

J. E. WRIGHT.
SAND BLAST APPARATUS.
APPLICATION FILED APR. 9, 1910.

993,743.

Patented May 30, 1911.

4 SHEETS-SHEET 1.

Fig. I

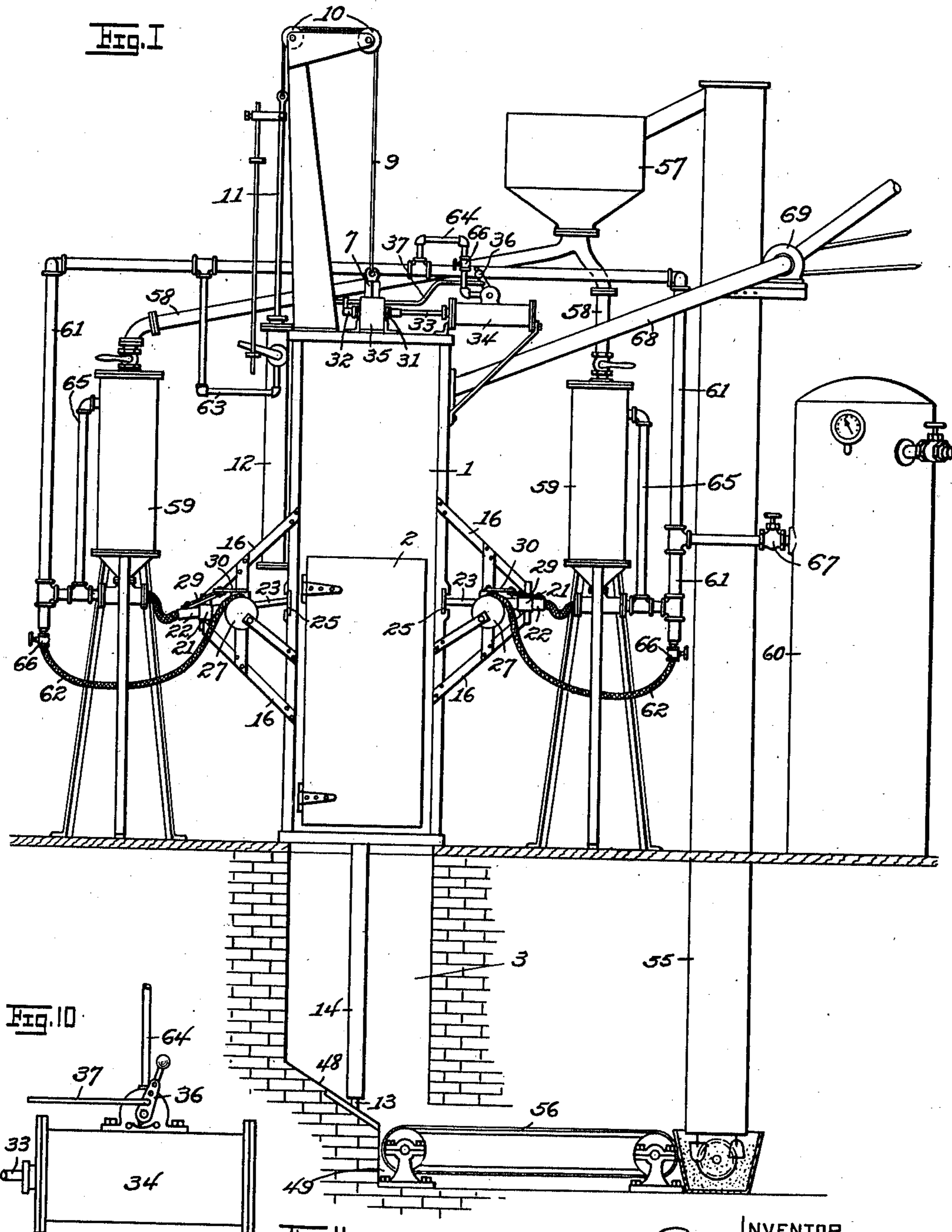


Fig. 10

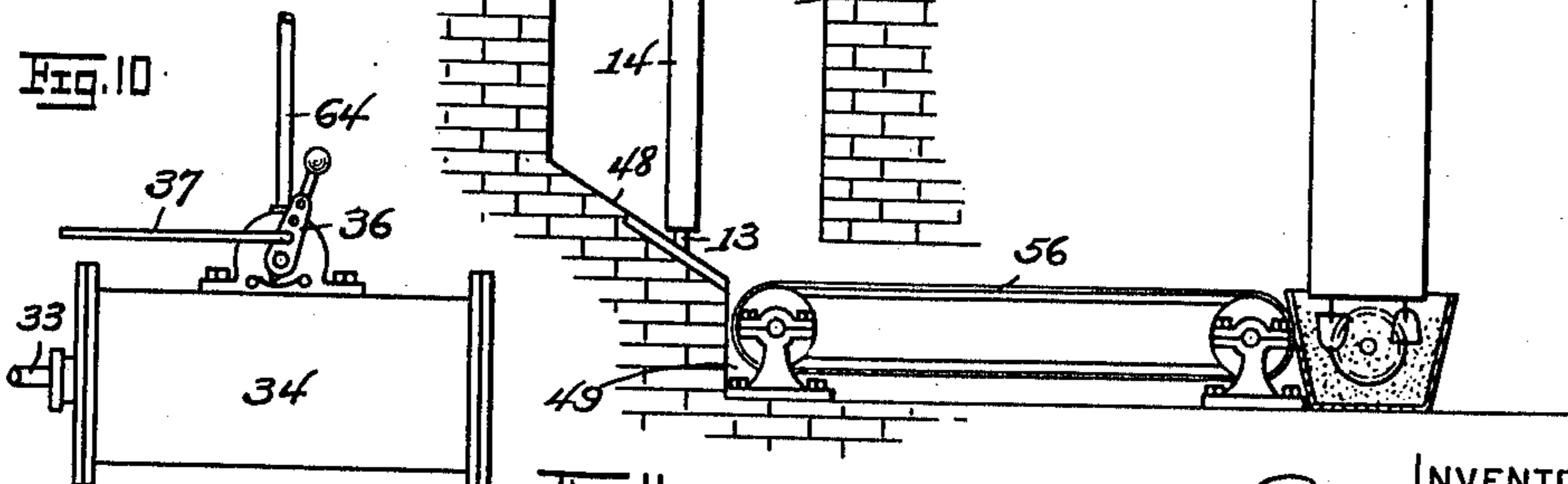
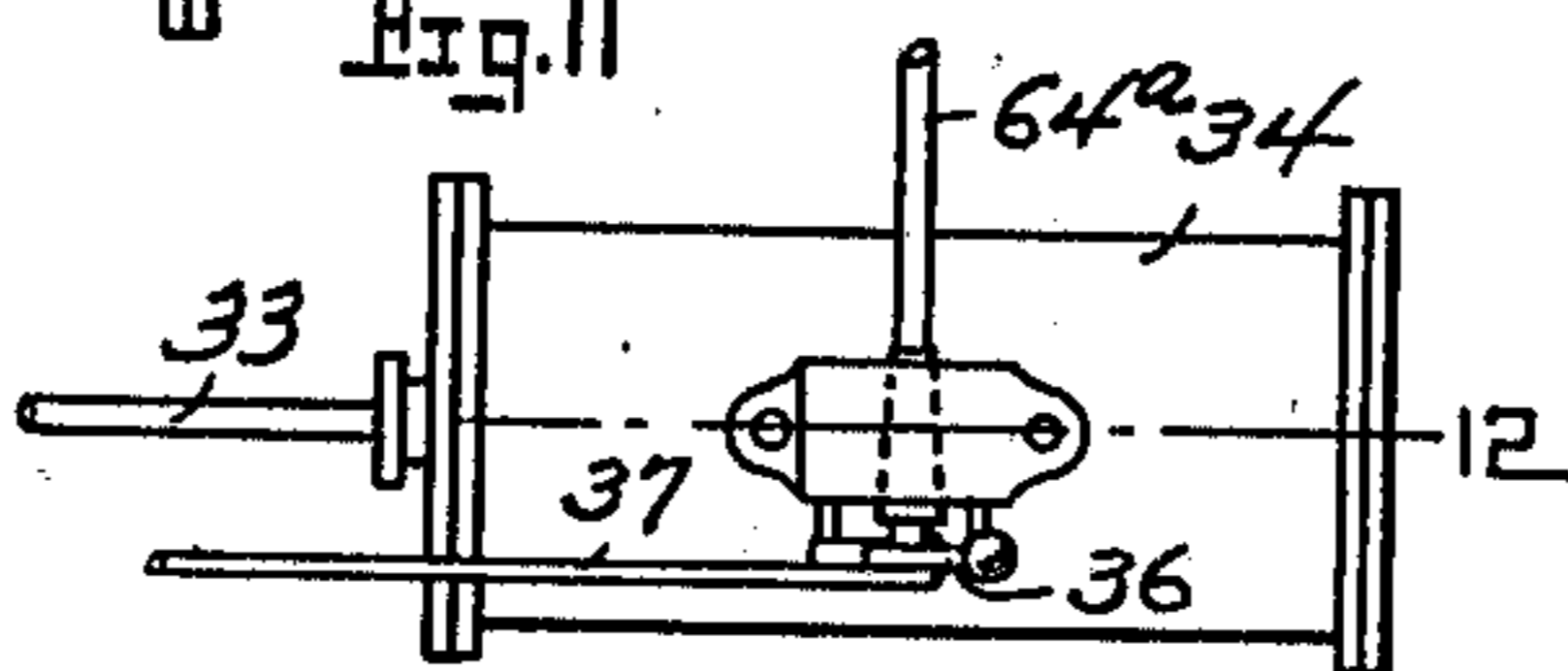


Fig. 11



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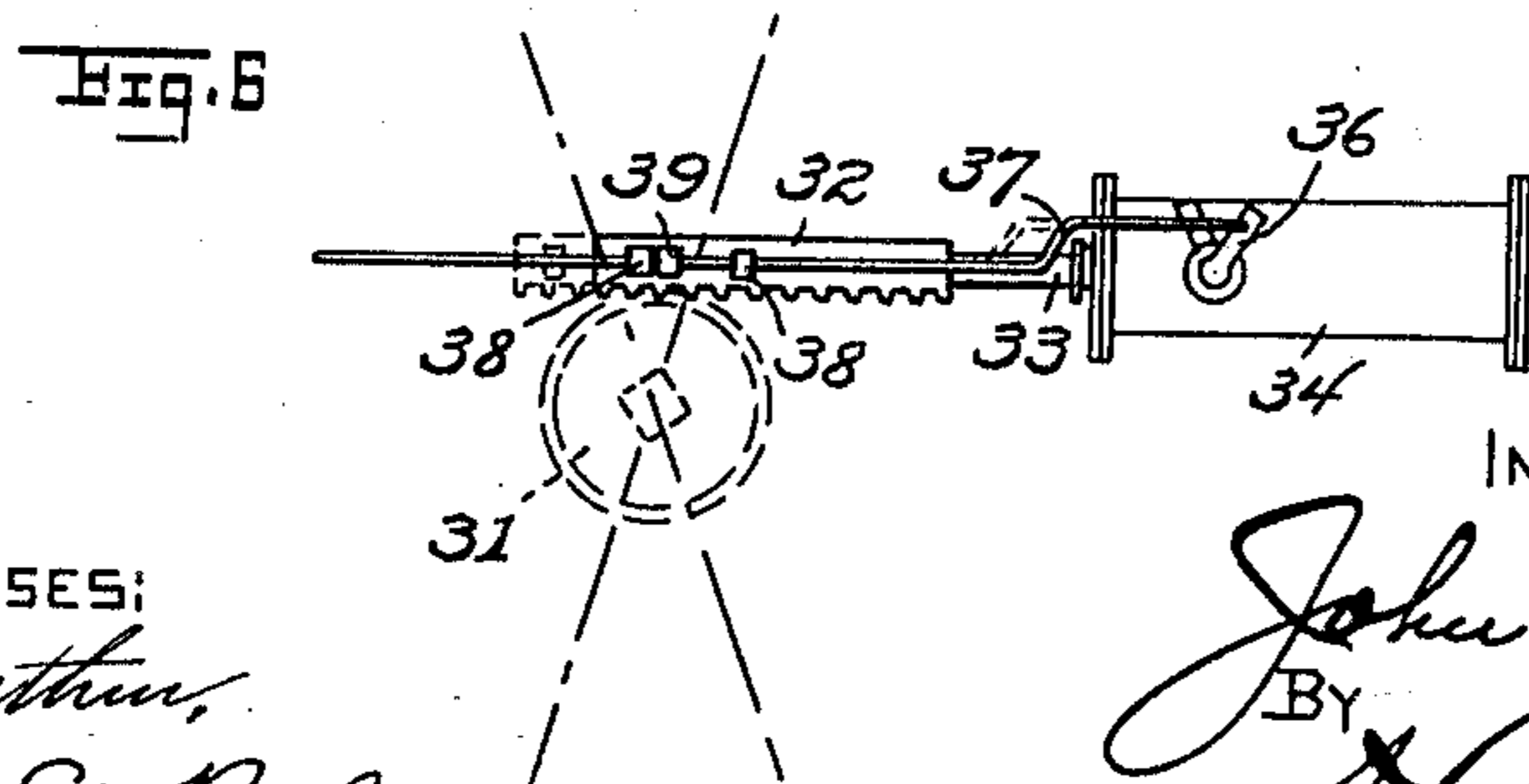
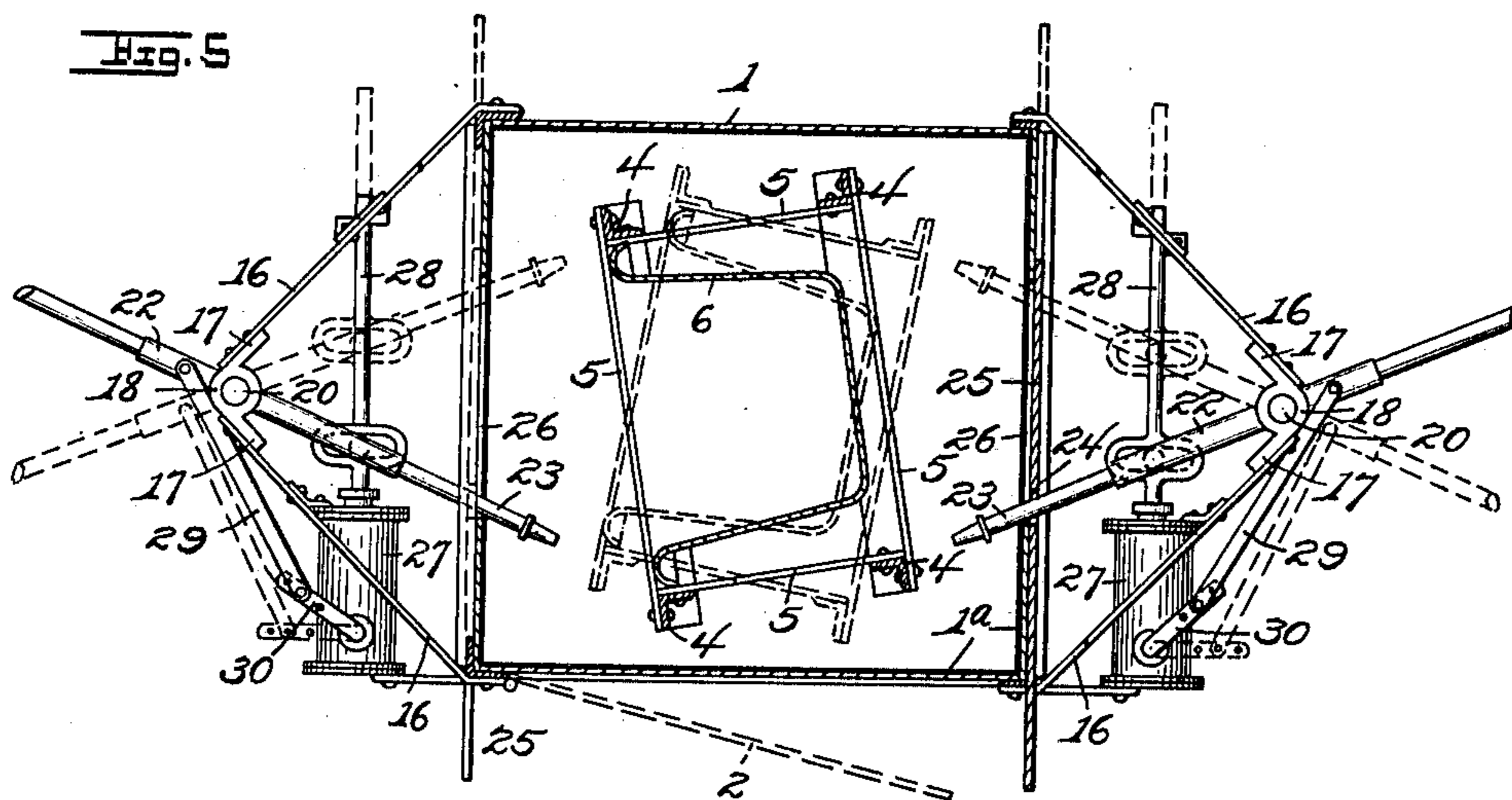
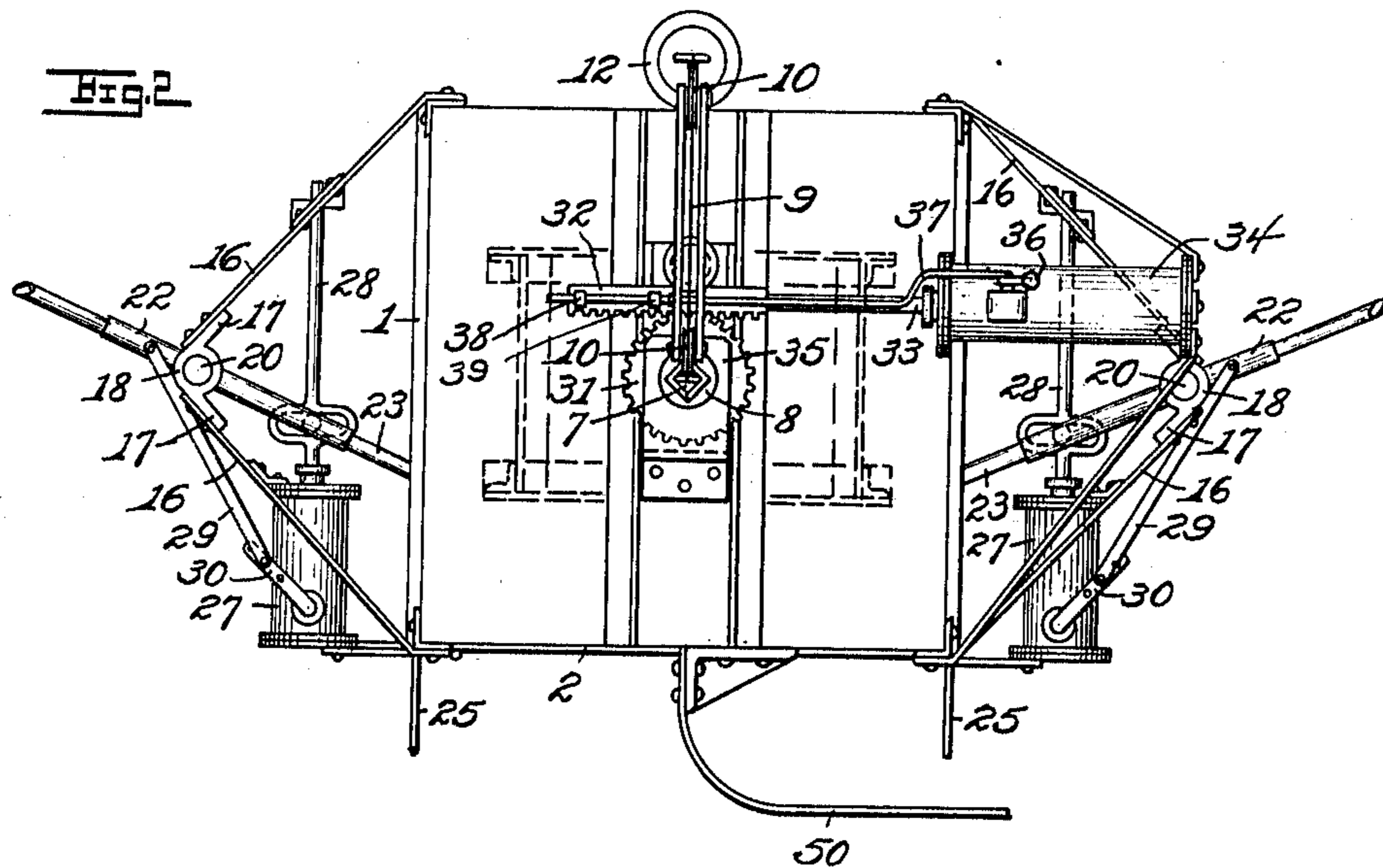
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4 SHEETS-SHEET 2.



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4 SHEETS—SHEET 3.

Fig. 3

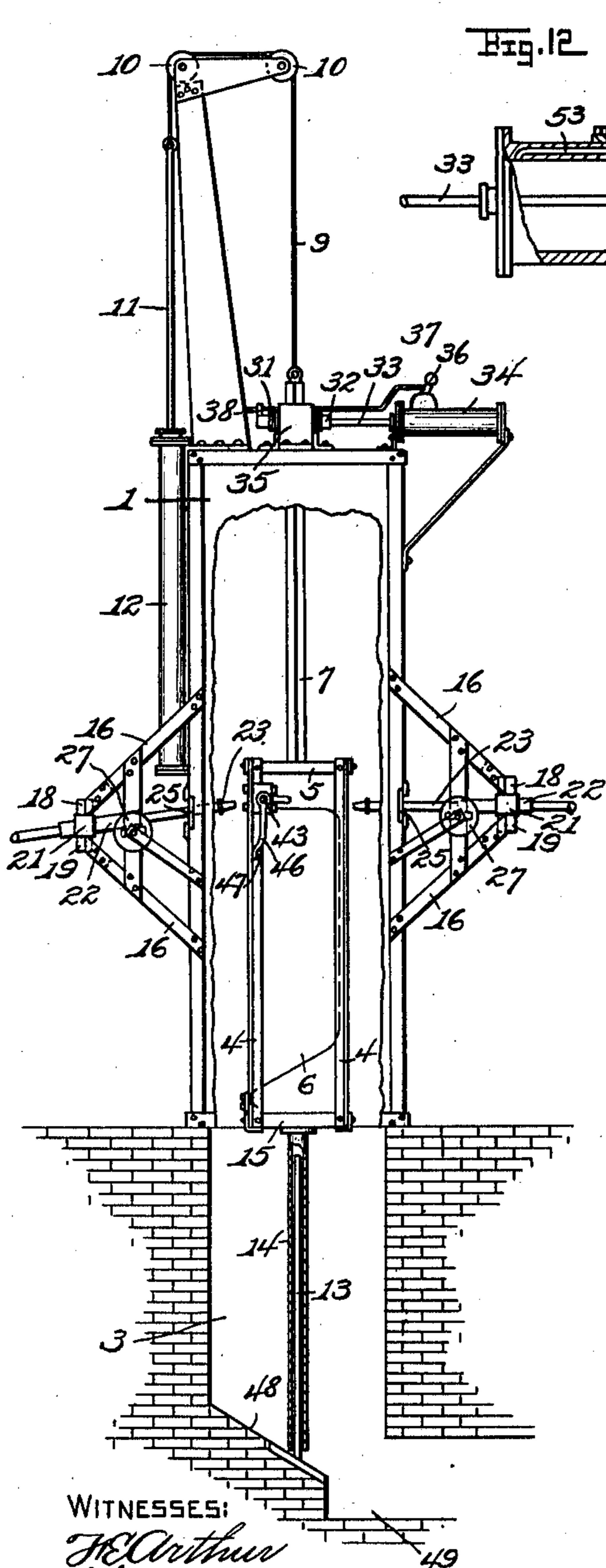


Fig. 4

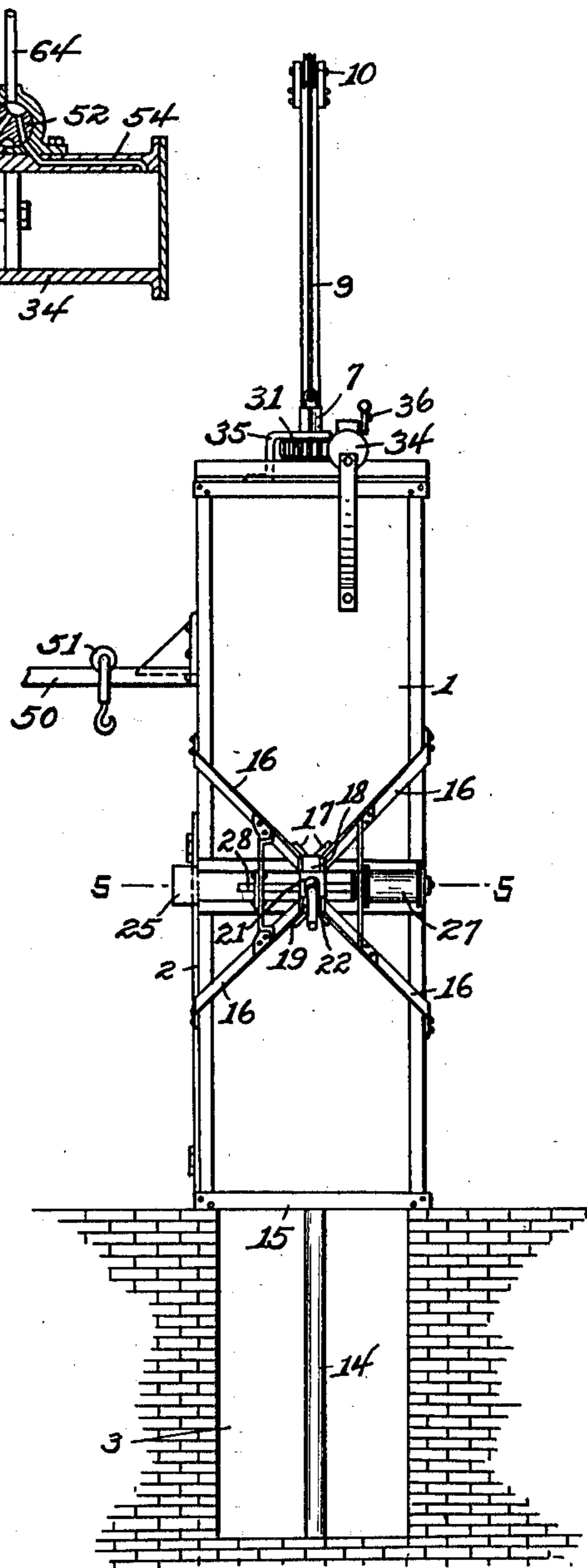
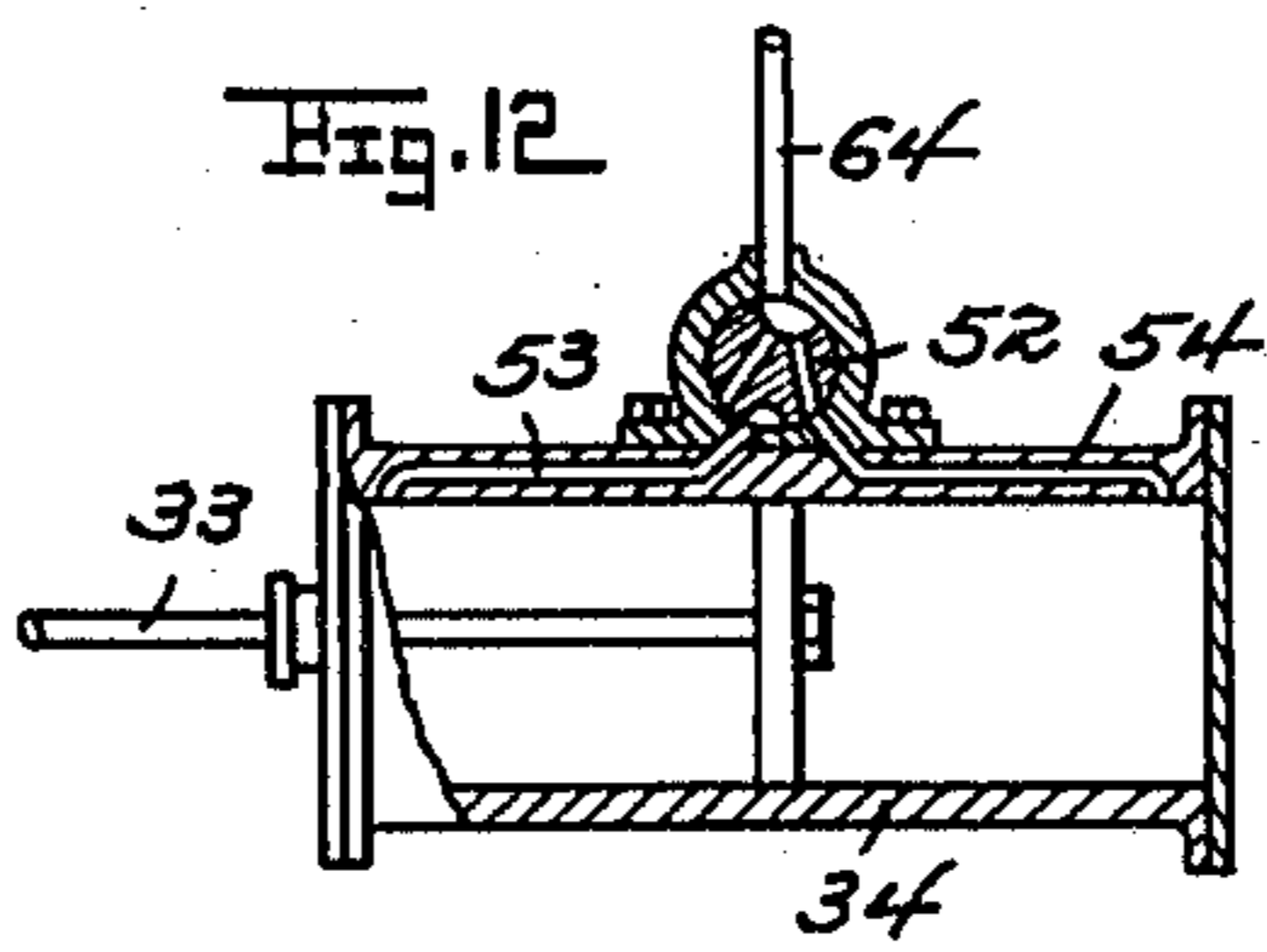


Fig. 12



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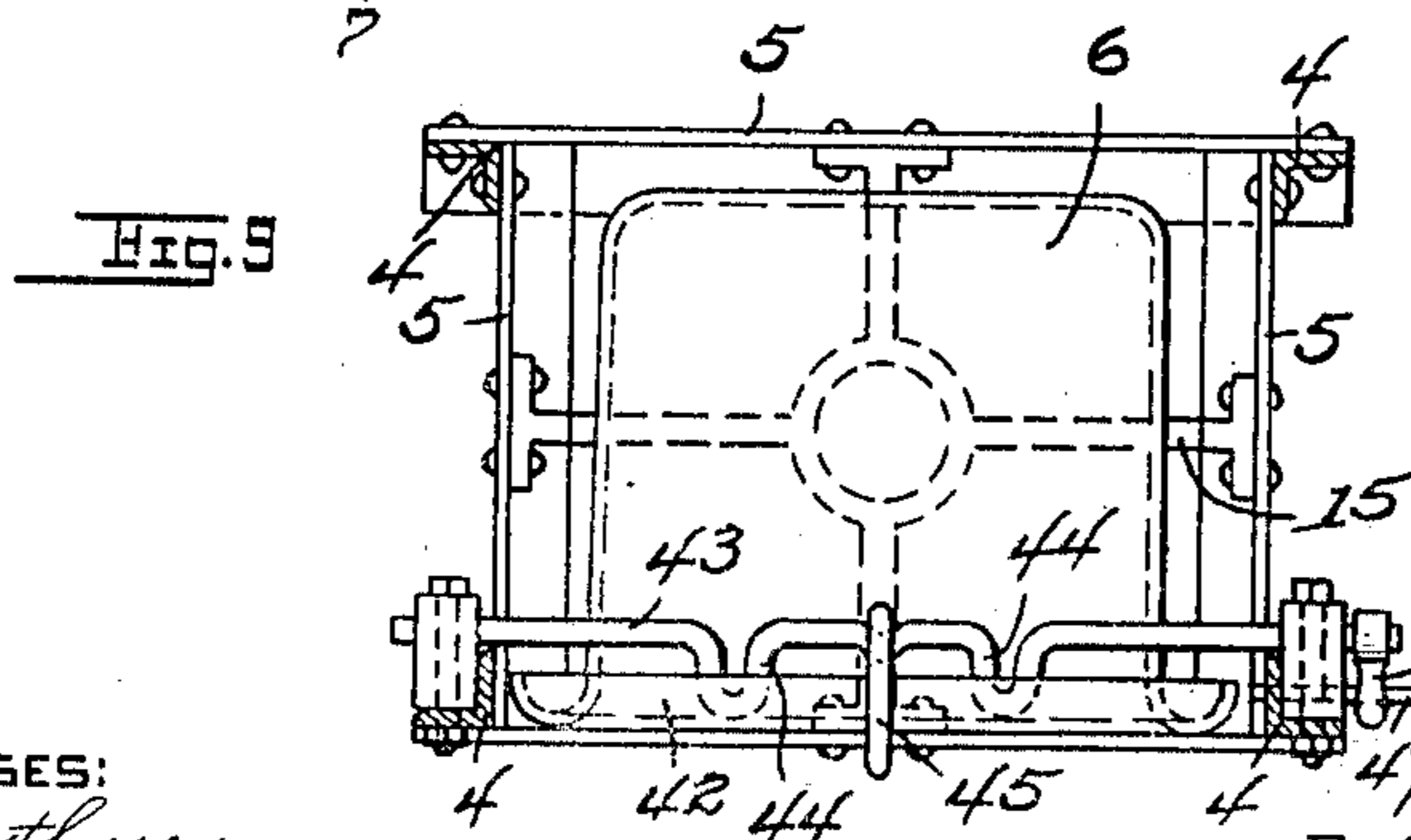
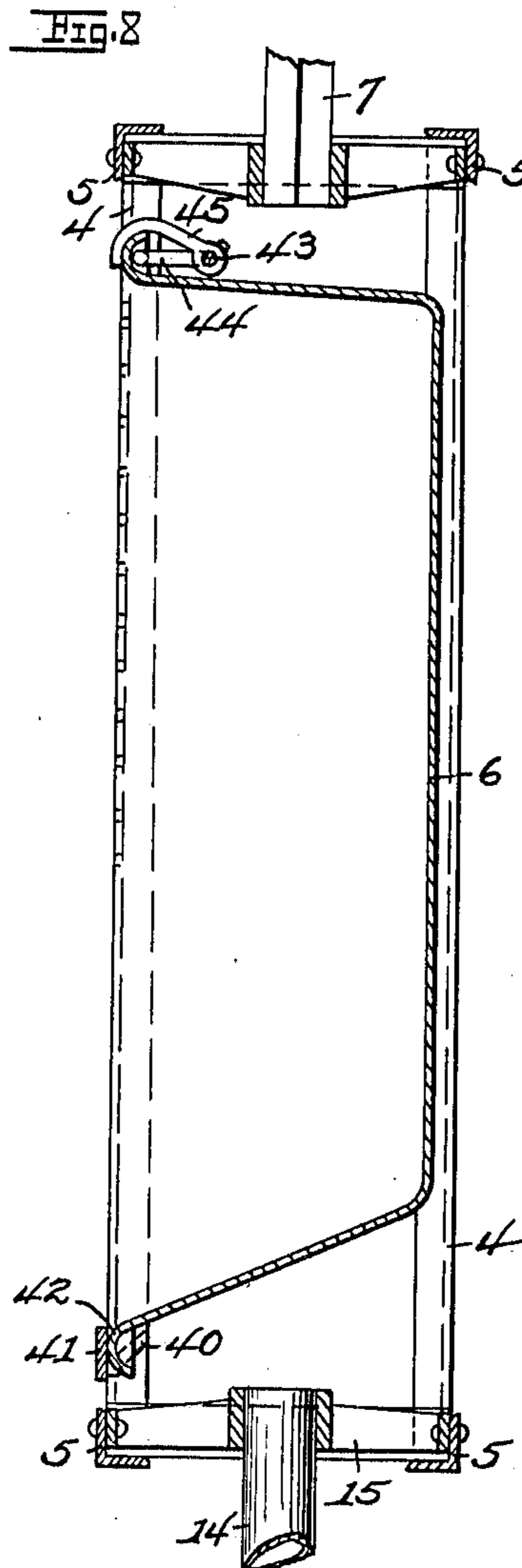
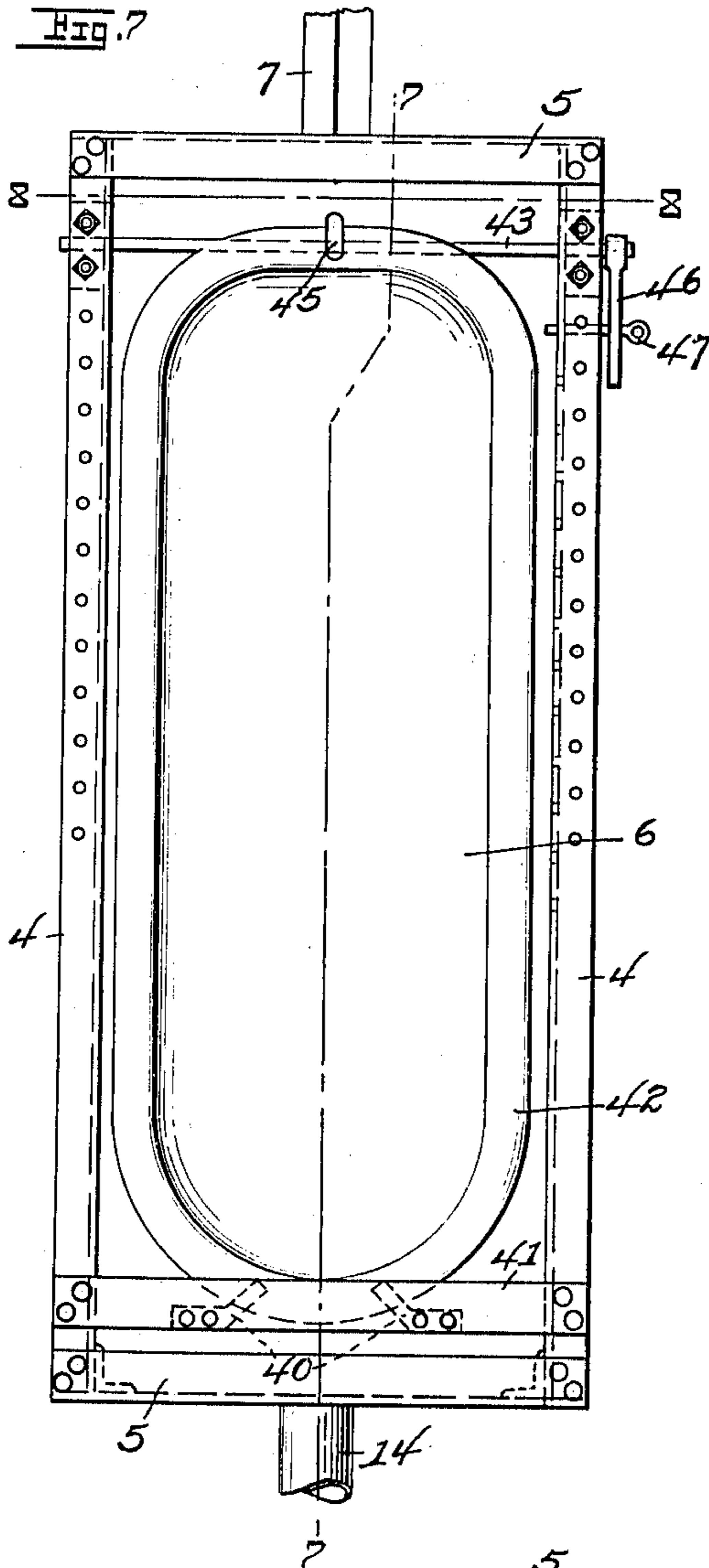
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4 SHEETS—SHEET 4.



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SAND-BLAST APPARATUS.

993,743.

Specification of Letters Patent.

Patented May 30, 1911.

Application filed April 9, 1910. Serial No. 554,484.

To all whom it may concern:

Be it known that I, JOHN E. WRIGHT, a citizen of the United States of America, and residing at Wheeling, county of Ohio, and State of West Virginia, have invented certain new and useful Improvements in Sand-Blast Apparatus, of which the following is a specification.

This invention relates to improvements in sand-blast apparatus, and more particularly to an apparatus for removing rough surfaces from metal and other articles, such, for instance as cast iron or steel bath tubs, kitchen sinks, lavatories and the like.

The primary object of the invention is to provide an apparatus of the character mentioned wherein is provided automatically movable blast nozzles which may be adjusted to have a certain definite range of movement and wherein the article acted upon is automatically transported or conveyed back and forth in front of said nozzles to subject its entire surface to the abrading or smoothing action of the blasts.

A further object is to provide means whereby a partial rotary or oscillatory motion is imparted to the article acted upon, exposing each and every portion of the surface thereof to the action of the blasts from the nozzles.

With these and other important objects in view, the invention finally consists in the particular construction, arrangement and combination of parts which will hereinafter be fully described, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a front elevation of the invention; Fig. 2 is an enlarged top plan view of the same with parts broken away; Fig. 3 is a front elevation of the same, a part of the casing wall being shown broken away and the tubular cage-guide being shown in section; Fig. 4 is an elevation of the same viewed from a point at right angles to the view point in Fig. 3; Fig. 5 is an enlarged horizontal section on the line 5—5, Fig. 4; Fig. 6 is a detail view of the mechanism employed for communicating an oscillatory motion to the cage; Fig. 7 is an enlarged front elevation of the cage with a bath-tub mounted therein; Fig. 8 is a vertical section of the same on the line 7—7, Fig. 7; Fig. 9 is a horizontal section on the line 8—8, Fig.

7; Fig. 10 is an enlarged side elevation of the cylinder shown in Fig. 6; Fig. 11 is a top plan view of the same; and Fig. 12 is a longitudinal sectional view of the same.

Referring to said drawings, in which like designating characters distinguish like parts throughout the several views—1 indicates an inclosure constituted by a casing, preferably rectangular in cross-section and having rectangular walls, and provided with a door 2 in one of its sides through which the ware or articles to be acted upon are inserted and removed. Said casing is open at its lower end and is mounted over a pit 3 adapted for receiving the abrading material as it falls after having performed its work in the abrading operation.

The inner walls of the casing are lined with soft rubber, felt, sheet-cork, or other similar material, adapted to receive the impact of the sand or other material discharged within the casing, the lining being herein designated 1^a and being adapted, firstly, to so cushion the impact as to prevent the breaking up of the sand or other material employed, and, secondly, to preserve or protect the walls of the casing from the abrasive action of the blasts.

Suspended within the casing 1 is a support for the ware to be acted upon, which, in the present instance, consists of a frame-like cage which may be rectangular, as herein depicted, or of any other suitable form. The frame shown comprises members 4, preferably of angle-iron, connected at their opposite ends by transverse or cross-members 5, said cage being adapted for receiving and holding therein the article to be acted upon, a bath-tub 6 being herein illustrated as mounted in said cage.

Having its lower end rigidly held in a suitable cross-head fixed in the upper end of the cage is a rod 7, preferably rectangular in cross section, which extends upward through and is vertically movable in a suitable sleeve-bearing 8 which is rotatably mounted in the upper end of the casing 1. Connected to the upper end of said rod 7 is the lower end of a cable 9 from which said rod and the cage is suspended, said cable being passed over suitably arranged pulleys 10 and connected to a power-transmitting element, as the piston-rod 11 of a motor or other motive-power cylinder 12, said rod 11

being adapted, in its reciprocating movements, to alternately raise and lower the cage. Appropriate means whereby said cage is guided or maintained in a vertical
 5 or non-swaying position is provided, the means herein depicted comprising a rod 13, mounted in the pit in alinement with said rod 7, and a tube 14 carried by a cross-head 15 mounted on the lower end of the cage,
 10 said tube embracing and being slidable upon said rod 13.

Mounted on the outer sides of the walls of the casing 1 is a frame composed preferably, of brace-members 16 which converge at their
 15 outer ends, as shown in Figs. 1, 2, 3, 4 and 5, the upper members being rigidly connected to the divergent arms 17 of, and supporting, a bearing 18, and the lower members being in like manner connected to and sup-
 20 porting a similar bearing 19. Said bearings 18 and 19 are separated and arranged in vertical alinement, and support the oppositely-disposed trunnions 20 of a rocker 21 which is mounted between said bearings and
 25 in which a tubular sleeve 22 is rigidly mounted in a substantially horizontal position. Projected through said sleeve 22 is a blast nozzle 23 through which the blasts of sand or other abrading material are direct-
 30 ed, the discharge end of said nozzle being projected through an opening or orifice 24 provided in a slide 25. Said slide extends transversely of the casing, covering a transverse opening 26 in the side of said casing,
 35 and is arranged to be moved forward and back with the lateral movements of the blast nozzle. Being of sufficiently greater length than said opening 26, said slide maintains said opening closed throughout the move-
 40 ment of the nozzle from one extreme position to the other.

For oscillating the blast-nozzle 23 any approved means may be employed, such, for instance, as a motive-power cylinder 27
 45 mounted in suitable position, and having a piston rod 28 operatively connected to the sleeve 22, as shown.

For automatically opening and closing the inlet port to the cylinder at one extrem-
 50 ity of the movement of the blast-nozzle, a toggle 29 is pivotally connected at one end to the sleeve 22 adjacent to the rear end of the latter and at its opposite end to a valve-lever or crank-arm 30, said lever, when in
 55 one position, closing said port.

For effecting oscillatory movement of the cage carrying the tub, so as to expose all portions of the latter to the blasts from the nozzles, a gear or pinion 31 is fixedly
 60 mounted upon the sleeve-bearing 8 through which the rod 7 is slidable, as hereinbefore described, and a gear-rack 32, carried by the piston-rod 33 of a power-transmitting element, such as a suitably mounted motive-
 65 power cylinder 34, is in operative engage-

ment with said pinion. A suitable bracket 35 carried by the casing 1 overlies the pinion 31, maintaining the latter and the sleeve bearing 8 against vertical movement. As is
 70 apparent, reciprocatory movement of the piston in cylinder 34 communicates an oscillatory movement to the cage bearing the ware acted upon and thereby effects the presentation of all parts of the same within
 75 the range of the blasts from the nozzles.

Connected to a crank-arm 36, by means of which the inlet port to the cylinder 34 is opened and closed, is one end of a rod 37 which lies in a position substantially paral-
 80 lel to the piston rod 33 and gear-rack 32 and is longitudinally movable through bearings 38 fixed upon said gear-rack. A member 39 is fixed upon said rod 37 between said bearings 38, so as to be contacted by the latter
 85 at points adjacent to the opposite limits of its reciprocating movements and to be thereby carried forward and back, rocking the three-way valve 52 to alternately open and close the opposite ports 53 and 54 of the
 90 cylinder.

Suitable means is provided for securing a bath-tub in place in the cage, said means comprising lugs 40 at the lower end of the cage, between which and a transverse mem-
 95 ber 41, to which said lugs are attached, the roll 42 of the tub is received; and a clamping device adjustably mounted at the upper end of the cage. Said clamping device, as shown in Figs. 7, 8 and 9, consists of a rod
 100 43 having its opposite ends journaled in opposite sides of the cage, said rod having crank-like bends 44 formed therein for engaging the tub beneath the roll 42, and a hook member 45 rigidly carried by said rod
 105 43 and adapted to be turned into a position overlying said roll for maintaining the same close against said bends 44. A lever 46 carried by said rod 43 at one end is adapted to be held by a pin 47 in a position maintain-
 110 ing the clamping device in adjusted position with relation to the tub, said pin being inserted through the casing behind the lever, as shown in Figs. 7 and 9.

The bottom of the pit is preferably formed with an inclined surface 48 and a
 115 receiving portion or trench 49, the latter being adapted for receiving the used blasting material as it slides from the inclined surface. Said material may be removed from the pit for re-use by any suitable
 120 mechanism as by an elevator 55 to which said material is delivered by an appropriate conveyer 56 and by which it is delivered to a suitably located hopper 57. Pipes 58 lead from said hopper to appropriately located
 125 tanks 59 from which the blasting material is conveyed through tubes to the blast-nozzles, steam, compressed air, water, or other power being employed for forcing said material.
 130

Referring to Fig. 1, 60 indicates a boiler or pressure tank from which steam or compressed air, as the case may be, is conducted through pipes 61 to a position for forcing the blasting material as it passes from said tanks 59. A branch pipe 62 leads to each cylinder 27, a branch pipe 63 to the cylinder 12, a branch pipe 64 to the cylinder 34, and branch pipes 65 to the interior of each of the tanks 59, as shown. Suitably located valves 66 are provided for shutting off the operating pressure at various points, and a master valve 67 is provided in the main pressure pipe adjacent to the boiler or tank 60. For removing the dust which remains in suspension within the casing, a collecting and discharge tube 68 is provided, a suitable suction fan being located in said pipe, as at 69, for producing suction in said tube. In practice, the ware or article to be acted upon is inserted through the doorway in the casing 1 and is rigidly mounted in the cage, after which the door 2 is closed. For conveying heavy articles to and from the apparatus, an overhead track 50 with trolley 51, as illustrated in Fig. 4, may be employed. Blasts of sand or other suitable material are then forced through the nozzles against said ware or article for smoothing the surfaces thereof as well as for removing the adhering molding-sand and cleaning the casting. Said nozzles may be permitted to remain stationary or may be caused to move transversely back and forth by employing the power-transmitting elements connected therewith. The cage is at the same time alternately elevated and lowered to bring the entire length of the articles within the range of the blasts, and it may be stopped at any point desired for allowing the blasts to be continuously directed against any desired point. At the same time, the cage may be oscillated or rotated so as to present any and all irregular or out-of-the-way portions of the article to the action of the blasts from the nozzles.

It will be noted that some of the parts herein shown and described may be dispensed with when desired, and also that by manipulation of the valves 66 one or more of the parts may be rendered non-operative.

As is obvious, a rotary motion may be imparted to the cage instead of the oscillatory motion described, in which case any suitable gearing may be employed. Inasmuch as the alterations required to change the mechanisms to render said cage rotary instead of oscillatory is clearly within the skill of an ordinary mechanic, it is not thought to be necessary to illustrate such a mechanism. The cylinders 27 are similar to the cylinder 34 depicted in Figs. 6, 10, 11 and 12 in that they each have the same construction of three-way valve and ports (not shown).

It will further be noted that many varia-

tions in the details of construction and in the form of the parts employed may be resorted to without altering or departing from the general spirit and scope of the invention. For example, the blast-nozzles may be operated by hand instead of mechanically, or may be oscillated vertically as well as horizontally, and additional nozzles may be provided and located in any preferred position. Hence, I do not desire to limit myself to the precise construction and arrangement of parts herein shown and described.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A blasting apparatus comprising a support for the ware to be acted upon, blast-nozzles arranged to direct blasts against the ware carried by said support, automatic means for transporting said support back and forth in front of said nozzles, and automatic means for oscillating said support during the travel of the latter.

2. A blasting apparatus comprising a longitudinally movable ware-support, blast-nozzles arranged to direct blasts across the path of movement of said support, and automatic means for turning said support simultaneously with the longitudinal movement thereof to present all parts of the ware carried thereby within range of said blasts.

3. A blasting apparatus comprising a longitudinally movable ware-support, blast-nozzles arranged to direct blasts across the path of movement of said support, means for imparting to said nozzles a non-rotary oscillation, and automatic means for oscillating said support during the longitudinal movement thereof to present concealed surfaces within range of said blasts.

4. A blasting apparatus comprising a longitudinally movable ware-support, blast-nozzles arranged to direct blasts across the path of movement of said support, means for oscillating said nozzles, means for turning said support to present concealed surfaces within range of said blasts, a casing within which said support is movable and through which said nozzles are projected, and a cushion-like lining for said casing.

5. A blasting apparatus comprising a casing, a ware-support suspended vertically within said casing, automatic means for reciprocating said support within said casing, means for imparting to the ware a partial rotary motion, blast nozzles disposed at opposite sides of the path of movement of the ware borne by said support for directing simultaneous blasts against opposite sides of the moving ware, and means for oscillating said nozzles along a horizontal path.

6. A blasting apparatus comprising a casing, a ware-support suspended vertically within said casing, automatic means for elevating and lowering said support, blast-noz-

zles for directing blasts across the path of travel of the ware borne by said support, and means for oscillating the support.

7. A blasting apparatus comprising a casing, a ware-support suspended vertically within said casing, automatic means for elevating and lowering said support, blast-nozzles for directing blasts across the path of travel of the ware borne by said support, means for oscillating the ware, and means for oscillating said nozzles along a horizontal path.

8. A blasting apparatus comprising a casing, a ware-support suspended vertically within said casing, automatic means for elevating and lowering said support, blast-nozzles for directing blasts across the path of travel of the ware borne by said support, automatic means for supplying blasting material to said nozzles, and automatic means for oscillating the ware.

9. A blasting apparatus comprising a casing, a ware-supporting cage suspended vertically within said casing, automatic means for elevating and lowering said cage, blast-nozzles for directing blasts across the path of travel of the ware borne by said cage, automatic means for supplying blasting material to said nozzle, means for collecting the used material, and means for oscillating the cage.

10. A blasting apparatus comprising a casing, a ware-support suspended vertically within said casing, automatic means for elevating and lowering said support, blast-nozzles for directing blasts across the path of travel of the ware borne by said support, automatic means for supplying blasting material to said nozzles, means for collecting the used material, means for returning said material for re-use, and automatic means for oscillating the ware.

11. A blasting apparatus comprising a casing, a ware-support suspended within said casing, means for elevating and lowering said support, blast-nozzles for directing blasts across the path of travel of the ware borne by said support, automatic means for supplying blasting material to said nozzles, means for collecting the used material,

means for returning said material for re-use, means for oscillating said nozzles, and means for oscillating the ware.

12. A blasting apparatus for ware having irregular surfaces comprising a casing, a ware-support suspended vertically within said casing, automatic means for elevating and lowering said support, blast-nozzles for directing blasts across the path of travel of the ware borne by said support, automatic means for supplying blasting material to said nozzles, means for collecting the used material, means for returning said material for re-use, and automatic means for turning the ware laterally to present non-exposed parts thereof within range of the blasts.

13. A blasting apparatus comprising a casing, a vertically movable ware-support suspended within said casing, automatic moving means for said support, blast-nozzles for directing blasts across the path of travel of the ware borne by said support, and separate valve-controlled means for oscillating said nozzles, in a horizontal plane, for oscillating said support, and for elevating and lowering said support.

14. A blasting apparatus comprising a longitudinally movable ware-support, blast-nozzles arranged to direct blasts across the path of movement of said support, means for oscillating said nozzles in a horizontal direction, automatic means for oscillating said support during the longitudinal movement of the latter, an inclosure within which said support is located, said inclosure having transverse openings therein, and slides of greater length than said openings slidably mounted in positions closing the latter, said nozzles being projected through said slides and said slides being movable with said nozzles during the oscillation of the latter.

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

JOHN E. WRIGHT.

Witnesses:

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