(No Model.) 3 Sheets—Sheet 1.

J. HEMPHILL & J. FAWELL.

INGOT MANIPULATOR.

No. 424,650. Patented Apr. 1, 1890.

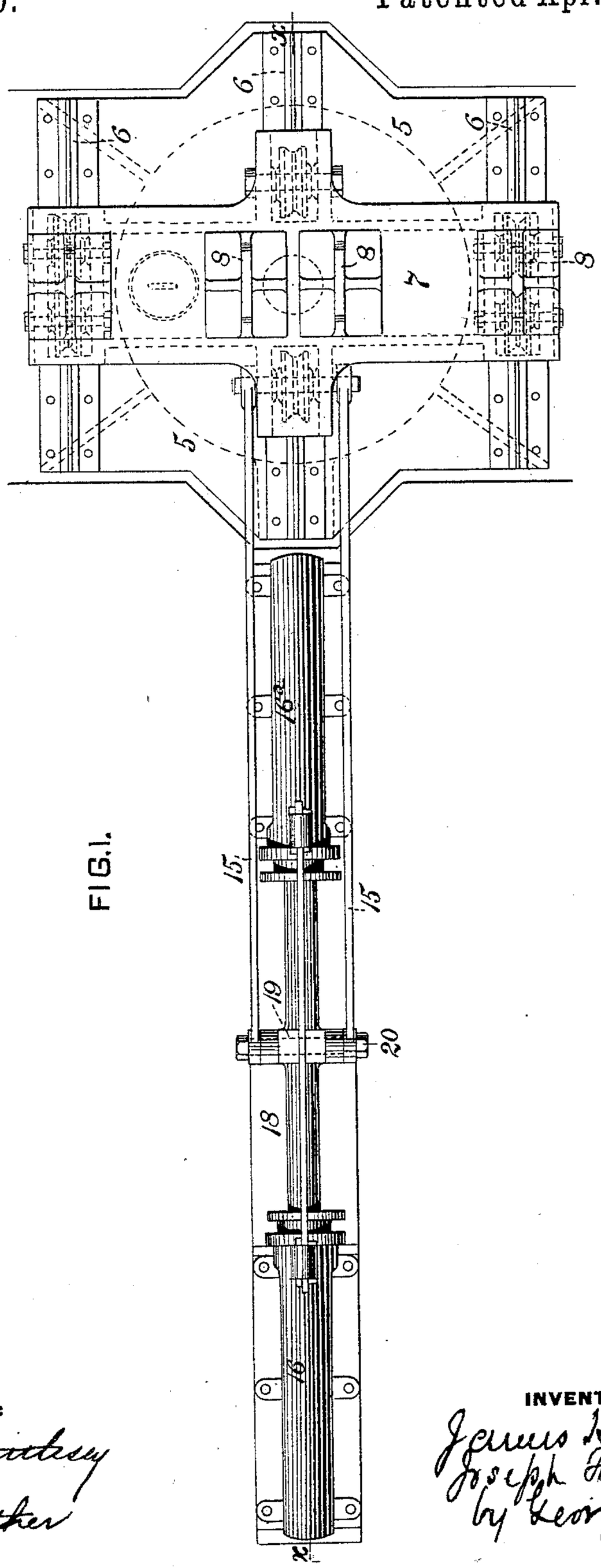

FIG. I.

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(No Model.) 3 Sheets—Sheet 2.

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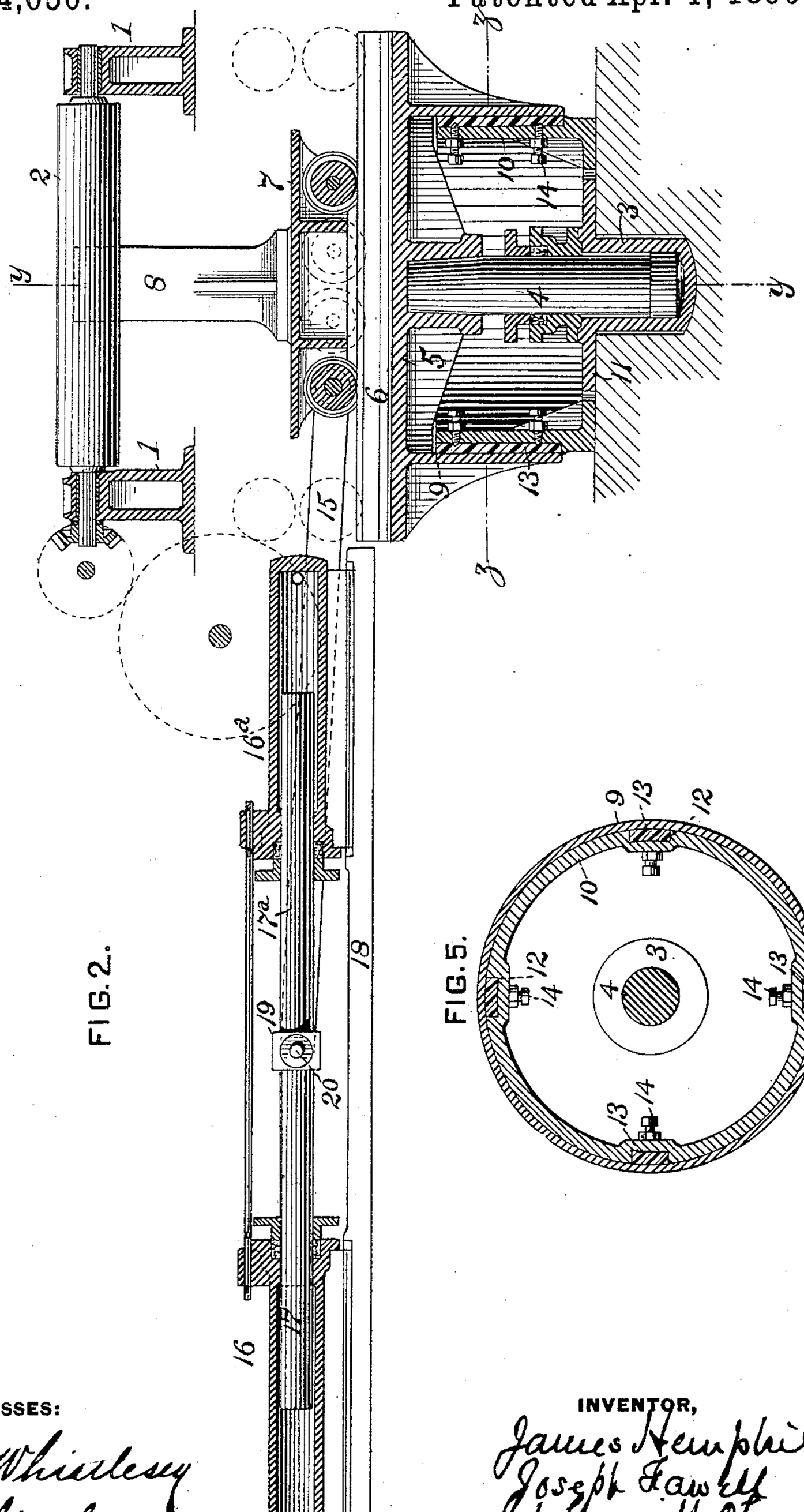

FIG. 2.

FIG. 5.

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(No Model.) 3 Sheets—Sheet 3.

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FIG. 3.

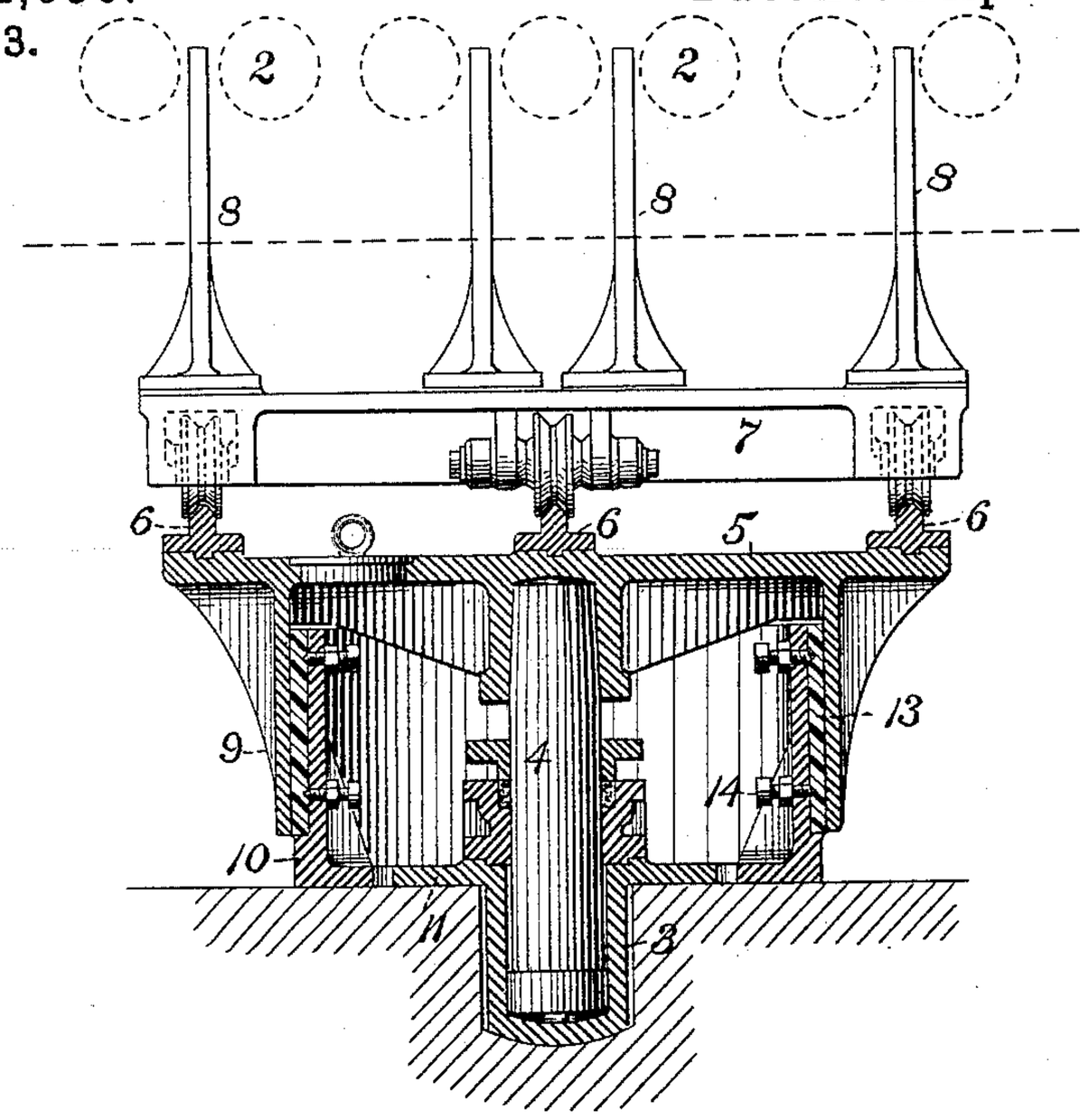
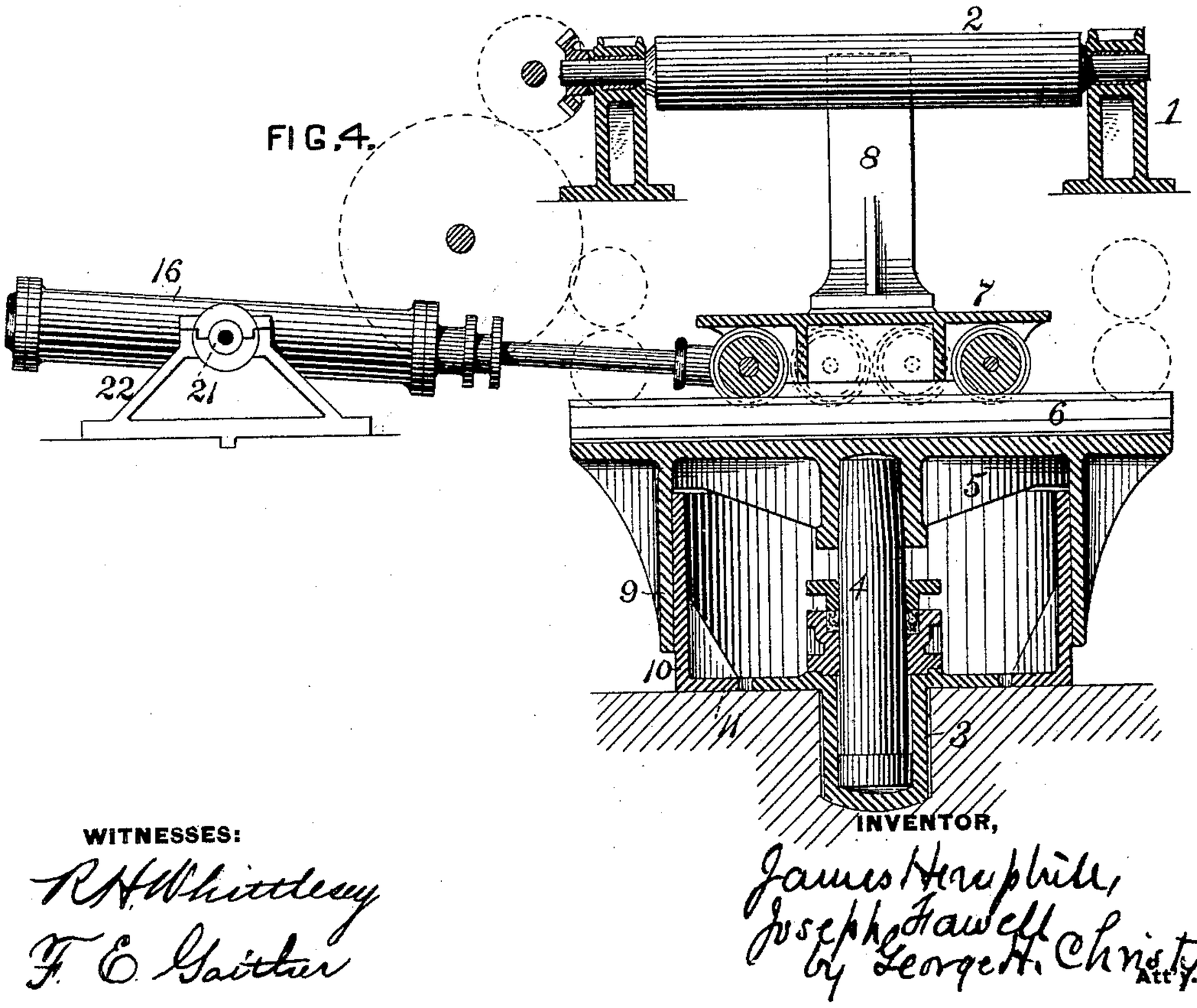


FIG. 4.



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UNITED STATES PATENT OFFICE.

JAMES HEMPHILL AND JOSEPH FAWELL, OF PITTSBURG, PENNSYLVANIA.

INGOT-MANIPULATOR.

SPECIFICATION forming part of Letters Patent No. 424,650, dated April 1, 1890.

Application filed February 1, 1890. Serial No. 338,905. (No model.)

To all whom it may concern:

Be it known that we, JAMES HEMPHILL, a citizen of the United States, and JOSEPH FAWELL, a subject of the Queen of Great Britain, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented or discovered certain new and useful Improvements in Ingot-Manipulators, of which improvements the following is a specification.

The invention described herein relates to certain improvements in devices for shifting ingots or large masses of metal on the feed-tables of rolling-mills for the purpose of bringing such ingots or masses of metal into line with the desired passes of the reducing-rolls; and the invention has for its object a construction and arrangement of mechanism whereby such operation may be effected rapidly and with certainty without interfering with the operation of the feed-table.

In general terms the invention consists in the construction and combination of mechanical devices or elements, all as more fully hereinafter described and claimed.

In the accompanying drawings, forming a part of this specification, Figure 1 is a plan view of the manipulator, the rolls and feed-table being removed. Fig. 2 is a sectional elevation of the same, and showing a portion of the feed-table, the plane of section being indicated by the line $x\ x$, Fig. 1. Fig. 3 is a sectional elevation, the section being taken on the line $y\ y$, Fig. 2. Fig. 4 is a view, partly in section and partly in elevation, showing a modification of the shifting apparatus; and Fig. 5 is a sectional view on the line $z\ z$, Fig. 2.

In the practice of our invention the feed-table is of the usual or any suitable construction and consists of side beams 1 and driven rolls 2. At a point approximately about midway of the length of the table and below the same is placed a fluid-pressure cylinder 3, and upon the upper end of the plunger 4 of said cylinder is secured a platform 5, having rails 6 formed or secured thereon, said rails being approximately parallel with the axes of the feed-rolls 2 and arranged at the ends and middle of the platform. On the rails 6 are placed the wheels of the truck or carriage 7, which has posts or standards 8 formed or secured thereon, said posts or standards being adapted when the platform is raised to pass up between the feed-rolls 2 and engage the ingot or other mass of metal thereon. Ingots when cast are about five or six feet long, and when rolled are extended to very much greater lengths; hence in order that the posts or standards may always have a good bearing on the article being rolled the platform 5 and truck 7 are considerably extended in a direction at right angles to the axes of the feed-rolls or in line with the feed of said rolls, and the posts or standards are arranged at the ends and middle portions of the truck, or may be arranged at equal intervals along the truck.

In order to steady and guide the platform when raised or lowered a cylindrical shell 9 is formed on the under side of the platform 5, and a similar cylinder 10, adapted to fit within the cylinder 9 and guide it in its vertical movements, is arranged outside of the fluid-pressure cylinder 3, and is preferably connected to said cylinder by a web 11, the cylinder 3 and shell 10 forming an integral structure. These cylindrical shells are made of as great diameter as the dimensions of the platform will permit, so that the guiding-surfaces may be near the edges of the platform, thereby providing a broader base for the platform and lessening any liability of tipping.

In order to compensate for the wear of the adjacent faces of the two shells, vertical recesses 12 are formed at three or more points in the periphery of the inner shell, and in these recesses are placed strips or liners 13, which can be moved outwardly by means of screws 14 as the surfaces of the cylinders wear away. The truck is connected to the piston 16 of a fluid-pressure cylinder 17 of the double-acting type, as shown in Fig. 4, or to the connected plungers of two single but oppositely-acting fluid-pressure cylinders 17 17^a, as shown in Figs. 1 and 2.

The construction shown in Figs. 1 and 2 consists of two single-acting fluid-pressure cylinders 17 17^a, so arranged on a base-plate 18 that the action of one is opposite that of the other. The plunger, 16 16^a of these cylinders are preferably formed integral with each other, but may be formed independent

of each other and connected by a bar or rod. On the part connecting the plungers is secured a collar 19, provided with trunnions 20, to which are connected one of the ends of the links 15, the opposite ends thereof being connected to the truck 7. This construction is preferred, as any packing of the pistons is avoided; but a double-acting cylinder may be employed, as shown in Fig. 4. When employing a double-acting cylinder, it is preferred to form trunnions 21 thereon, said trunnions being mounted in suitable bearings 22, so that the cylinder may oscillate.

In order to avoid the use of flexible connections, the actuating-fluid is admitted through one of the trunnions, which is made hollow for that purpose.

In operating the manipulator the truck is first shifted by the cylinder or cylinders 17 until the posts or standards are immediately under or at one side of the ingot on the feed-table. The platform or truck is then raised by admitting fluid under pressure into the cylinder 3, thereby either lifting the ingot or causing the posts to move up alongside thereof. The truck is again shifted, thereby either carrying the ingot toward one side or the other of the feed-table or else sliding it along the rolls.

The edges of the floor of the truck should be made to project sufficiently far beyond the wheels to prevent scales produced in rolling from dropping down onto the journals of the wheels.

The lifting-cylinder and the guiding-shells are protected from the scales by the platform 5, which is, however, provided with a covered man-hole, as shown in dotted lines in Fig. 1, to permit access to the interior of the shells for adjusting the packing-glands of the cylinder 3 or adjusting the liners 13.

We claim herein as our invention—

1. In a rolling-mill, the combination of a feed-table, a vertically-movable platform, and a movable truck mounted on said platform and provided with posts or standards arranged to pass between the rolls of the feed-table, substantially as set forth.

2. In a rolling-mill, the combination of a feed-table, a vertically-operating fluid-pressure cylinder, a platform attached to the upper end of the plunger of said cylinder, and a movable truck mounted on said platform, and provided with posts or standards arranged to pass between the rolls of the feed-table, substantially as set forth.

3. In a rolling-mill, the combination of a feed-table, a vertically-movable platform, a truck mounted on said platform, and provided with posts or standards arranged to pass between the rolls of the feed-table, and two single and oppositely-acting fluid-pressure cylinders for shifting the truck on the platform, substantially as set forth.

4. In a rolling-mill, the combination of a feed-table, a vertically-movable platform, a cylindrical shell depending from the platform, a stationary shell fitting within the movable shell, and a movable truck mounted on said platform, and provided with posts or standards arranged to pass between the rolls of the feed-table, substantially as set forth.

5. In a rolling-mill, the combination of a feed-table, a vertically-movable platform, a cylindrical shell depending from said platform, a stationary shell fitting within the movable shell and provided with vertical grooves or recesses, outwardly-adjustable strips or liners arranged in said grooves or recesses, and a movable truck mounted on the platform and provided with posts or standards arranged to pass between the rolls of the feed-table, substantially as set forth.

In testimony whereof we have hereunto set our hands.

JAMES HEMPHILL.
JOSEPH FAWELL.

Witnesses:
W. B. CORWIN,
DARWIN S. WOLCOTT.