

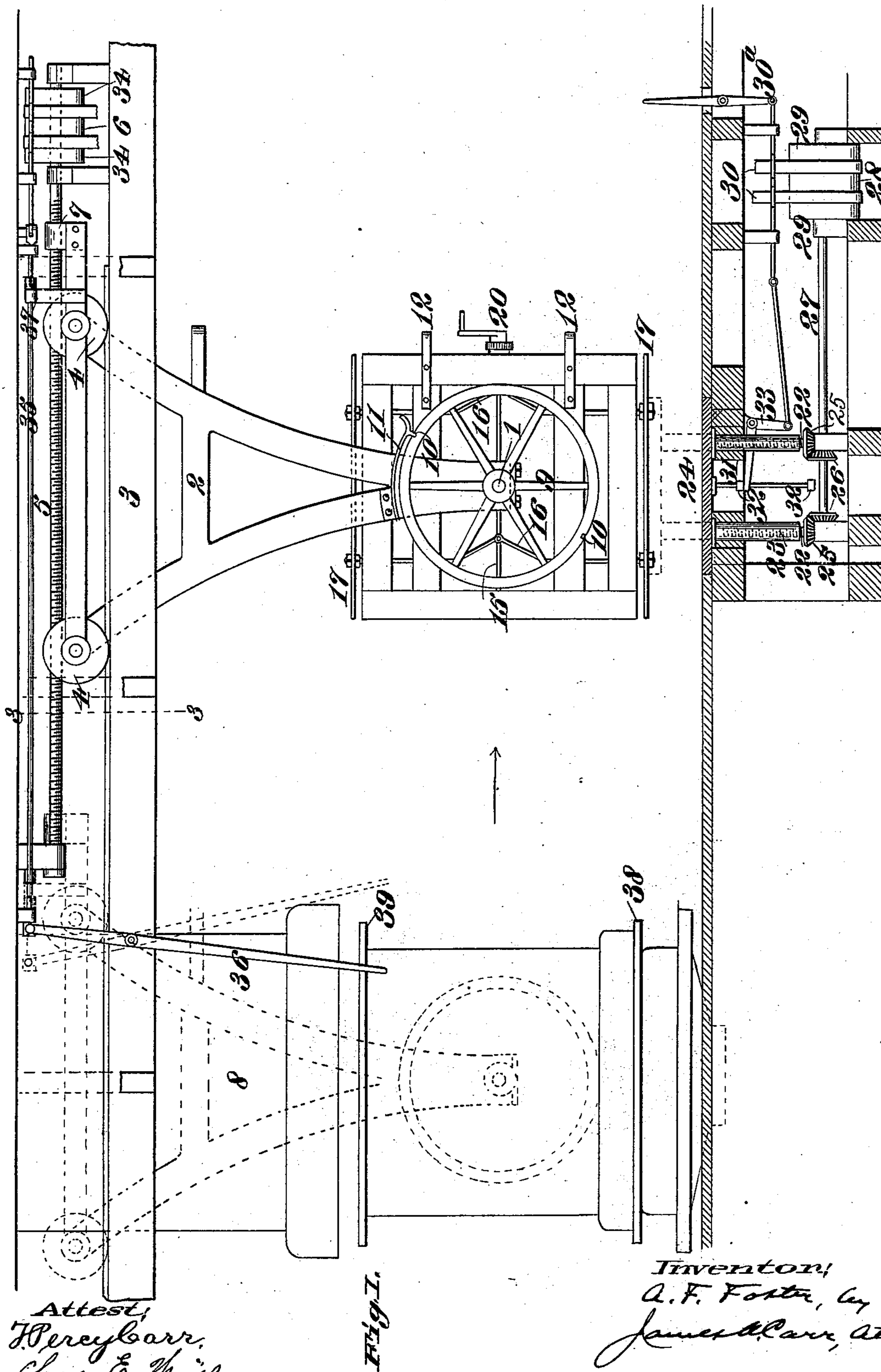
(No Model.)

3 Sheets—Sheet 1.

A. F. FOSTER.
PIPE TURNER.

No. 510,169.

Patented Dec. 5, 1893.



Attest,
J. Percy Barr,
Chas. E. Hill

Fig. 1.

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James A. Carr, Atty.

(No Model.)

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Fig. 2.

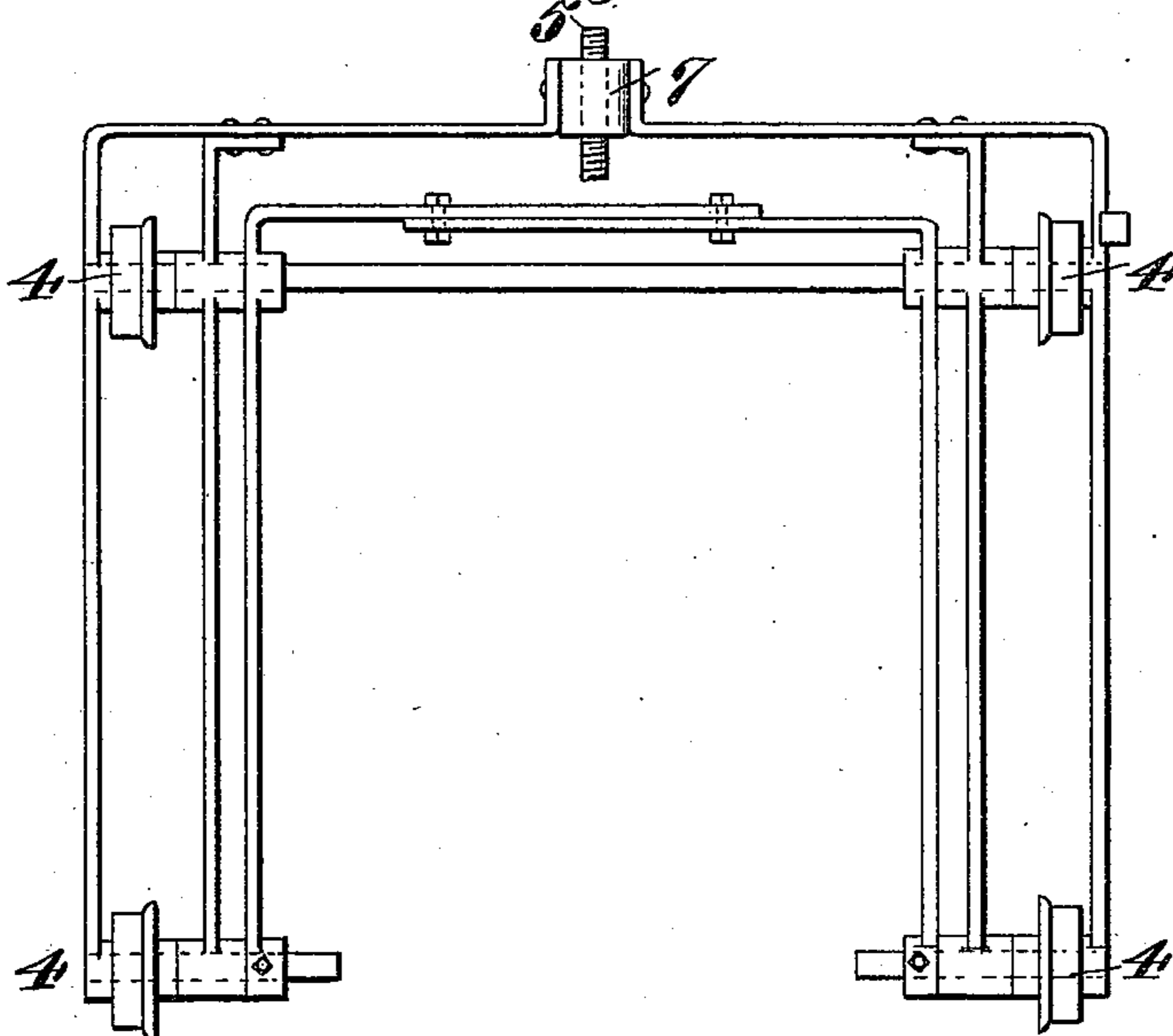


Fig. 3.

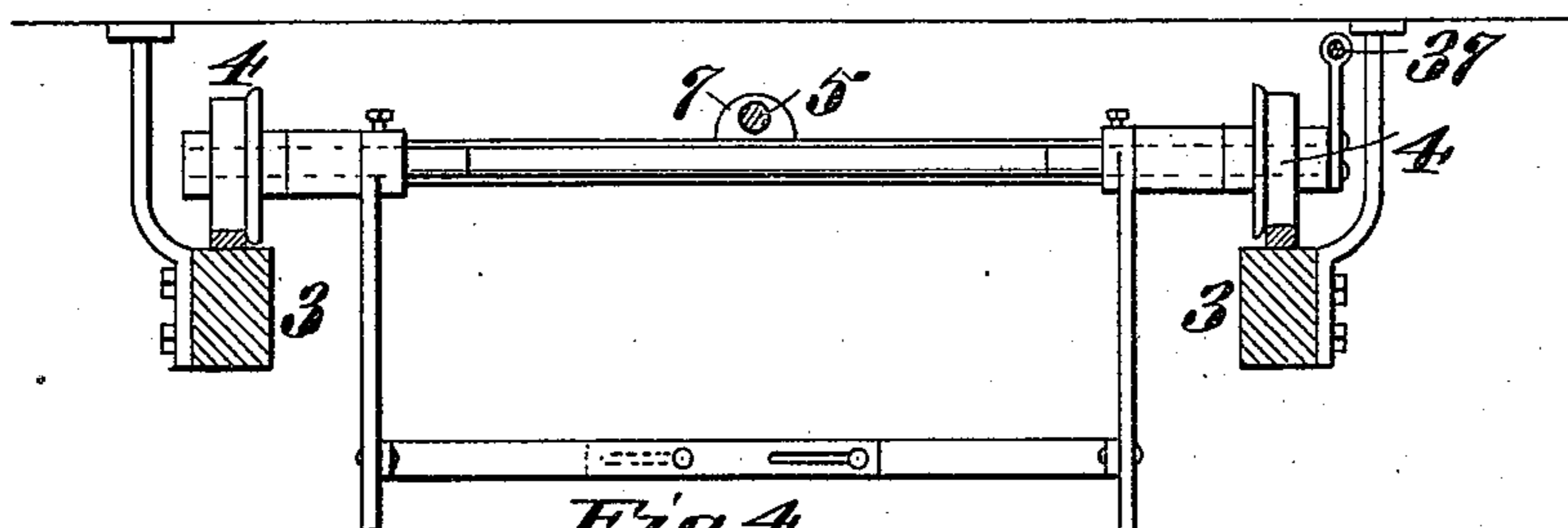
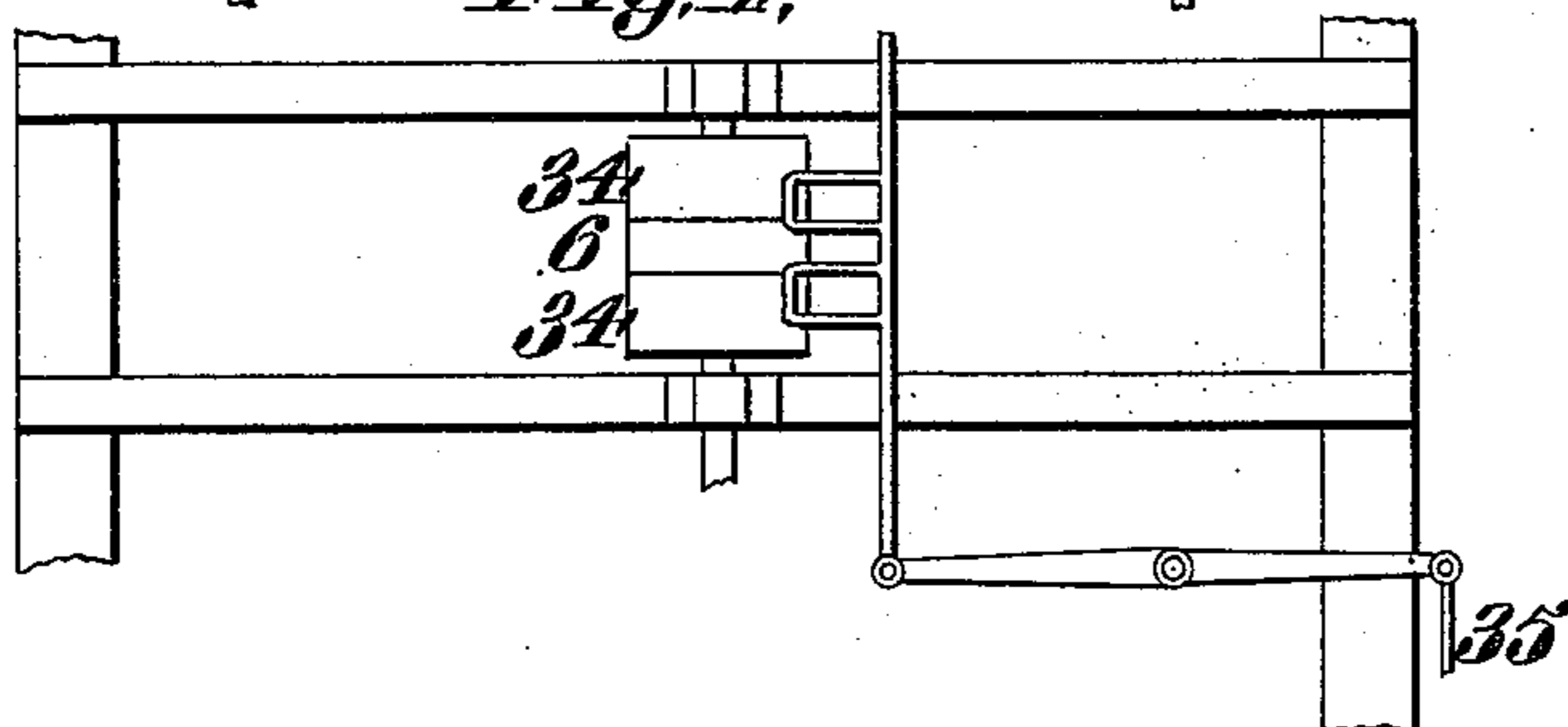


Fig. 4.



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Fig. 5.

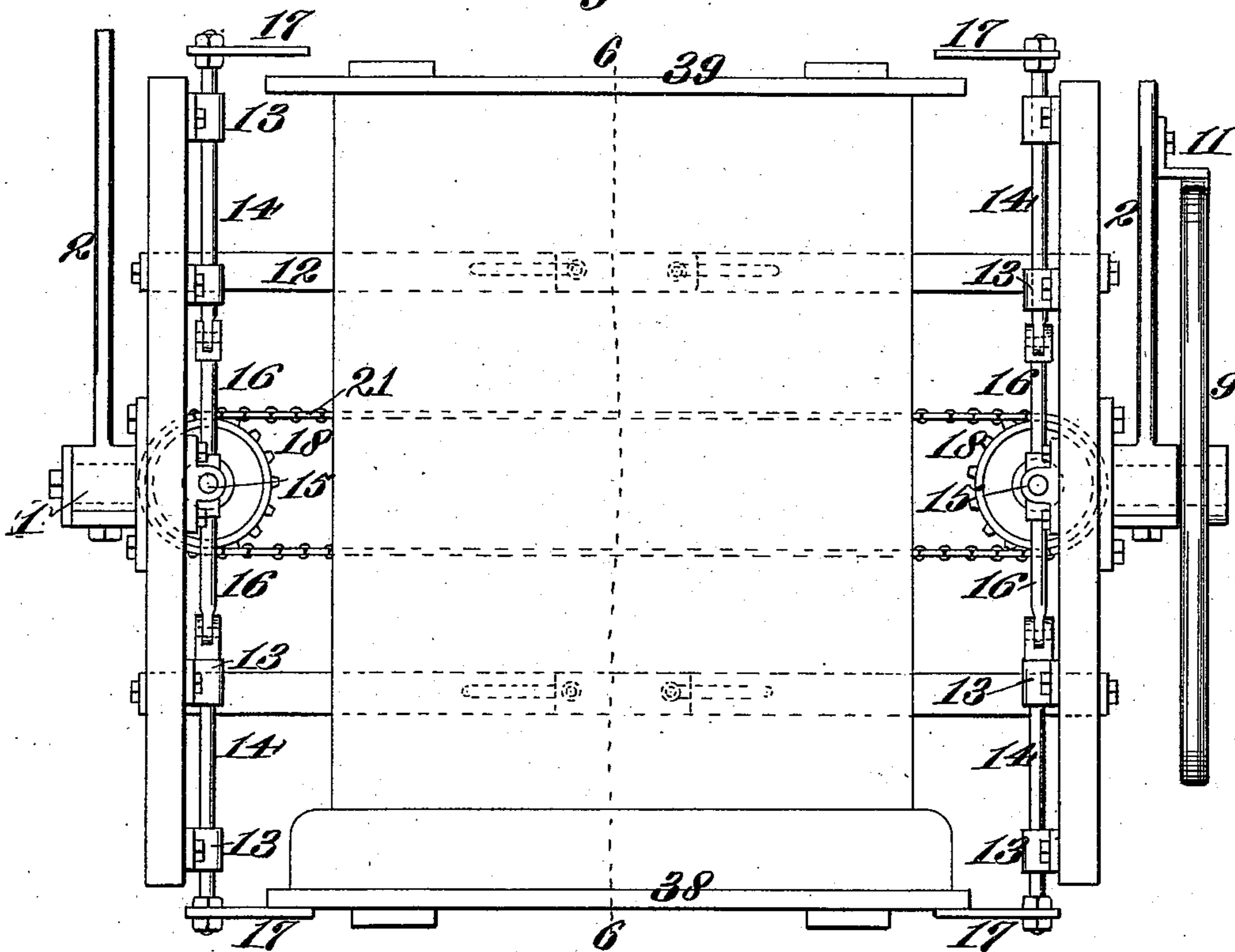


Fig. 6.

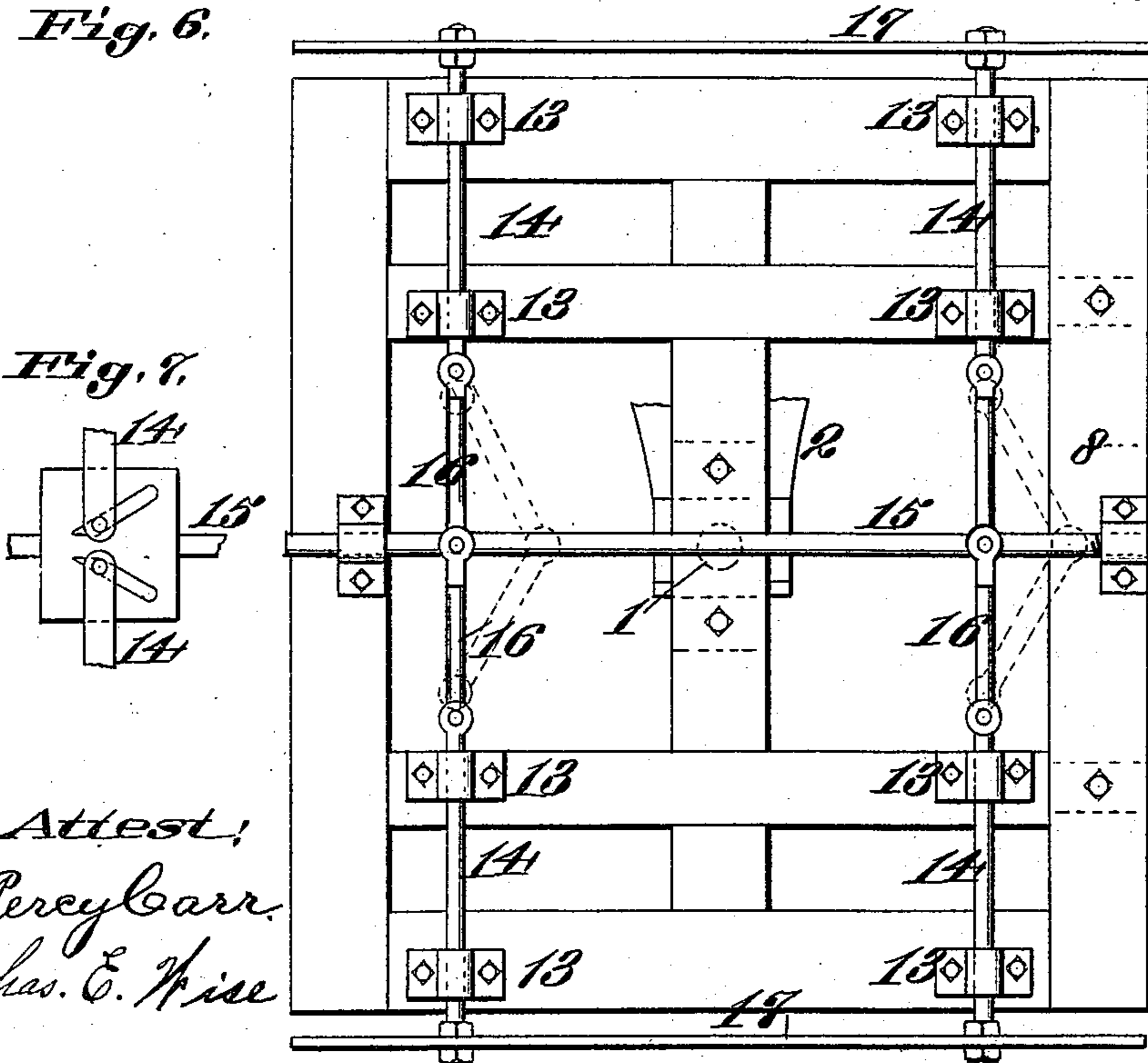


Fig. 7.

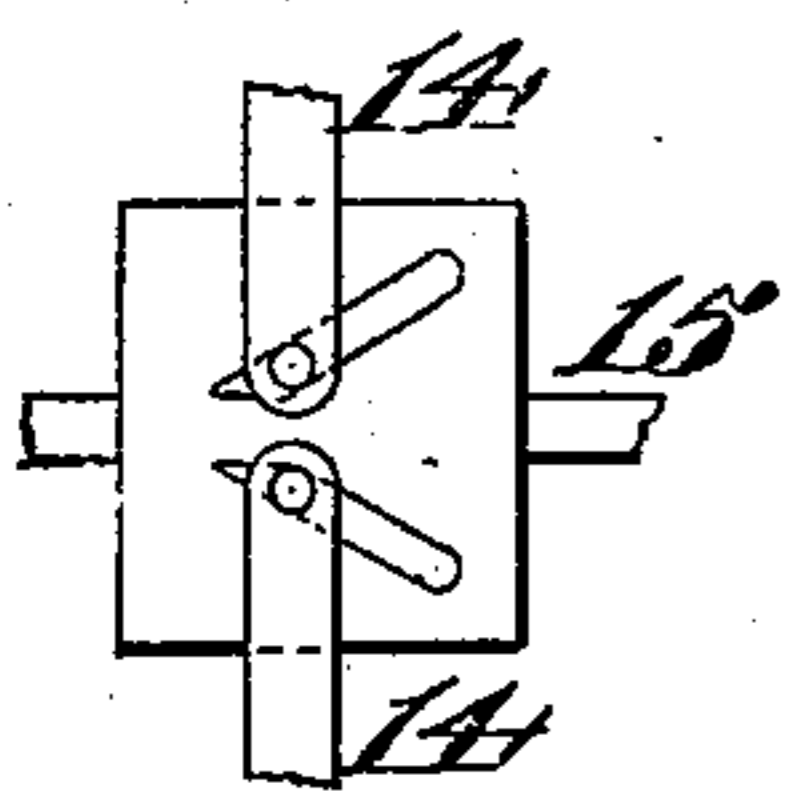
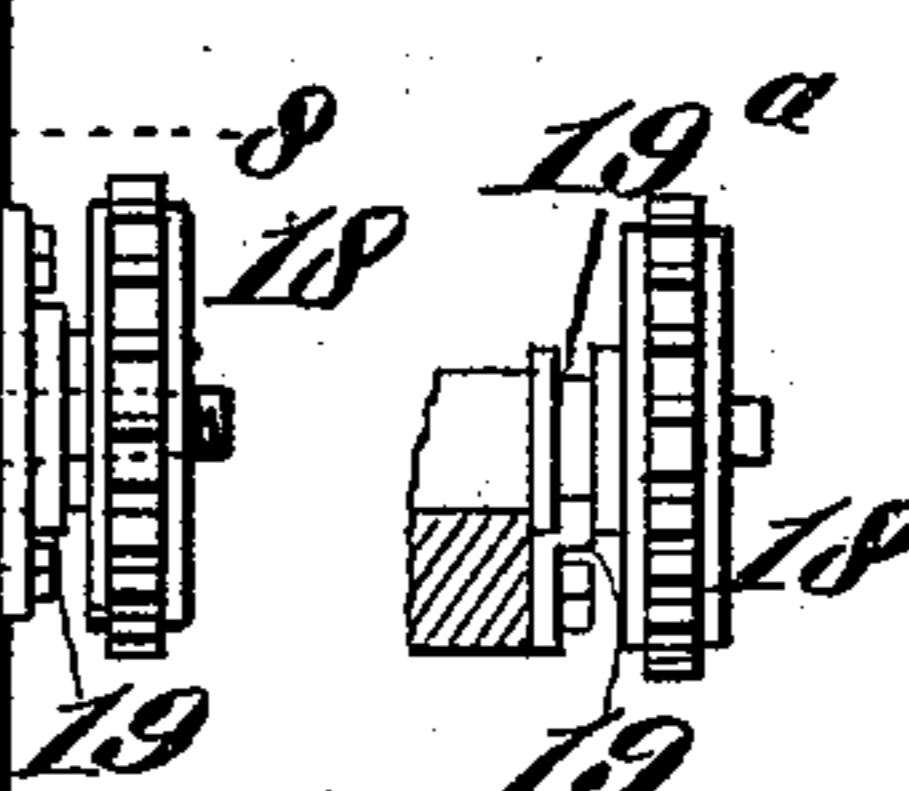


Fig. 8.



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UNITED STATES PATENT OFFICE.

ALFRED F. FOSTER, OF ALTON, ILLINOIS.

PIPE-TURNER.

SPECIFICATION forming part of Letters Patent No. 510,169, dated December 5, 1893.

Application filed April 22, 1893. Serial No. 471,393. (No model.)

To all whom it may concern:

Be it known that I, ALFRED F. FOSTER, a citizen of the United States, residing at Alton, in the county of Madison and State of Illinois, have invented a certain new and useful Improvement in Pipe-Turners, of which the following is a specification.

My invention relates to the manufacture of pipe out of clay or other plastic materials, and has for its principal objects to facilitate the handling of the pipe after it is pressed in the ordinary pipe press, and in the course of finishing preparatory to drying, and also to lessen the danger of such pipe warping or sagging in its removal and handling while still in a plastic condition.

To these ends, my invention consists in the process of handling the pipe hereinafter described and claimed.

It also consists in the mechanical turner and in the several arrangements and combinations hereinafter described and claimed.

In the accompanying drawings, forming part of this specification, Figure 1 is a front elevation of my device. Fig. 2 is a plan of the carrier frame. Fig. 3 is a side elevation of the carrier frame, showing other parts on the section 3—3 of Fig. 1. Fig. 4 is a detail plan view of the belt shifting device of the carrier frame. Fig. 5 is a vertical end view of the carrier looking in the direction of the arrow in Fig. 1, and showing a pipe in position. Fig. 6 is a transverse section of the carrier on the line 6—6 of Fig. 5, omitting the pipe. Fig. 7 is a detail view showing a pin-and-slot connection as a substitute for the toggle-joint; and Fig. 8 is a detail showing the threaded sprocket wheel for operating the toggle-joint.

The turner consists of a cage supported on trunnions, 1, journaled in a horizontally movable traveling frame or carriage, 2, the said frame being suspended from an elevated track, 3, on which rollers, 4, on the frame or carriage, run. The movement of the frame or carriage is effected by a screw-threaded shaft or leading screw, 5, which is turned by a driving belt running over a pulley, 6, fixed thereon. A threaded block, or cross-head, 7, fixed to the frame or carriage, works on said shaft or leading screw, so that the frame travels backward or forward according to the direc-

tion of rotation of the fixed pulley, 6. In the forward position of the frame, the turner should be directly below the die, 8, and its backward movement should bring the turner over the unloading device hereinafter described. The trunnion, 1, of the turner, has a hand-wheel, 9, fixed thereto, which hand-wheel has two notches, 10, in its circumference, located diametrically opposite each other. A detent, 11 preferably a spring detent, is fixed to the frame so as to engage one of said notches when the turner is in a vertical position.

As shown in Fig. 5, one end of the turner is open. At its opposite end, slotted bars, 12, provided with threaded bolts, extend from the front and rear sides overlapping each other, and the several bolts of said bars pass through the slots of their corresponding bars, whereby the distance between said front and rear sides is adjustable. Nuts screwed onto said bolts lock the bars together, whereby the turner may be made to accommodate pipes of various sizes. The suspension arms for the turner are adjusted likewise by a similar bolt-and-slot connection; but enlarged hubs formed thereon and fitting on the roller axles of the main frame so as to slide thereon, have set screws to fix the suspension arms in position on such axles. The forward roller axles should be arranged to pass on each side of the pipe die without striking against said die.

Guide blocks, 13, are arranged on the front and rear sides of the turner, and through these blocks extend reciprocating bars, 14, arranged in pairs, the two bars of a pair being on opposite sides of a reciprocating bar, 15, perpendicular to them, and to which each is connected by a link, 16. The free ends of corresponding bars of the several pairs on the front side have clamping plates, 17, fastened thereto, as likewise have the free ends of the corresponding bars on the rear. This arrangement is in effect a series of toggle-joints having their operating bar, 15, in common, so that the links of the several joints should be of equal length and parallel.

The operating bars or shafts, 15, both on the front side and on the rear side of the turner are screw-threaded at one end, and on this end works a correspondingly threaded nut or sprocket wheel, 18. These nuts are fixed in position by a fixed projection, 19,

which fits in a circumferential slot, 19^a, in the nut. The nuts, however, are free to turn; the effect of the turning of the nut, therefore, is a longitudinal movement of the bar, 15, on which it works. The turning of one of the nuts is effected by a crank-arm, 20, fixed thereto.

The nut heads are provided with teeth or sprockets over which passes a sprocket chain, 21, whereby the turning of one nut effects the turning of the nut to which said sprocket chain connects. The longitudinal movement of the threaded bars thus effected by the turning of the nuts, either draws the plates, 17, closer together or separates them farther, as in the ordinary toggle-joint.

The unloading device is shown in Fig. 1. Vertical threaded shafts, 22, work in interiorly threaded sockets, 23, which are fixed to a plate or platform, 24. The vertical shafts have fixed bevel gears, 25, thereon, which mesh with bevel gears, 26, fixed to a horizontal shaft, 27, to which a pulley, 28, is fixed. This fixed pulley is between two loose pulleys, 29, of the same diameter but twice its width, and two belts, 30, run on said pulleys the width of the intermediate pulley apart. These belts are provided with any ordinary positive shifting device, 30^a, and also with an automatic shifting device. This consists of a rod, 31, fixed to a plate or platform, 24, and carrying tappets, 32, between which is the arm of a bell-crank or other lever, 33, and connecting devices adapted to transmit motion from the tappet to shift said belts. The location of the tappets on their rod to effect the shifting of the belts at the proper time requires simple mechanical skill. The pulley 6 fixed to the leading shaft for the main frame has likewise a loose pulley, 34, of twice its width but of the same diameter, on each side thereof, and the driving belts are also separated by the width of the fixed pulley. A rod, 35, carrying loops through which said belts pass, has a hand-lever, 36, attached thereto, for reciprocating the same to shift said belts. Said rod also has tappets thereon between which a projecting arm, 37, on the traveling frame or carrier, 2, moves, and these tappets are so located that when the frame reaches certain predetermined points, the projecting arm strikes one of said tappets so as to shift the driving belt and stop the travel.

The operation of the device is as follows:
The clay or other plastic material having been formed into pipe in the ordinary press with the bell-shaped end down, the socket-plug of the die is unlocked and lowered a short distance. A pipe-board or loose socket-plug, 38, of wood or other suitable material, having an annular rib to make it correspond with the die, is inserted into the bell-end of the pipe. The rib projects far enough from the pipe-board to keep the bell-end of the pipe from touching the board, and therefore the rib receives the whole weight of the pipe.

The wooden socket-plug having thus been inserted, the operator admits steam to the cylinder of the press, whereby the bell-end of the pipe, which has been held from dropping by the friction of the clay, is forced downwardly by the downward movement of the mass of clay in the formation of the body of the pipe. This downward movement of the pipe continues, carrying with it the socket-plug of the die, until the socket-plug has reached the proper limit of motion, at which limit the clamping plates of the turner in their open position will be respectively above and below the ends of the pipe on said socket-plug. Then the upper end of the pipe is finished off or a second loose plate or pipe-board, 39, is placed on that end of the pipe so as to bear on the entire end, which may be finished off at a later stage. The hand-lever, 36, is now moved so as to shift the proper belt, onto the fixed pulley of the driving shaft, and thereby turn the leading screw so as to move the traveling frame or carriage from which the turner is suspended. The traveling frame continues to move until the open end of the turner passes the pipe and the pipe is entirely inside of the turner, at which position the projection on the frame or carriage strikes the tappet so as to shift the driving belt off of the fixed pulley and thereby stop the turner. The crank-arm on the turner is now turned so that the nut fixed thereto, and therefore the second nut connected to the first by the sprocket and chain, work on the screw-threaded rods of their toggle-joints, whereby the clamping-plates are drawn toward each other. The clamping-plates thus drawn toward each other will bear against the pipe-boards or plates at each end of the pipe, so as to clamp the pipe between said plates. The hand-lever, 36, is now moved backward so as to shift the second belt onto the driving pulley of the leading screw and the traveling frame and carrier are now moved back to their former position by this reverse action; and when the projection on the frame or carriage strikes the second tappet, the second belt is automatically shifted off of the fixed pulley, and the carriage stops. The second tappet is so located as to effect the stopping when the turner is directly over the unloading device. At any time while the pipe is clamped in place on the turner, the operator releases the detent on the frame from the notch on the turner and, by means of the hand-wheel, revolves the turner a half-revolution on its trunnions so that the socket or bell-end of the pipe is up. The clamping plates are then separated by turning the crank-arm in a direction the reverse of its former direction. Then, as will be easily understood, by proper manipulation of the hand-lever, 30^a, to shift the belts, the platform of the unloading device rises to lift the pipe off of the lower clamping plates, and the turner may be moved forward to repeat its

operation with another pipe. From the unloading device the pipe may be conveyed by any suitable device to its proper destination.

Numerous changes may be made, both in mechanical construction and in the operation described. For instance, instead of finishing the smaller end of the pipe on the socket-plug, such finishing may be done at any time before the reversal of the pipe, the clamping plates, if already closed, being separated for this purpose; and if such finishing is wished to be done after the removal of the pipe from the socket-plug, the turner carriage may be stopped at any desired place by manipulating the positive-acting belt-shifter. So also, it is immaterial whether the unloading platform rises to receive the pipe after it is turned or inverted, before or after the clamping plates are separated.

Some of the more important mechanical modifications are the following: A sliding block having inclined slots in which pins on the clamping-plate bars work, are substituted for the links of the toggle-joint, as shown in Fig. 7. It is obviously unnecessary that both the upper and lower clamping-plates should actually move, as the movement of either will suffice.

I wish it understood that I do not confine myself to the specific locking device shown, for preventing the turner from rotating on its trunnions; the turner is practically evenly balanced on such trunnions, and other locking devices than that shown may obviously be used in its place. So also, I do not consider the chain-and-sprocket connection of the clamping bars as of the gist of my invention, but merely as an illustration of a single form thereof.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. A pipe-turner comprising a cage having trunnions thereon, and a horizontally movable traveling frame for said cage, said trunnions being journaled in said frame, substantially as described.

2. A pipe-turner comprising a reversible cage and a horizontally movable traveling frame in which said cage is journaled, said cage being provided with clamping plates, and devices for operating said clamping plates, substantially as described.

3. A pipe-turner comprising a reversible cage and a horizontally movable traveling frame in which said cage is journaled, said cage being provided with clamping plates and devices for operating the same, and being also provided with a locking device for holding it in position on said frame, substantially as described.

4. A pipe-turner comprising a reversible cage and a traveling frame in which said cage is journaled, said cage being provided with clamping plates and a screw-threaded bar for each pair of clamping plates, links connect-

ing the clamping plates of a pair to their corresponding bar and screw-threaded nuts on said bars, said nuts being locked against longitudinal movement but being provided with means for turning the same, substantially as described.

5. A pipe-turner comprising a reversible cage and a traveling frame in which said cage is journaled, said cage being provided with clamping plates and devices for operating said clamping plates, and devices for automatically stopping said traveling frame, substantially as described.

6. The combination with a pipe-turner comprising a reversible cage and a traveling frame in which said cage is journaled, said cage being provided with clamping plates and devices for operating the same, of a screw-threaded shaft provided with two loose pulleys and an intermediate fixed pulley thereon, a screw-threaded block fixed to said traveling frame and working on said shaft, a sliding bar carrying loops through which the driving belts pass and having tappets thereon, and a projecting piece on said traveling frame adapted to strike said tappets, substantially as described.

7. The combination with a pipe-turner comprising a reversible cage and a traveling frame in which said cage is journaled, said cage being provided with clamping plates and devices for operating the same, of a screw-threaded shaft provided with two loose pulleys and an intermediate fixed pulley thereon, a screw-threaded block fixed to said traveling frame and working on said shaft, a sliding bar carrying loops through which the driving belts pass and having tappets thereon, and a projecting piece on said traveling frame adapted to strike said tappets, and a device for positively operating said sliding bar, substantially as described.

8. A pipe-turner comprising a reversible cage and a traveling frame in which said cage is journaled, said cage being provided with clamping plates and devices for operating the same, and an unloading device consisting of a vertically movable platform adapted to receive the pipe from said cage, substantially as described.

9. A pipe-turner comprising a reversible cage, a traveling frame in which said cage is journaled, said cage being provided with clamping plates and devices for operating the same, and an unloading device consisting of a vertically movable platform, a shaft for operating the same, provided with loose pulleys and a fixed pulley, and an automatic device for shifting the driving belts of said pulleys, substantially as described.

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Witnesses:

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JAMES A. CARR.