

No. 661,470.

Patented Nov. 6, 1900.

J. FAWELL & J. E. SCHWAB.

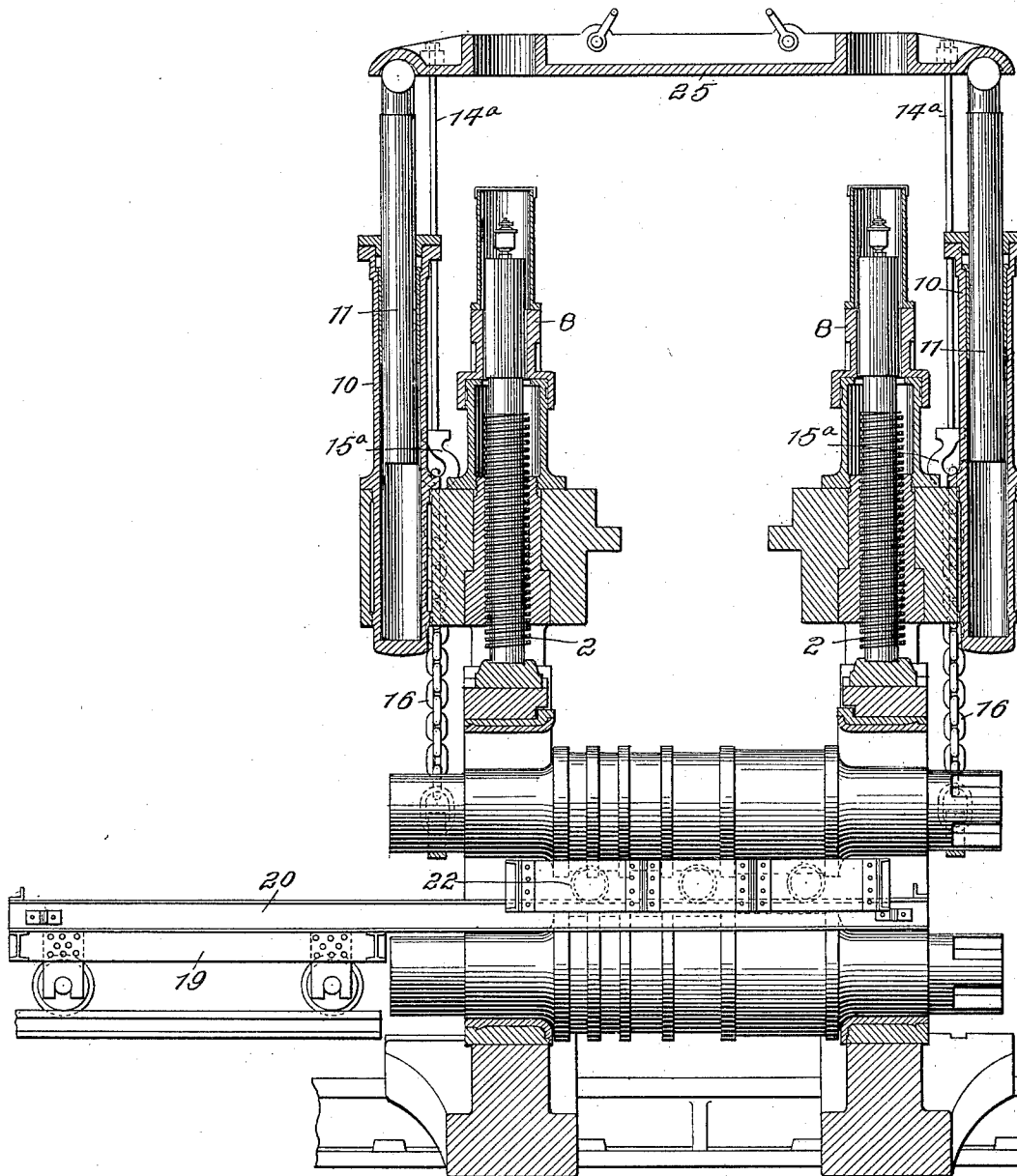
ROLLING MILL.

(Application filed May 22, 1900.)

(No Model.)

9 Sheets—Sheet 1.

FIG. 1.



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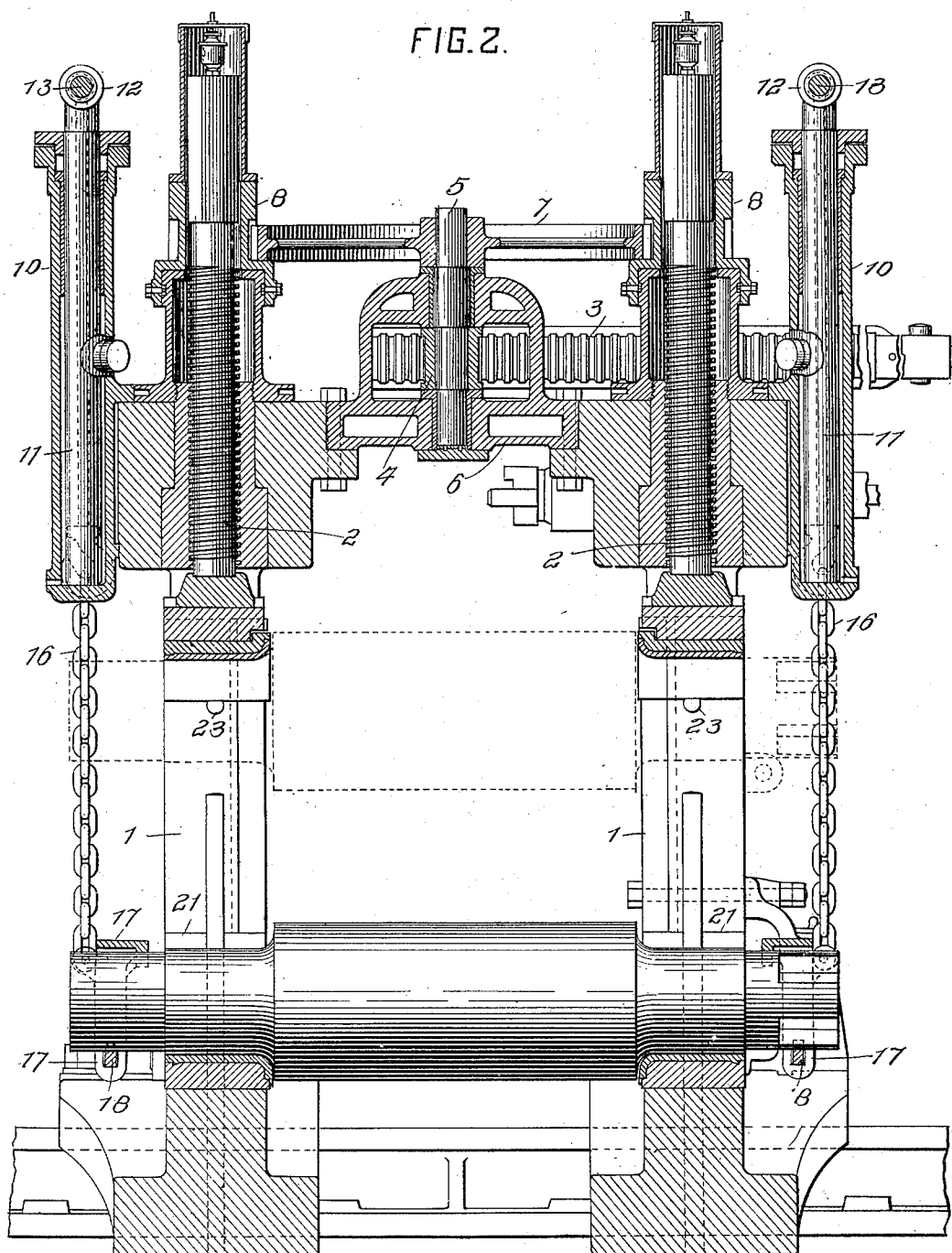
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FIG. 2.



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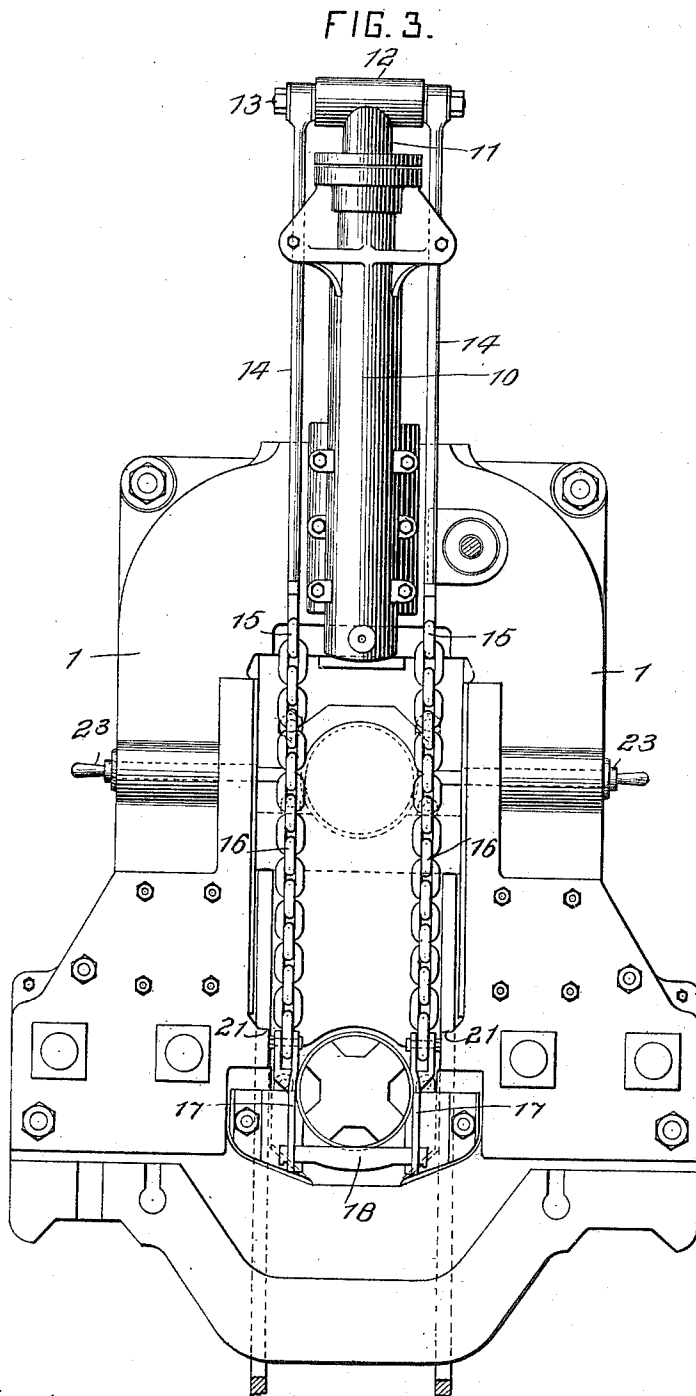
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9 Sheets—Sheet 3.



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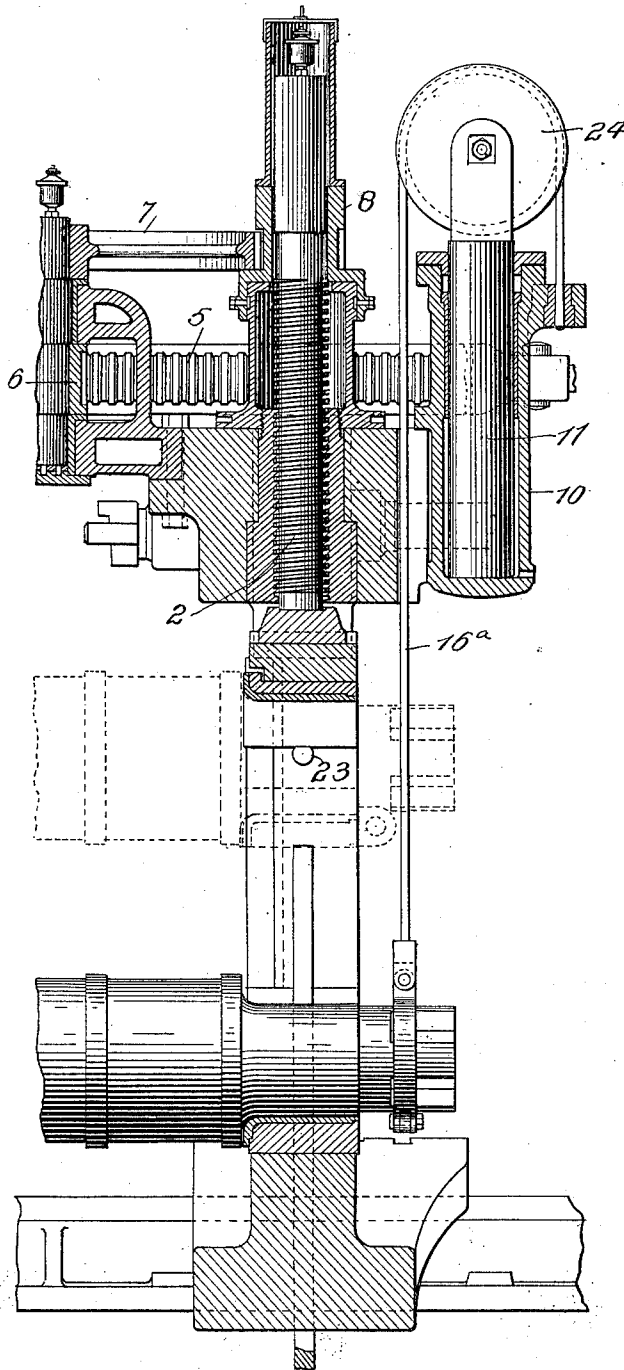
ROLLING MILL.

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FIG. 4.



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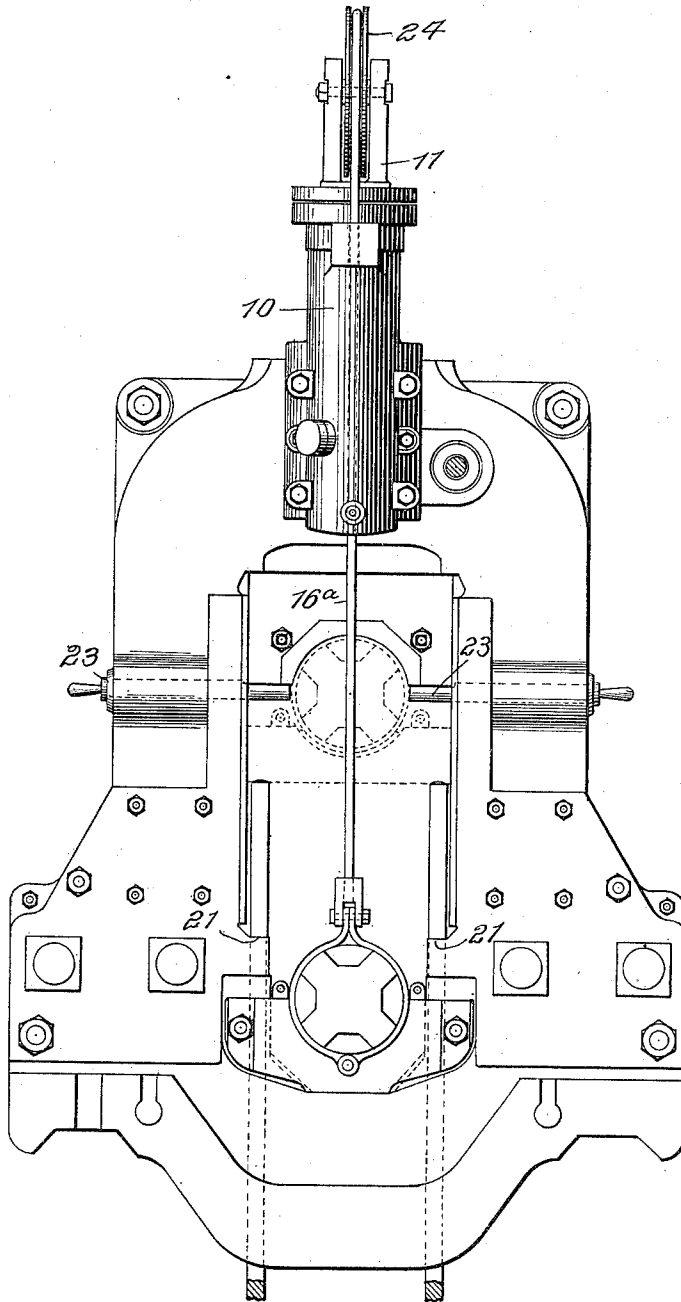
ROLLING MILL.

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FIG. 5.



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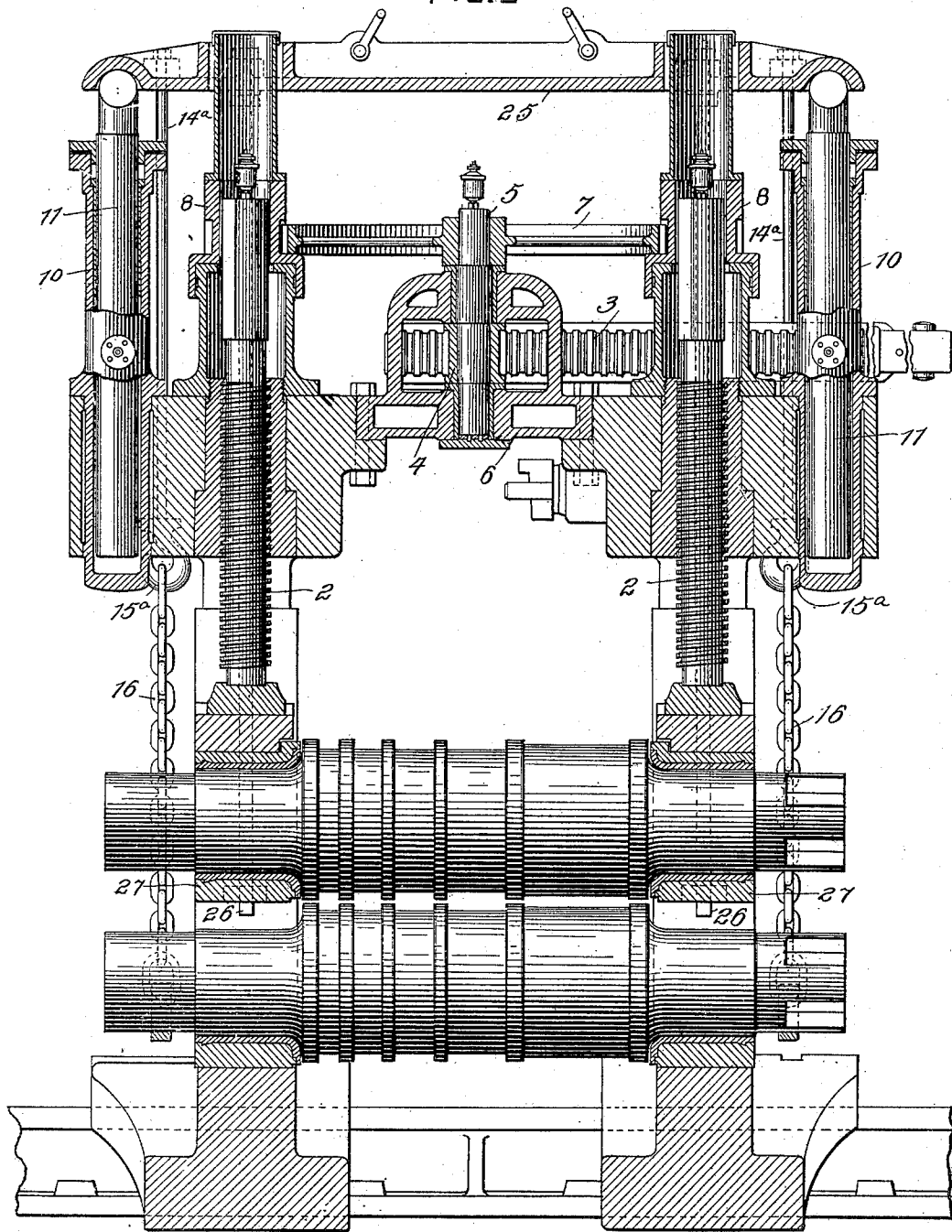
ROLLING MILL.

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FIG. 6



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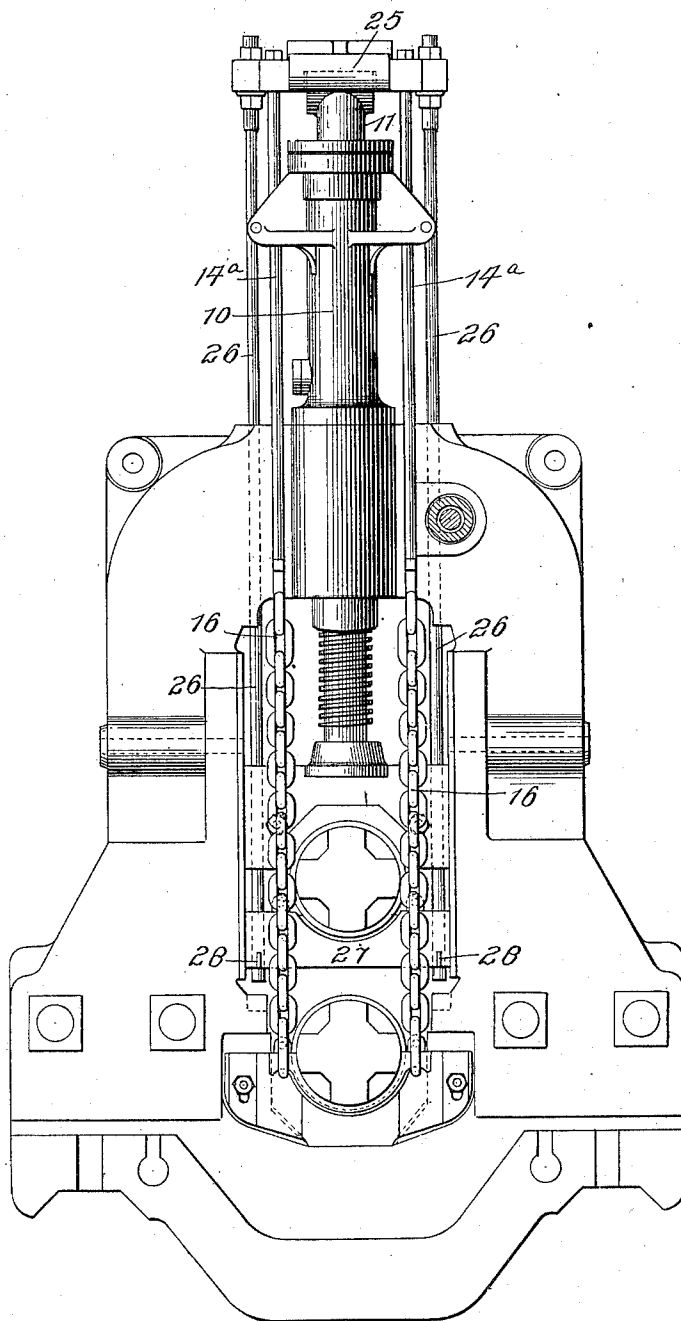
J. FAWELL & J. E. SCHWAB.
ROLLING MILL.

(Application filed May 22, 1900.)

(No Model.)

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FIG. 7.



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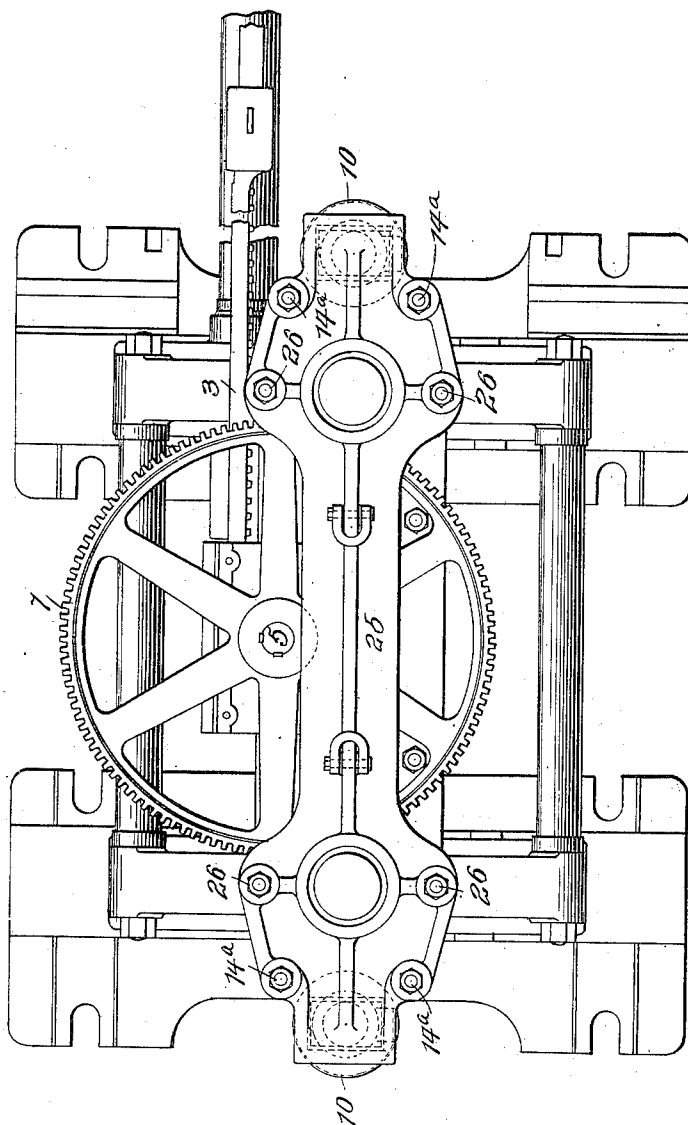
J. FAWELL & J. E. SCHWAB.
ROLLING MILL.

(Application filed May 22, 1900.)

(No Model.)

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FIG. 8



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ROLLING MILL.

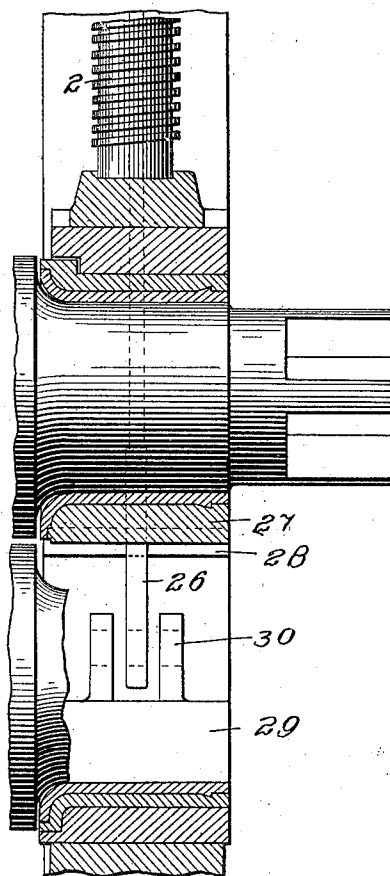
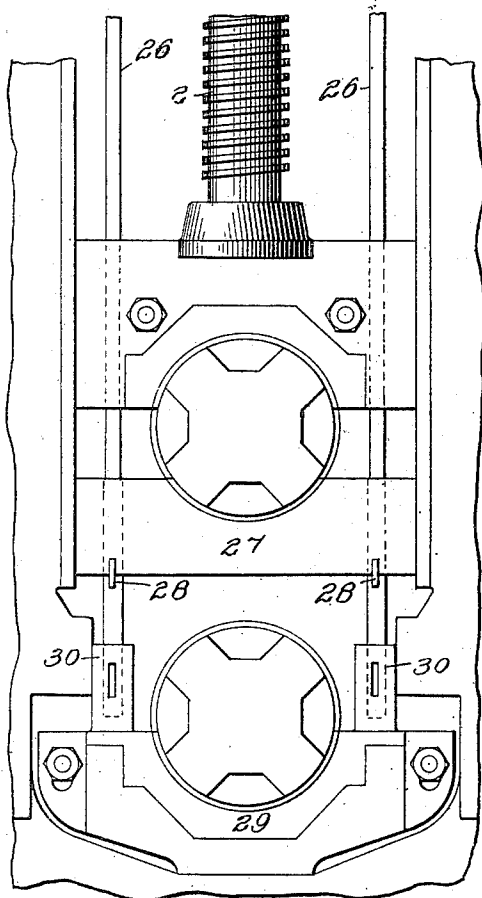
(Application filed May 22, 1900.)

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FIG. 9.

FIG. 10.



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UNITED STATES PATENT OFFICE.

JOSEPH FAWELL, OF PITTSBURG, AND JOSEPH E. SCHWAB, OF DUQUESNE,
PENNSYLVANIA.

ROLLING-MILL.

SPECIFICATION forming part of Letters Patent No. 661,470, dated November 6, 1900.

Application filed May 23, 1900. Serial No. 17,596. (No model.)

To all whom it may concern:

Be it known that we, JOSEPH FAWELL, of 312 Denniston avenue, Pittsburg, and JOSEPH E. SCHWAB, of Duquesne, in the county of Allegheny and State of Pennsylvania, citizens of the United States, have invented or discovered certain new and useful Improvements in Rolling-Mills, of which improvements the following is a specification.

The invention described herein relates to certain improvements in rolling-mills, and has for its object a construction and combination of parts whereby the changing of rolls involving the removal of one set and the insertion of another set of rolls in the housings can be facilitated; and it is the further object of the invention to provide for the holding of the upper roll in contact with its adjusting-screws or other adjusting devices. The invention is hereinafter more fully described and claimed.

In the accompanying drawings, forming a part of this specification, Figure 1 is a view, partly in section and partly in elevation, showing the manner of changing rolls. Fig. 2 is a sectional elevation of a stand of rolls having roll-lifting cylinders applied thereto. Fig. 3 is an end elevation of the construction shown in Fig. 2. Fig. 4 is a sectional elevation of a portion of a stand of rolls, illustrating a modification of the lifting mechanism. Fig. 5 is an end elevation of the construction shown in Fig. 4. Fig. 6 is a sectional elevation of a roll-stand, showing our improvement adapted for rolling, changing, and for balancing the upper roll. Figs. 7 and 8 show an end elevation and a top plan, respectively, of the construction shown in Fig. 6. Figs. 9 and 10 are end and sectional elevations of portions of a stand of rolls, illustrating a further modification of our improvement.

In the practice of our invention the housings 1 are constructed in the usual or any suitable manner known in the art and are provided with adjusting-screws 2, operated in any suitable manner, but preferably by means of a rack 3, intermeshing with a pinion 4, which is mounted upon a vertical pin 5, supported by a bridge 6, secured to the

opposite housing. On the upper end of the pin 5 is secured a gear-wheel 7, intermeshing with peripherally-toothed portions of sleeves 8, surrounding the stems of the screws 2. As shown in Figs. 2, 4, and 6, the stems of the screws and the sleeves are so constructed that the screws are caused to rotate with the sleeves, while free to move longitudinally through them. Any other suitable form or construction of adjusting mechanism may be employed without departing from the spirit of our invention, as hereinafter described.

On the housings are mounted fluid-pressure cylinders 10, provided with rams 11. In the construction shown in Figs. 2 and 3 the rams are provided at their upper ends with heads 12, through which pass pins 13. From these pins are suspended rods 14, preferably provided at their lower ends with hooks 15, adapted to engage sections of chains 16. The lower ends of these chains are connected to bridles consisting of side bars 17 and a horizontal bar or bit 18. As shown in Figs. 2 and 3, the fluid-pressure cylinders 10 are so mounted on the housings that the suspending devices connected thereto will hang immediately over the projecting journals of the rolls.

In changing rolls the upper roll must first be removed from the housing and then the second roll, after which the new lower roll is placed in position and then the upper roll. As shown in Fig. 1, we employ a transfer device consisting of a carriage 19, adapted to move along rails arranged in suitable relation to the roll-housings. This carriage is provided with rails 20, which project beyond one end of the carriage a distance sufficient to permit of the rails being inserted through the window of one housing and their outer ends resting upon shoulders 21 in the window of the other housing. On these rails is arranged a trolley-buggy 22, constructed to hold the body of the roll. The rails 20 of this transfer device are arranged such a distance apart as to permit of the insertion of the rails in the manner described through the windows of the housings of the rolls.

In changing rolls the rams of the fluid-pressure cylinders are lowered sufficiently far to permit the horizontal bar 18 being passed under the journals of the upper rolls and into the side pieces 17. The adjusting-screws are then raised and fluid-pressure is admitted to the cylinders to raise the upper roll to the upper ends of the windows of the housings. Supporting-pins 23 are then inserted through the housings to engage the bearing-blocks of the upper roll and hold them in position when the roll is removed. The carriage 19 is then run forward, the rails 20 passing in through the window of one housing and into the window of the other housing, so that their outer ends will rest upon the shoulders 21 of the second housing. The buggy 22 is then run forward onto the rails into position below the upper roll, which is then lowered onto the buggy. The suspending devices are then removed from the journals of the roll and the buggy, with the roll, moved out onto the carriage to such position as will permit of the roll being lifted by a suitable crane and carried out of the way. The carriage 19 is then run out, and the bridles of the lifting device are applied to the journals of the lower roll. The latter is then raised sufficiently far to permit the rails 20 and the buggy 22 to be run into the housing and under the elevated roll. The latter is next lowered onto the buggy and drawn out from the housing and removed by the crane. Another roll is then placed upon the buggy, run into the housings, and elevating devices connected to the journals of this roll, which is then raised from the buggy. The carriage is again shifted, so as to permit this roll being lowered onto its journal-blocks. The lifting devices are then disconnected from the journals, the carriage again shifted to proper position, a roll having been previously placed upon the buggy. The lifting devices are next connected to the journals of this roll to raise it from the buggy, whereupon the carriage is withdrawn. The supporting-pins 23 are next drawn out to permit the bearing-blocks of the upper roll to drop onto the journals of this roll, which is then lowered and the lifting devices disconnected.

As shown in Figs. 4 and 5, chains or ropes 16^a, having one end connected to the lifting-cylinder or some stationary part of the mill and passing over pulleys 24, mounted on the upper ends of the rams and connected at their lower ends to bridles or other suitable devices for engaging the necks of the rolls, can be substituted for the bars and chains shown in Figs. 1 and 2.

As shown in Figs. 6, 7, and 8, a cross-head 25 may be supported upon the upper ends of the lifting-rams, said cross-head extending across from housing to housing and having openings therethrough, so as to permit the cross-head to move up and down along the

adjusting-screws or their protecting-sleeves, but entirely out of contact therewith. To the cross-head are connected the bars 14^a, provided at their lower ends with hooks 15^a, to which are connected the chains 16. In addition to the connections whereby the rolls may be lifted in the manner described when a change of rolls is desired rods 26 are connected to the cross-head 25, said rods extending, as shown, down through the housings alongside adjusting-screws and into the windows. The lower ends of these rods 26 are connected to cross bars or blocks 27 by any suitable detachable means—such, for example, as the removable pins or keys 28. As shown in Figs. 6 and 7, the upper surfaces of the blocks 27 are made concave, so as to form seats for the journals of the rolls. This mechanism can be employed by maintaining a constant pressure in the lifting-cylinders for holding the rolls up against the adjusting-screws and can also be used for raising the upper roll to the upper ends of the housings when it is desired to change the rolls. Ordinarily the roll-balancing connections to the fluid-pressure cylinders would be employed for lifting the upper rolls when it is desired to change the latter and the rods and chains employed for lifting the lower roll; but, as will be readily understood, these rods 26 may be made of sufficient length to extend down a sufficient distance to be connected to the journal-blocks 29 of the lower roll. These journal-blocks are so constructed, as shown in Figs. 9 and 10, as to permit of their being removed laterally from the housings. A convenient manner of connecting the blocks to the rods 26 when the lower roll is to be raised consists in slotted lugs 30, on the journal-blocks 29, for the reception of the lower ends of the rods, to which the blocks are detachably connected by pins or keys. It will be understood that the rods will be disconnected from the blocks 29, except when the lower roll is to be raised.

We claim herein as our invention—

1. In a rolling-mill having in combination lifting mechanism independent of the roll-adjusting mechanism mounted on the roll-housing, and means for detachably connecting the lifting mechanism to both rolls, substantially as set forth.

2. A rolling-mill having in combination lifting mechanism independent of the roll-adjusting mechanism mounted on the roll-housing, a cross-head movable by the lifting mechanism, and means for detachably connecting the cross-head to the rolls, substantially as set forth.

3. A rolling-mill having in combination fluid-pressure cylinders mounted upon the housing, a cross-head connected to the rams or pistons of said cylinders, rods extending down from the cross-head on opposite sides of the rolls, and means for detachably con-

necting the rolls to said rods, substantially as set forth.

4. A rolling-mill having in combination two
lifting-cylinders arranged on the housings
5 outside of and in, or approximately in line
with the roll-adjusting screws, and means for
detachably connecting the rams of the cylinders with the rolls, substantially as set forth.

In testimony whereof we have hereunto set our hands.

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Witnesses:

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