

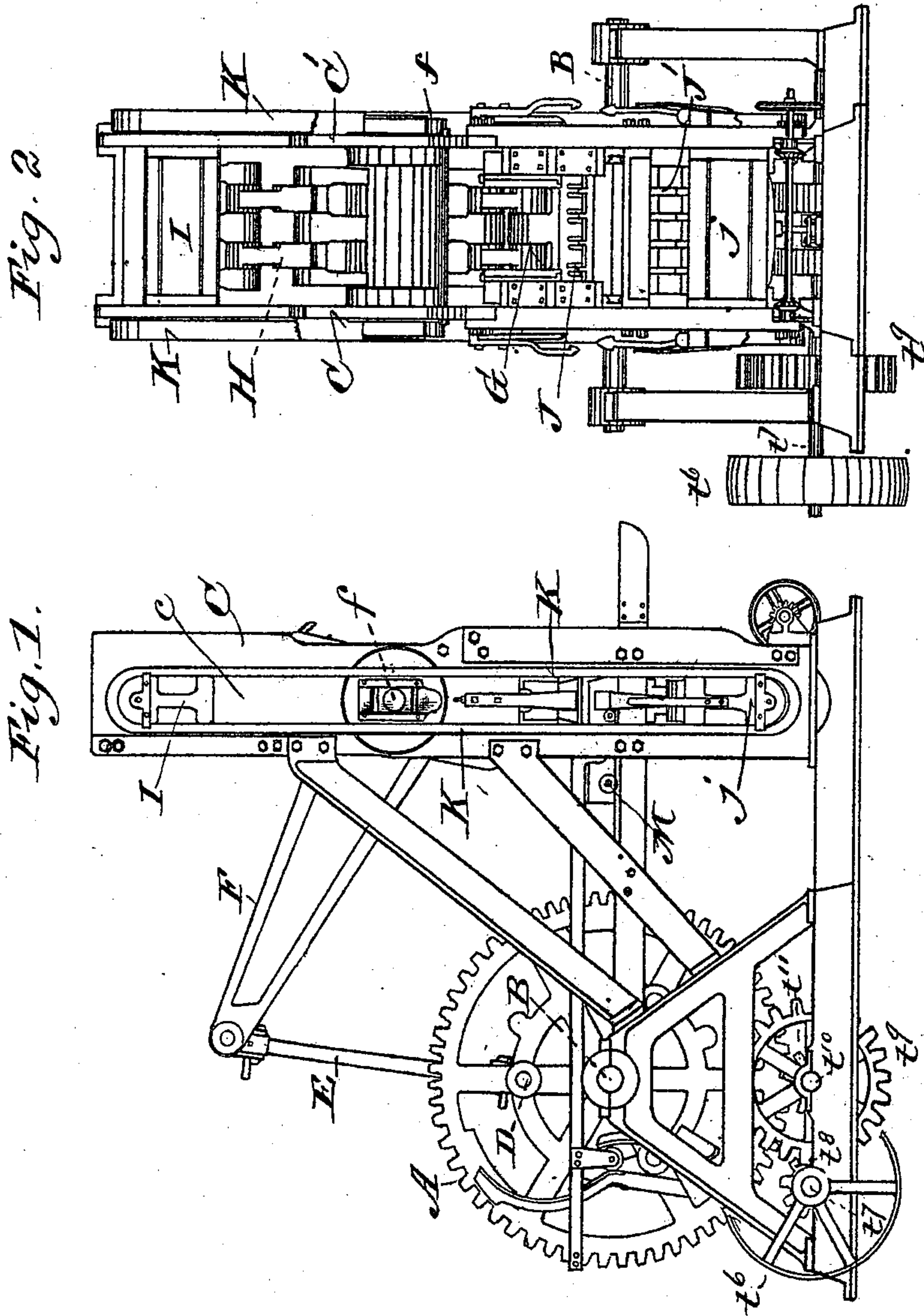
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4 Sheets—Sheet 1

J. J. KULAGE.
BRICK MACHINE.

No. 516,375.

Patented Mar. 13, 1894.



Witnesses:
J. Bonville
G. A. Pierson

Inventor:
Joseph T. Kulage
by C. D. Moody
att.

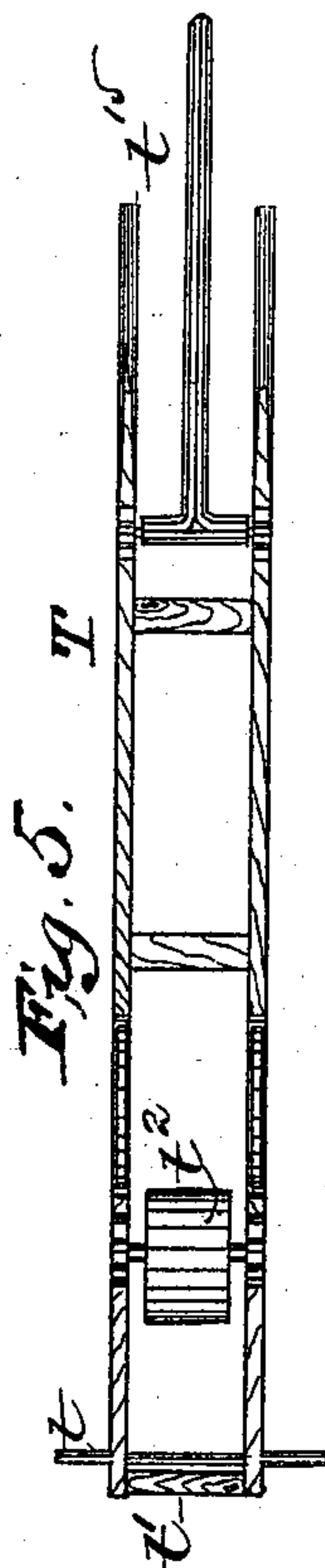
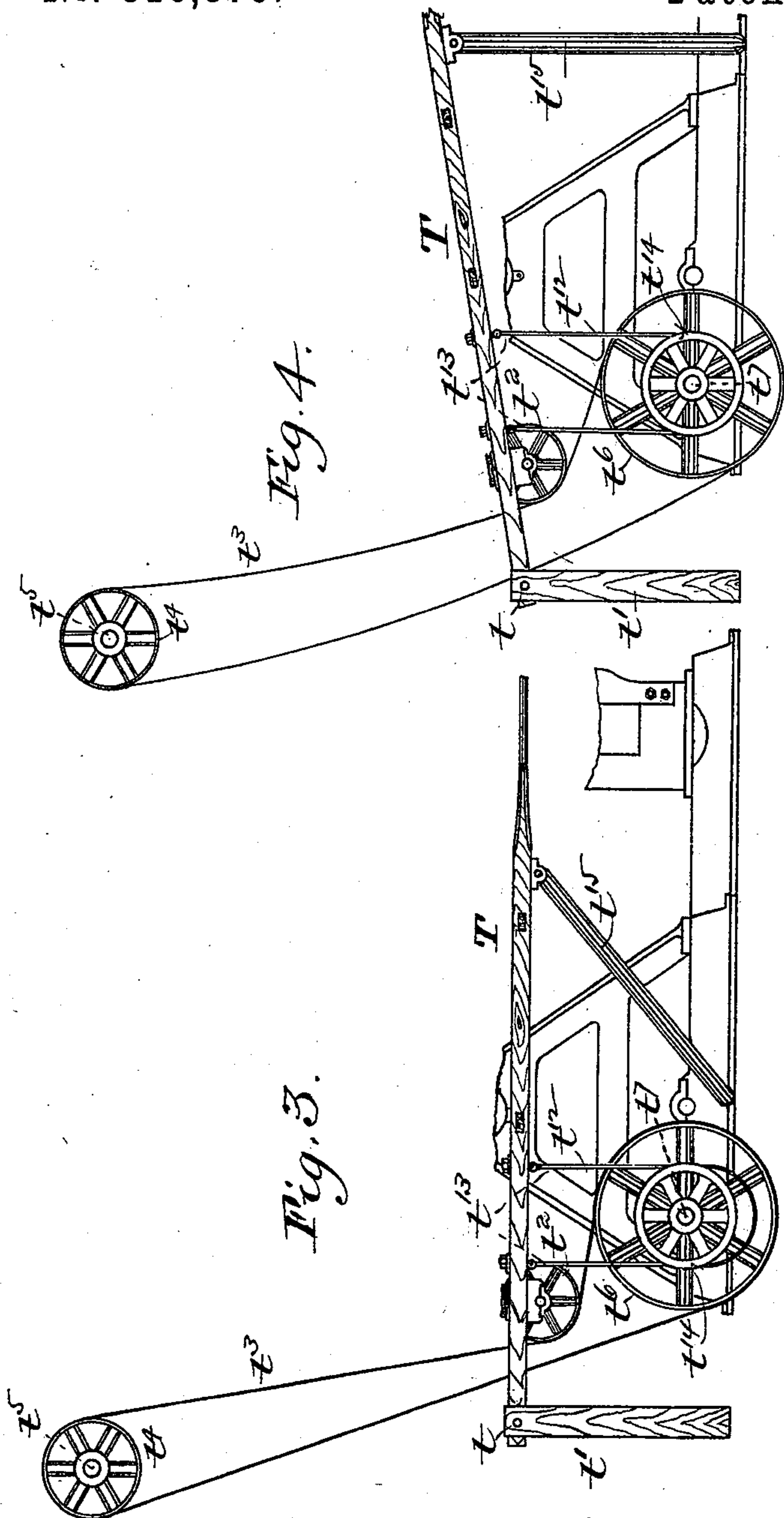
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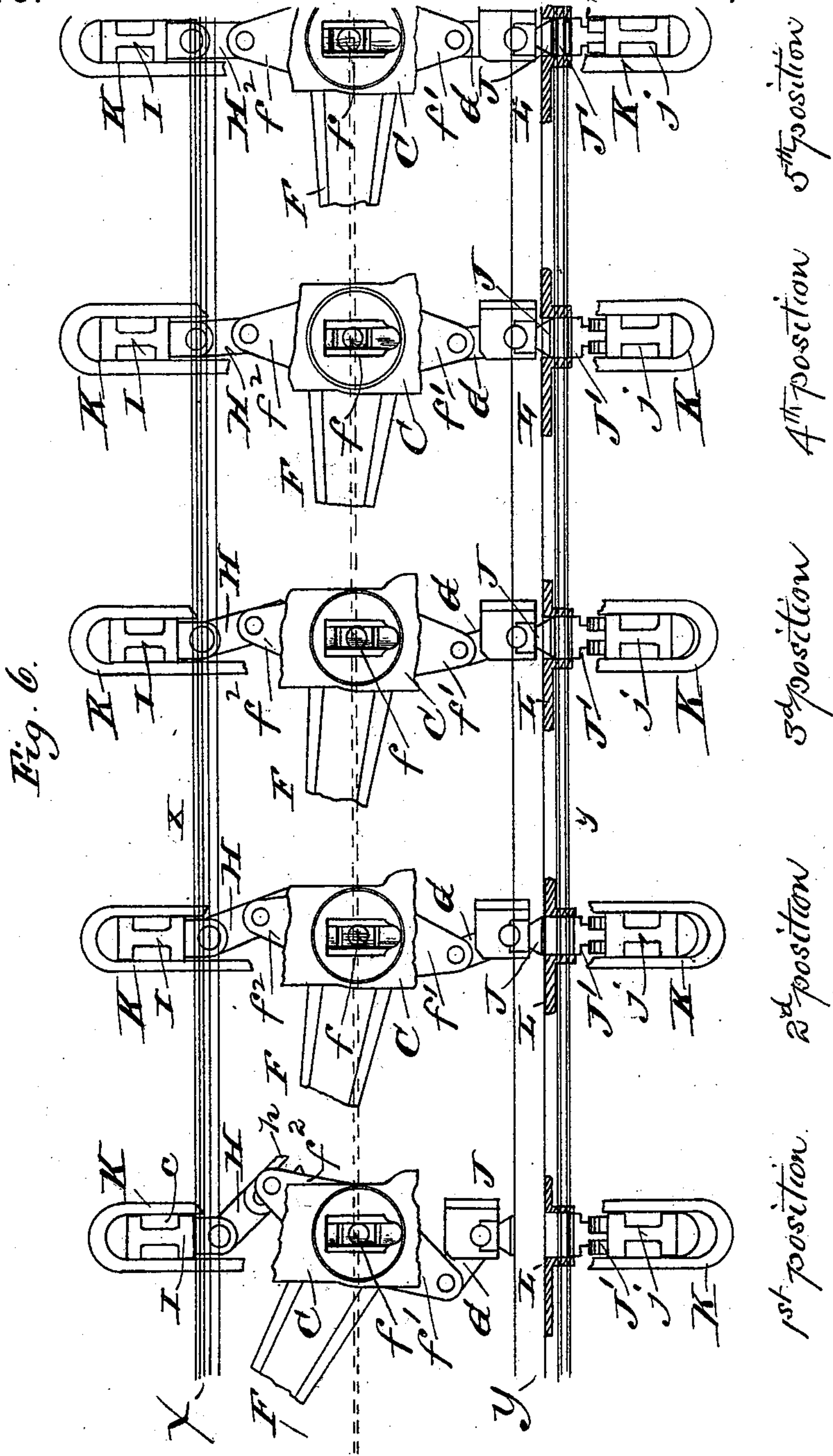
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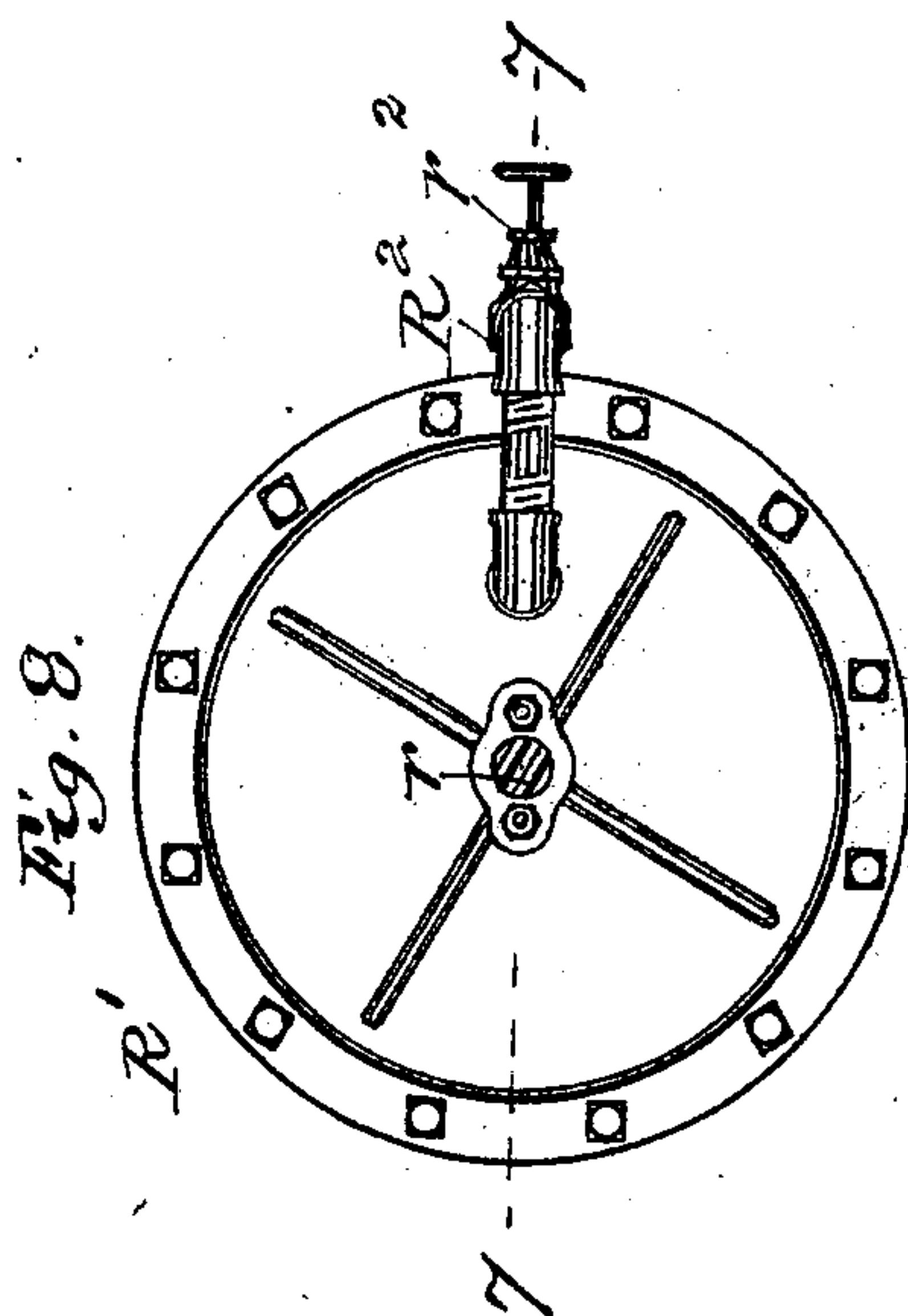
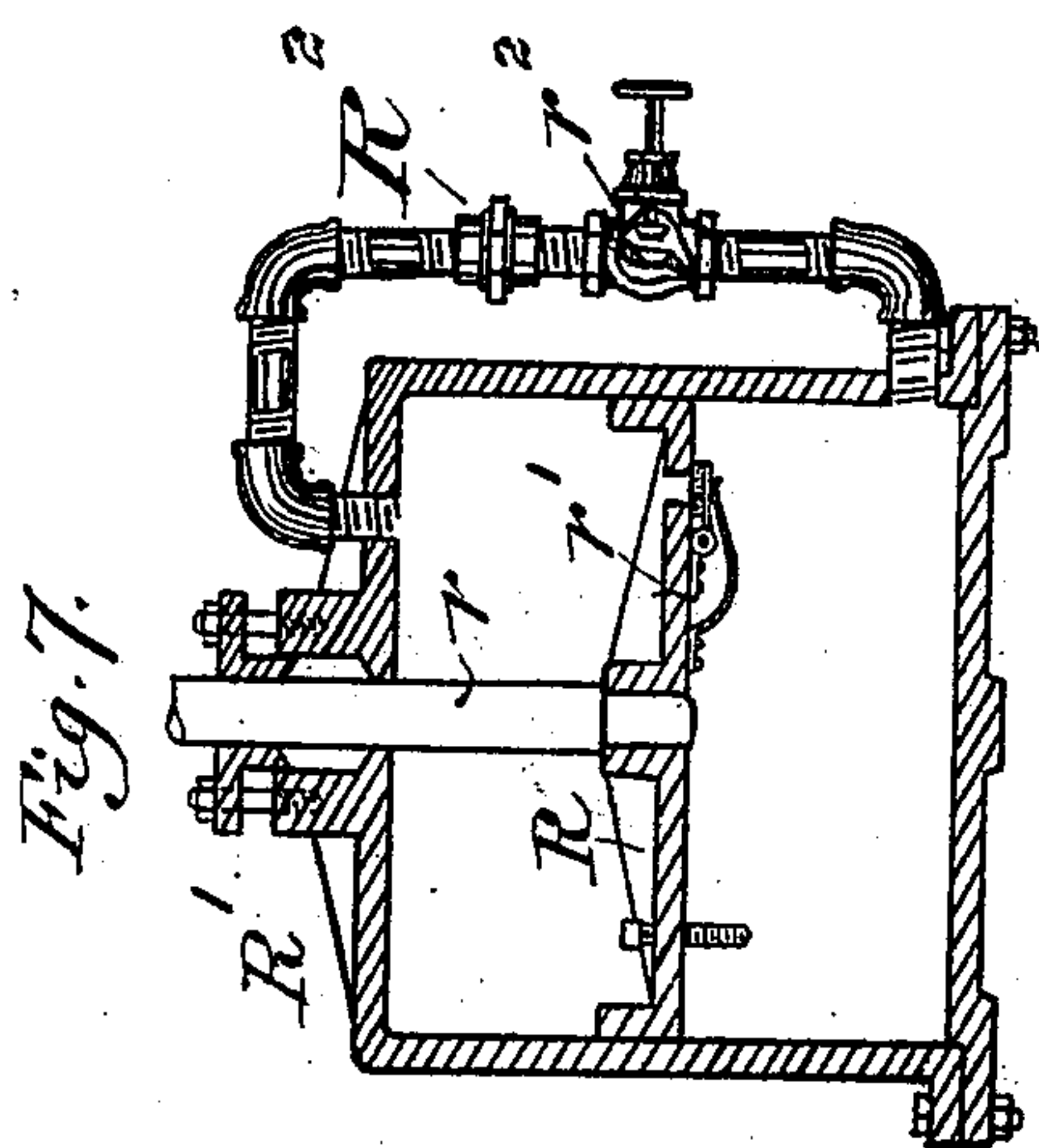
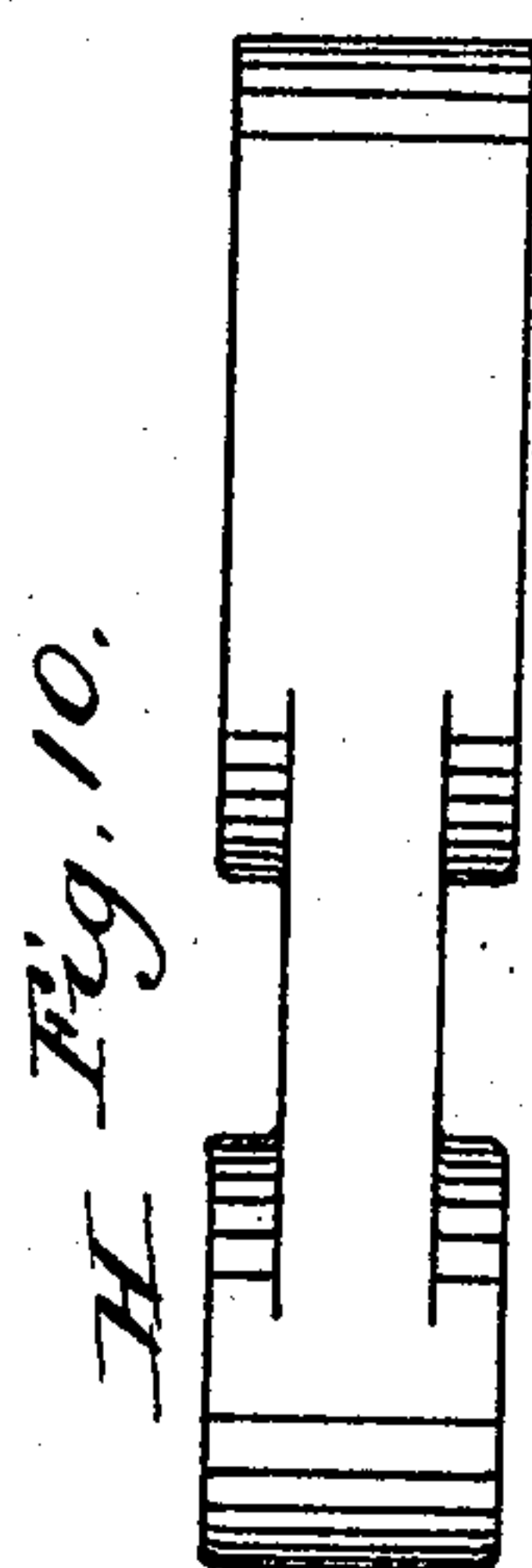
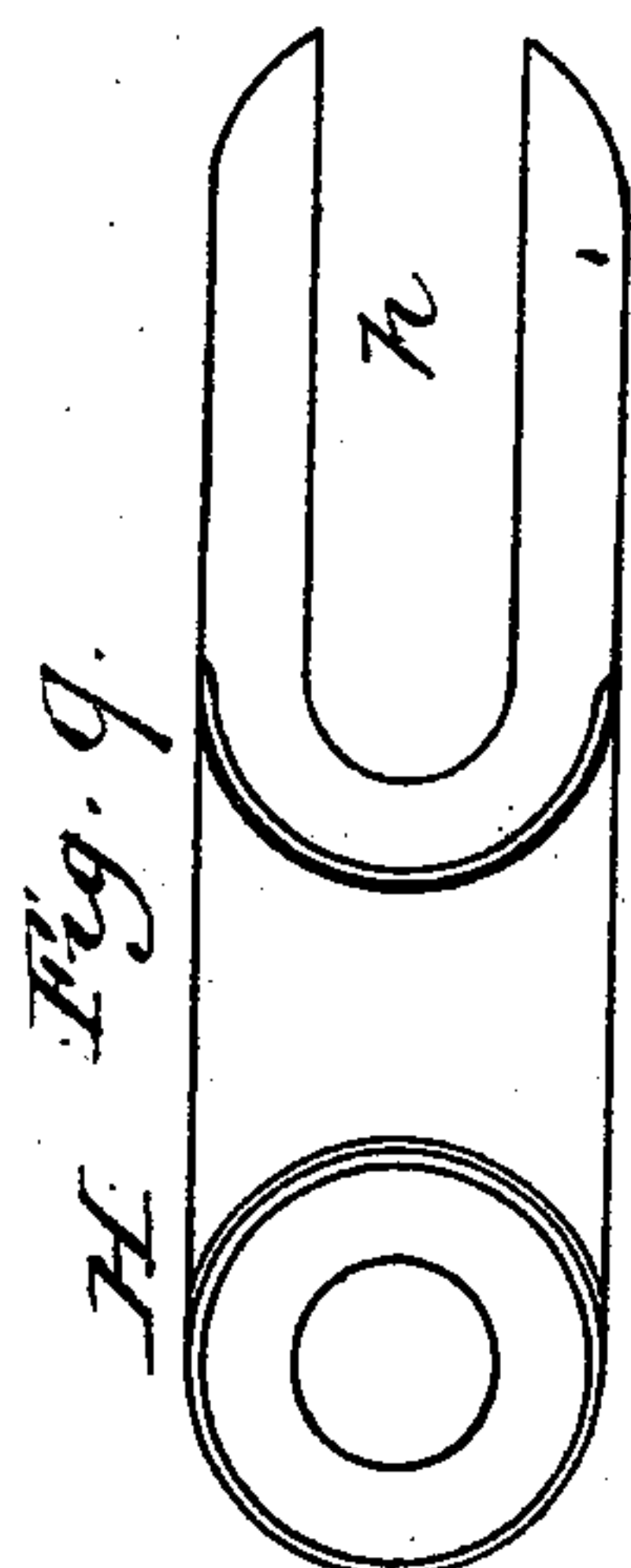
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Patented Mar. 13, 1894.



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UNITED STATES PATENT OFFICE.

JOSEPH J. KULAGE, OF ST. LOUIS, MISSOURI.

BRICK-MACHINE.

SPECIFICATION forming part of Letters Patent No. 516,375, dated March 13, 1894.

Application filed September 1, 1890. Serial No. 363,731. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH J. KULAGE, of St. Louis, Missouri, have made a new and useful Improvement in Brick-Machines, of which the following is a full, clear, and exact description.

The present improvement relates mainly to that class of brick-machines in which opposing plungers, in the formation of the bricks, are moved toward each other in the mold, and ties are employed to unite movable abutments respectively above and beneath, or at opposite sides of, the pressing-mechanism, and the improvement consists, in part, in the means whereby the reactive force, incident to the action of one of the plungers, in exerting its pressure, is utilized by being transmitted to act upon the ties and cause them to draw the other of the plungers toward the first named plunger.

The improvement relates also to the means whereby the weight of the principal portion of the pressing-mechanism is utilized in producing the preliminary pressure upon the clay in the molds; also to the means for stopping and starting the machine; also, to the means for cushioning the fall of the lower plunger, all substantially as is hereinafter set forth and claimed, aided by the annexed drawings, making part of this specification, and in which—

Figure 1 is a side elevation of a brick-machine containing the improvement; Fig. 2 a front elevation of the same; Fig. 3 a side elevation showing the improved mechanism for stopping and starting the machine, the parts being as when the machine is in operation; Fig. 4 a view similar to that of Fig. 3, but showing the parts as when the machine is not in operation. Fig. 5 is a plan of the mechanism of Figs. 3 and 4. Fig. 6 is a view in the nature of a diagram employed to facilitate an understanding of the parts used in producing the preliminary pressure upon the clay in the molds; the view exhibits a series of positions into which, successively, the parts of the pressing-mechanism are moved in producing the preliminary, and final, pressures upon the clay; the mechanism is shown in side elevation, and only that portion of the construction which is essential to an understanding of the feature referred to is exhib-

ited. Fig. 7 is a vertical section of the lower-plunger-cushioning-mechanism, the section being on the line 7—7 of Fig. 8, which, in turn, is a plan of the parts of Fig. 7; and Figs. 9 and 10, respectively, a side elevation and an edge elevation of the slotted arm of the toggle. The views are not all upon the same scale.

The same letters of reference denote the same parts.

The brick-machine exhibited in the drawings, to which the improvement under consideration is well adapted, is mainly similar to that shown in Letters Patent of the United States No. 383,399, granted to me May 22, 1888, for an improvement in brick-machines.

A represents one of the two gear wheels preferably used. It is attached to the shaft B, and is provided with the wrist-pin, D, from which a pitman, E, leads to the lever, F, which is of the double-bell-crank type, and is journaled upon the pins f that in turn are held in the uprights C, C'. The arms f^1 , f^2 , of the lever are respectively jointed to the links G and H. The lower links, G, are in turn jointed to the upper plunger J, and the upper links in turn are jointed to the cross-bar I, which is adapted to be moved upward and downward in the slot c , respectively, in the uprights C, C', and, at the sides of the uprights respectively, connected with the links K, K, which lead downward past the upper plunger and connect with the cross-bar j of the lower plunger j' . The lower plunger is drawn upward by means of the links which, in turn, are raised by means of the upper cross-bar. Both plungers work upward and downward between the uprights C, C', in combination with the mold L and charger M, all substantially as in the patented construction referred to, saving as that construction and operation are modified by the improvement now under consideration, which, more particularly described, consists as follows:

For an understanding of that part of the improvement which relates especially to the pressing of the clay reference is had to Fig. 6 which more particularly illustrates the action of the parts. The pin f is so held in the uprights C, C', that it is free to rise therein in effecting the described pressure; the broken lines, Fig. 6, indicate the levels before the

pressing is initiated and afterward; in the first position of the parts the lower plunger is at the bottom of the mold, and the upper plunger is raised above the mold; in the second position of the parts the position of the lower plunger has not been changed, but the lever F and the toggles have been adjusted to cause the upper plunger to be moved downward to the top of the mold, and the position of the pin f has not been changed; the pressure is now about to be applied; in the third position of the parts the lever and toggles have been moved farther in the same direction, but the lower plunger remains as before, and the upper plunger has been moved farther downward into the mold and the position of the pin f is unchanged; in the fourth position of the parts the position of the lower plunger has not been changed, but the upper plunger has been moved farther downward into the mold and sufficiently to effect what is termed the preliminary pressure; up to this stage of the pressing the position of the pin f has not been changed saving that it has been raised sufficiently in the uprights for its weight, together with the weight of the principal portion of the lever and toggles, to be no longer sustained by the uprights, but instead thereof to be sustained by the clay in the mold; that is, after initiating the pressing, the weight of the lever and toggles is gradually transferred from the frame work of the machine onto the clay in the molds, and, in the last position described, the weight is mainly sustained by the clay; exclusively; by reason of this the frame work of the machine is strained but slightly and only sufficient power needs to be applied to the lever to effect its rotation; but when the parts have been turned into the fourth position the full weight of the principal portion of the lever and the toggles (a weight in practice sufficient to produce, say fifteen hundred pounds pressure or more to each brick) is brought to bear upon the clay in the mold and thereby, and by means of such weight only, the air is expelled from the clay and the preliminary pressure thereupon produced; at the same time the upper cross-bar, carrying the links as described, has been elevated sufficiently to cause the links at the lower end thereof to bear upward against the lower cross-bar; the parts are now moved into the fifth position; the toggles are straightened, and the pin f , the lever and toggles, by means of the links, are moved upward in the mold sufficiently to cause the final pressure to be accomplished. In this respect the operation differs from that of brick-machines hitherto constructed, and in which the part corresponding to the pin or bearing f is not movable toward and from the mold; in the machines alluded to any reactive force exerted by the upper plunger is not transmitted beyond the pin or bearing f and hence has no effect upon the upper cross-bar; in the present machine the reactive force of the upper

plunger is transmitted through the toggles (which, with the upper cross-bar, may for this purpose be treated either as a composite structure, or as a single part), to the upper cross-bar, thence to the links K, K, and thence to the lower cross-bar and plunger, and thereby utilized, to produce the described upward movement of the lower plunger. The link H is slotted, substantially as shown at h to permit the lever arm f^2 to move downward without necessarily drawing the upper cross-bar all the way downward with it—that is, the upper cross-bar need have vertical movement only for the moving of the lower plunger. The upper series, x and the lower series y , of lines in Fig. 6 are employed to indicate the various described changes in the positions of the parts of the pressing-mechanism.

So far as the putting to use of the rotating force of one of the plungers in effecting the operation of the other of the plungers is concerned I desire not to be restricted to the particular means here shown for transmitting said force, namely, the lever F, links G, H, &c.

The improved means for starting and stopping the machine are as follows: T represents a lever arranged at the side of the machine and pivoted, at t , to a suitable support t' , to enable the lever to be turned into either of its positions respectively shown in Figs. 3 and 4. The lever carries a pulley t^2 , which is designed to coact with the belt t^3 , leading from the pulley t^4 , upon a driving shaft t^5 , and carried around the pulley t^6 , that is attached to a shaft t^7 , Figs. 1, 2, 3 and 4. When the lever T is raised, as in Fig. 4, the pulley t^2 does not bear sufficiently upon the belt to drive the pulley t^6 , but when the lever is in the position of Fig. 3 the pulley t^2 tightens the belt sufficiently to cause the pulley t^6 to be driven from the pulley t^4 . The motion of the pulley t^6 , can be transmitted by any suitable means to the gears A. One such means is shown; the shaft t^7 is provided with a pinion t^8 , which engages with a gear t^9 upon a shaft t^{10} , which shaft is pivoted with a pinion t^{11} , that engages with the gear A. An additional feature of that part of the improved construction now under consideration is a brake-band t^{12} . This last named part is attached at its end t^{13} , to the lever T and it extends thence to pass around a pulley t^{14} , upon the shaft t^7 . When the lever T is adjusted to effect the driving of the machine the brake-band is loose upon the pulley t^{14} , and when the lever T is moved to effect the stopping of the machine the brake-band is tightened upon the pulley t^{14} , and the desired stopping is thereby facilitated. A leg t^{15} is used to support the free end of the lever T when raised.

The improved means for cushioning the drop of the lower plunger is substantially as follows: The lower plunger J', is connected, by means of the rod r , with the piston R, which is adapted to work upward and downward in the air-cylinder R'. The piston is provided with a downwardly-opening valve

r' , to enable the air above the piston to escape beneath the piston as that part is raised in the cylinder, substantially as in the construction above referred to. The improvement relates more especially to the means for controlling the downward movement of the piston. R^2 represents a pipe leading from the lower part of the interior of the cylinder upward to connect with the upper part of said interior. As the piston moves downward the air is expelled from beneath it into the pipe R^2 and thence into the cylinder again above the piston, and as the piston is raised the air from above the piston is expelled into the pipe R^2 , and thence returned into the cylinder beneath the piston, and so on, the air, at each half stroke of the piston being driven forward and backward as described. Now, according to the rate at which the air is moved from beneath the piston through the pipe to above the piston, is the rate at which the piston and lower plunger can drop. By means of the valve r^2 in the pipe R^2 the flow of air through the pipe can be controlled and the fall of the plunger thereby cushioned as desired.

I claim—

1. In a brick molding machine, the combination with the toggle lever, of the vertically movable bearings between which it is fulcrumed, the mold and vertically movable cross-tie connected to the said toggle lever, the lower vertically movable cross-tie, links connecting the said upper and lower cross-ties and the lower plunger, arranged to operate substantially as specified.

2. The combination in a brick molding machine, of the toggle lever, the mold and the

vertically movable cross-tie connected to the said lever, and the vertically movable bearings between which the lever is fulcrumed, whereby the position of the toggle lever is permitted to be changed, so as to bring its weight and that of the cross-tie upon the clay in the mold, substantially as specified.

3. The combination in a brick molding machine, of the upper and lower vertically movable cross-ties, I, j , the connecting links, K , the toggle lever pivotally connected with the upper cross-tie I , and mold J , and the movable bearings in which the fulcrum pins f of the toggle lever are journaled to permit said lever to rise and fall in the frame vertically, substantially as set forth.

4. The combination with the toggle lever F , the vertical movable bearings between which it is fulcrumed, and the upper movable cross-tie, of the slotted arm H , connecting the upper cross-tie and the toggle lever, substantially as and for the purpose specified.

5. The combination with the driving wheel t^6 , the belt t^3 , and pulley t^4 , of the pulley t^2 , the lever T having journal bearings therefor, the pulley t^{14} , the brake band t^{12} , and leg t^{15} , all arranged to be operated substantially in the manner specified.

6. In combination with the lower plunger, the piston and rod, the air-cylinder, and the valved pipe R^2 , substantially as described.

Witness my hand this 27th day of August, 1890.

JOSEPH J. KULAGE.

Witnesses:

C. D. MOODY,
C. C. LOGAN.