a bifurcated key 55, shown detached by Fig. 7^f, which occupies said grooves, and is held in place by said lid and its fastening-bolt as in Figs. 7^e and 7^d. Any endwise displacement of the combined box and brass relatively to the broom-shaft is

thus prevented. A strong and rigid runner 56, in the form of an eye having a convex interior as shown in Fig. 7^a, is cast fast on the outside box and brass 48 opposite its lid 51 to embrace the outer guide-bar 27, as in Figs. 7 7^a; and a like runner 57 is cast on the inside box and brass 49 in line with its bore, or opposite that end which is provided with said lateral flanges 47, to embrace the inner slotted arm 42; and this runner, 57, embraces the inner guide-bar 28 as in Figs. 7^b 7^c. This difference of location between the runners of the respective combined boxes and brasses facilitates assembling the parts as a whole. Otherwise the boxes and brasses at both ends of each broom-shaft are alike, and those for both revolving brooms are alike as above indicated. Said arm 43 of each of the rock-shafts 35 projects in a nearly horizontal direction toward the end of the sweeper, as in Fig. 3, and is coupled at its extremity to a vertical link 58, which connects the rock-shaft with the short end of a hand-lever 59, pivoted in a standard 60 by a horizontal pin or bolt 61, Fig. 3, and controlled with the aid of a slotted standard 62 having a vertical series of holes 63 to receive a locking pin, by means of which the lever may be kept in position. Each of said side brooms or scrapers 16, correspondingly, is connected with the short end of a hand-lever 64, which is preferably adjusted by means of a chain 65, as in Fig. 3. As said side brooms or scrapers 16 form no part of our invention, any further description of them is considered unnecessary; and the same is true of numerous other parts incidentally shown in the drawings, which will be readily understood by those skilled in the art without further description. All such parts and details for the purposes of this invention may be of any approved character.

When one of the revolving brooms 15 is raised by depressing the long end of its lifting-lever 59, the rock-shaft 35 is turned with the requisite force, and the broom is lifted by the slotted arms 41 42 without in any way interfering with the control of the broom by the guide-bars 27 28; and when the broom is thus lifted, or rises to ride over an obstruction, said guide-bars keep its shaft 22 at the proper distance from the countershaft 21 so that the tension of the power-transmitting chain 26 is preserved. At such times, and at all times, the combined boxes and brasses 48 49 form a manifestly advantageous means for applying said guide-bars and slotted arms as directly as possible to the broom-shafts themselves, and for preventing endwise displacement of the latter or of either of such cooperating parts.

A single electric motor for driving both revolving brooms is represented at 23 in Figs. 2 2^x. If preferred, the countershaft 21 may be divided at midlength, or duplicated, and a pair of such motors connected with the respective countershafts, so as to drive the respective revolving brooms independently of

each other. An independent motor or motors of any other description may be used in like manner; or, if it is not convenient to employ an independent motor, the countershaft 21 may be driven from the axles of the running-gear as in Figs. 8 and 9. In this modified arrangement, sprocket-wheels 66 of uniform diameter are keyed on the axles proper of the wheels and axles 12, and connected by chains 67 and sprocket-pinions 68, to a short countershaft 69, parallel with the axles, which is mounted in suitable bearings 70 on the deck 10; and said countershaft 69 is in turn connected by bevel-gears 71 72 with said countershaft 21 of the broom-driving mechanism. When the modified sweeper is pushed or pulled into action, motion is transmitted, with the requisite increased speed, from the wheels and axles 12, through said chain and spur gearing 66 67 68 69 70 71 72, to said countershaft 21, and thence to both of the revolving brooms 15 through the power-transmitting connections 24 26 25 22 before described. Other like modifications will suggest themselves to those skilled in the art.

Having thus described the said electric sweeper and modifications thereof, we claim as our invention and desire to patent under this specification—

1. In a snow-sweeper for street-railways, the combination with a revolving broom having an axial shaft of a countershaft parallel thereto, a power-transmitting chain and sprocket-wheels connecting said shafts, tension-preserving guide-bars at the ends of the broom-shaft having main portions in the form of arcs with radii the center of which is at said countershaft, and a raising and depressing rock-shaft which is likewise parallel to said broom-shaft and has rigid arms engaging with the respective ends of the broom-shaft, substantially as hereinbefore specified.

2. In a snow-sweeper for street-railways, the combination with a revolving broom having an axial shaft of guide-bars at the ends of the broom-shaft, a raising and depressing rock-shaft which is parallel to said broom-shaft and has slotted arms, and boxes for the respective ends of said broom-shaft constructed with rigid runners which slide on said guide-bars and sleeve-portions embraced by said slotted arms, substantially as hereinbefore specified.

3. In a snow-sweeper for street-railways, the combination with a revolving broom having an axial shaft of a countershaft parallel thereto, a power-transmitting chain and sprocket-wheels connecting said shafts, tension-preserving guide-bars at the ends of the broom-shaft, and adjusting devices at the upper end of such main portion of the outer guide-bar, substantially as hereinbefore specified.

4. A double-ended electric snow-sweeper for street railways, comprising an electric motor independent of the means for propelling the sweeper, in combination with a diagonal countershaft at midlength to which said mo-

tor is geared, sprocket-wheels and oppositely-
extending sprocket-chains at the respective
ends of said countershaft, revolving brooms
parallel with said countershaft at the respect-
5 ive sides of the sweeper, having axial shafts
and sprocket-wheels at the inner ends of both
shafts driven by said sprocket-chains, and
tension-preserving guide-bars at the ends of
each broom-shaft, substantially as hereinbe-
10 fore specified.

5. In a snow-sweeper for street-railways, the
combination with a revolving broom having
an axial shaft, a countershaft parallel there-
to, power-transmitting connections between
15 said countershaft and the broom-shaft includ-
ing a sprocket-chain, and means for limiting
the raising and lowering movements of the
broom to an arc having a radius the center of
which is at said countershaft, of a rock-shaft,
20 above and parallel to the broom, having slot-
ted arms of relatively short radius engaging

with the respective ends of the broom-shaft,
substantially as hereinbefore specified.

6. In combination with a broom-shaft hav-
ing a grooved end, and with an arc-shaped 25
guide-bar of long radius and a slotted lifting
arm of relatively short radius adjacent to said
grooved end, a combined box and brass hav-
ing a bore fitted to said grooved end, a sleeve
portion concentric therewith embraced by the 30
slotted portion of said arm, lateral flanges
between which said arm slides, an internally
grooved box portion, a key fitted to the grooves
of the box and shaft, means for keeping such
key in place, and a rigid runner sliding upon 35
said guide-bar, substantially as hereinbefore
specified.

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