No. 867,767. PATENTED OCT. 8, 1907.

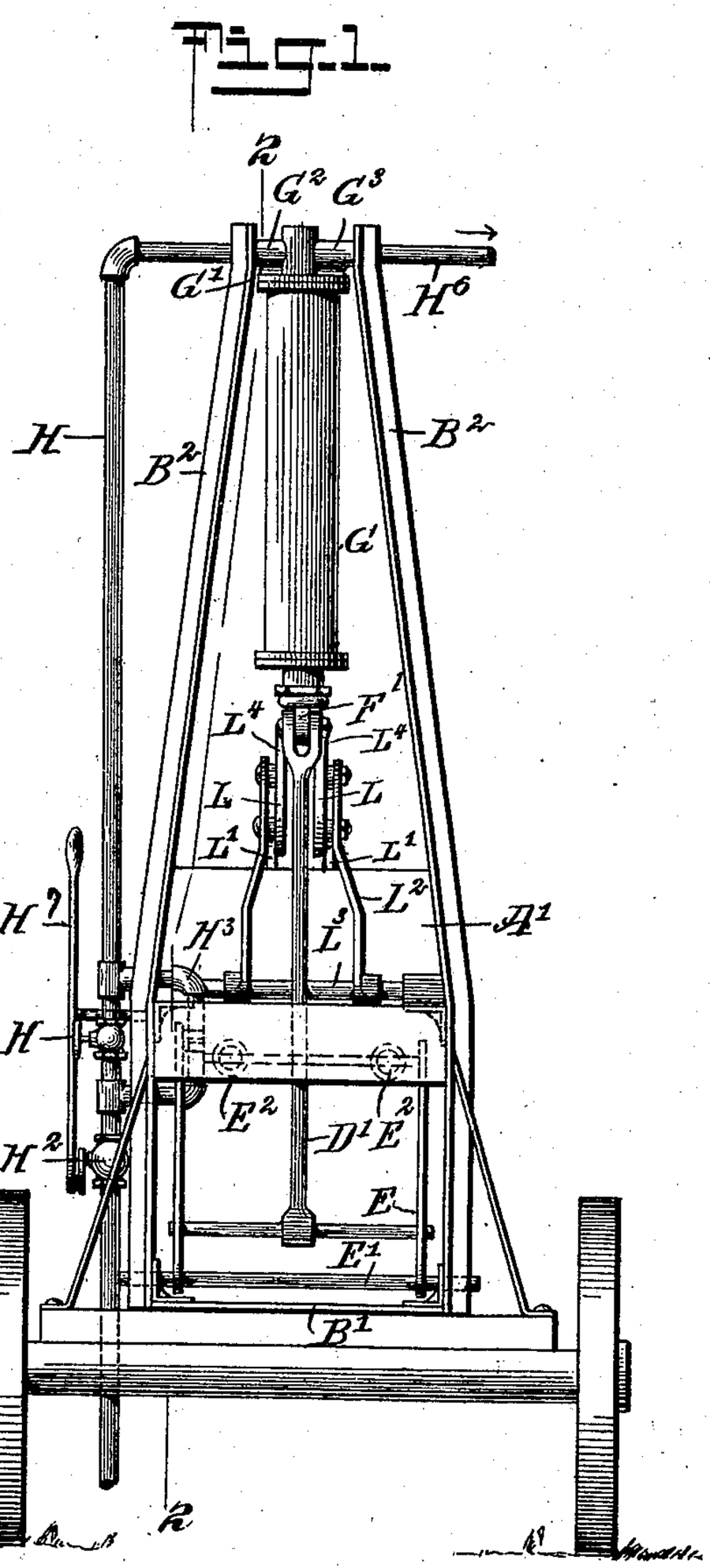
H. B. TROUT.

BALING PRESS.

APPLICATION FILED DEC. 26, 1906.

4 SHEETS—SHEET 1.

Fig. 1.



WITNESSES

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4 SHEETS—SHEET 2.

FIG. 3.

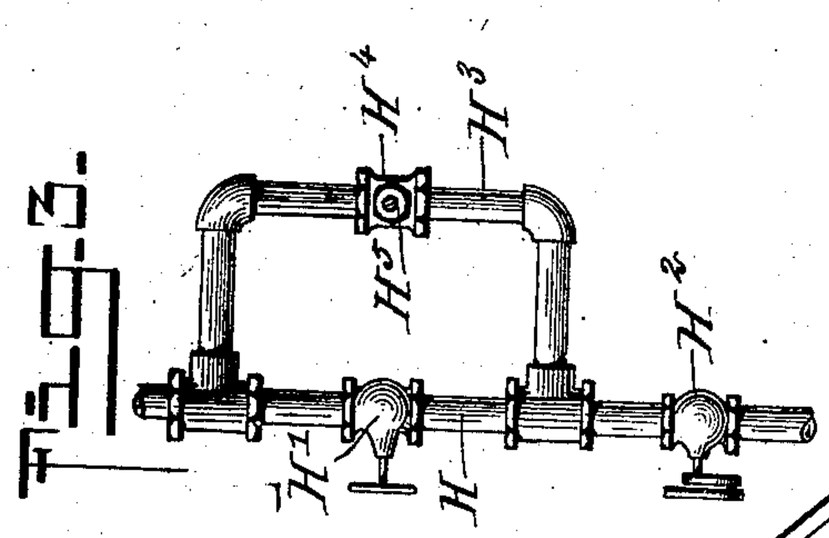

FIG. 2.

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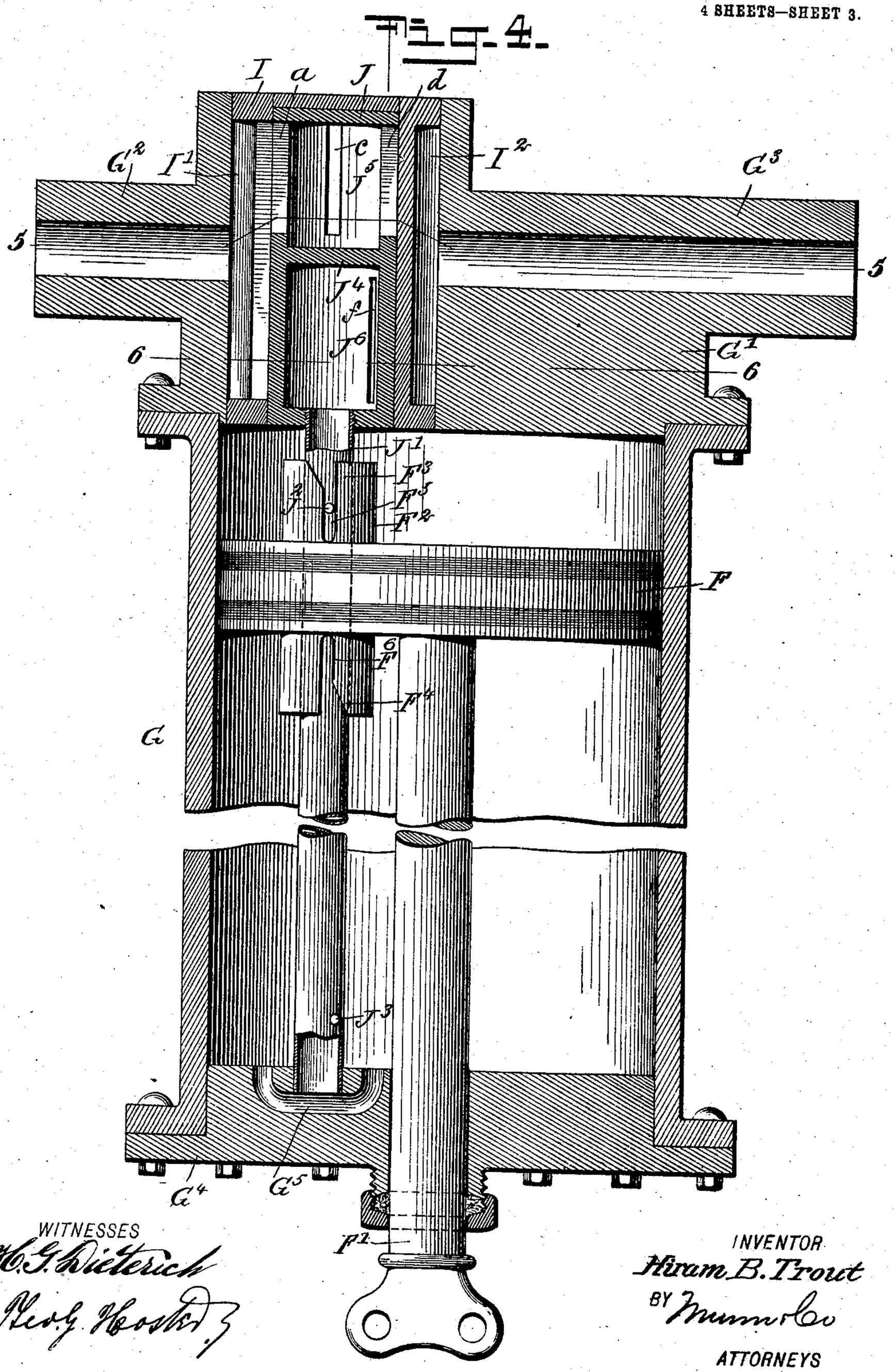
4 SHEETS—SHEET 3.

Fig. 4.



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4 SHEETS—SHEET 4.

Fig. 5.

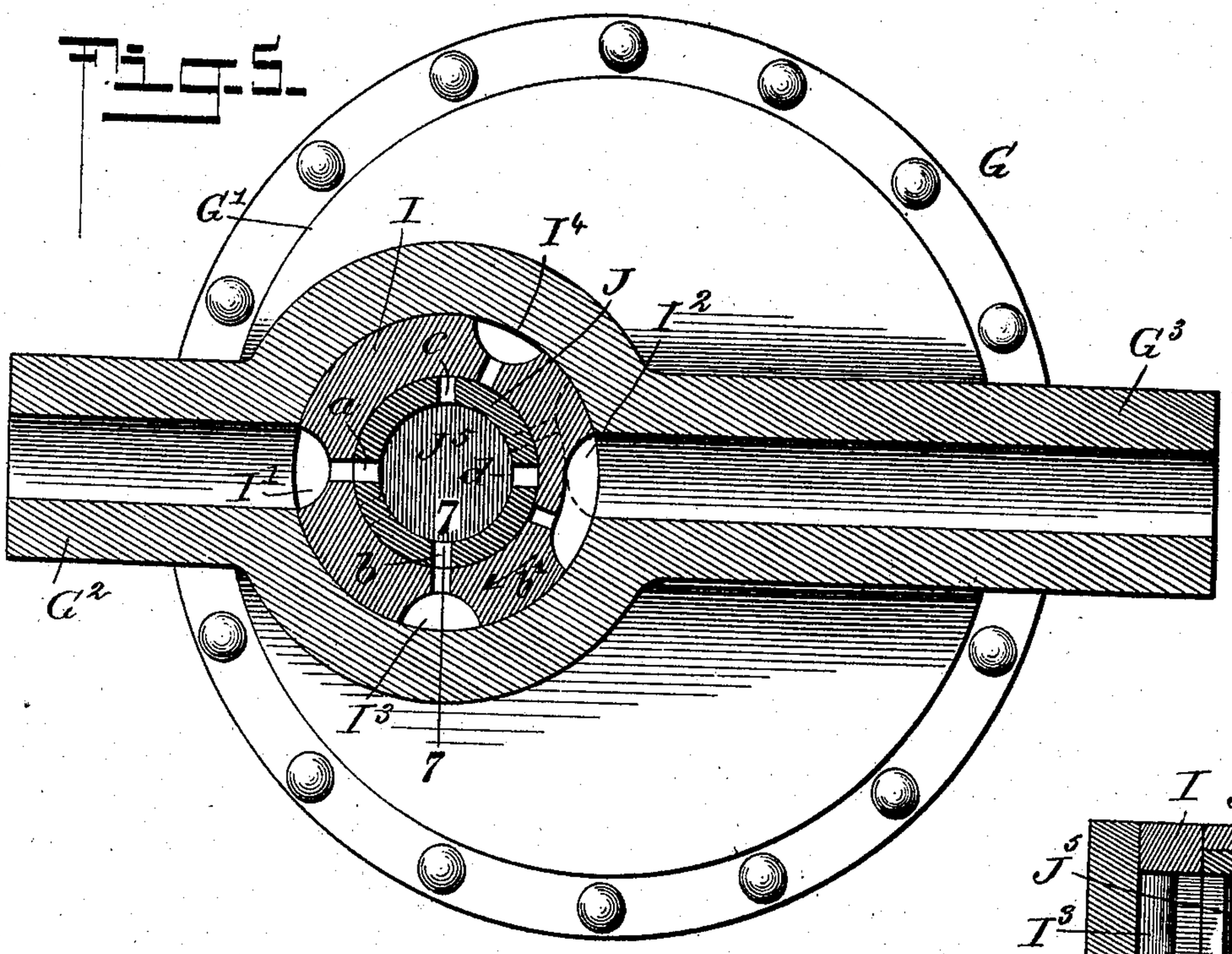


Fig. 6.

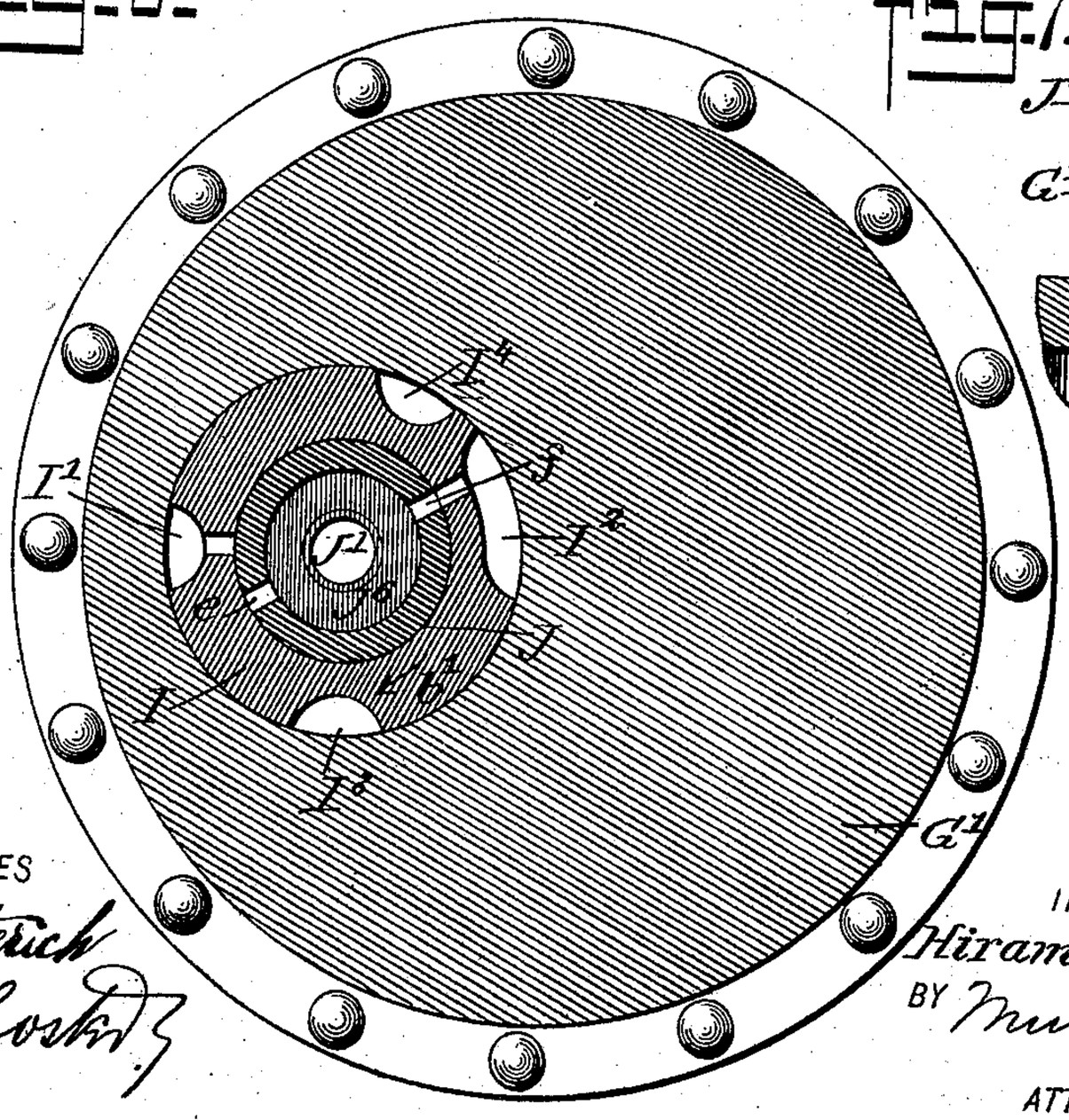
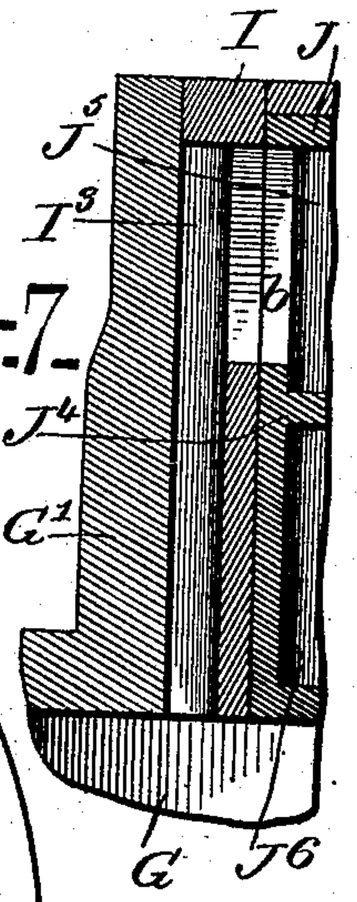


Fig. 7.



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UNITED STATES PATENT OFFICE.

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BALING-PRESS.

No. 867,767. Specification of Letters Patent. Patented Oct. 8, 1907.

Application filed December 26, 1906. Serial No. 349,567.

To all whom it may concern:

Be it known that I, HIRAM BRUCE TROUT, a citizen of the United States, and a resident of Shelbyville, in the county of Shelby and State of Illinois, have invented a new and Improved Baling-Press, of which the following is a full, clear, and exact description.

The invention relates to baling presses actuated by steam power, and its object is to provide a new and improved baling press, arranged to insure the economical use of the steam or other motive agent, and to increase the compressing force of the engine in the last portion of the compressing period by an increase in the motive agent, and by a direct application of the increased force on the follower.

The invention consists of novel features and parts and combinations of the same, which will be more fully described hereinafter and then pointed out in the claims.

A practical embodiment of the invention is represented in the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is an end elevation of the improvement; Fig. 2 is a longitudinal sectional side elevation of the same, on the line 2—2 of Fig. 1; Fig. 3 is an enlarged end elevation of the steam supply pipe for the engine and the means for increasing the motive agent in the engine during the last portion of the compression period; Fig. 4 is an enlarged transverse section of the engine; Fig. 5 is a sectional plan view of the same on the line 5—5 of Fig. 4; Fig. 6 is a similar view of the same on the line 6—6 of Fig. 4, and Fig. 7 is a sectional side elevation of the same on the line 7—7 of Fig. 5.

The baling box A as illustrated in the drawings is mounted on or forms part of the body B′ of a wheeled vehicle B, and in the said baling box A reciprocates a follower C for compressing the hay, straw, cotton or other material into bale form. The follower C is preferably provided with wheels C′ running on the bottom of the baling box A, and the said follower is connected with a toggle bar D having its companion bar D′ pivotally connected with a resistance arm E fulcrumed at E′ on the body B′ of the vehicle B. A compression spring E^2 is connected with the resistance arm E to give the desired resistance to the toggle bar D′. The two toggle bars D and D′ are pivotally connected with the outer end of the piston rod F′ of the piston F mounted to reciprocate in the cylinder G of an oscillating steam engine, the upper head G′ of the said cylinder G being provided with hollow trunnions G^2, G^3 journaled in suitable bearings arranged on standards B^2 forming part of the vehicle body B′. The trunnion G^2 is connected with a steam supply pipe H leading to a boiler or other suitable source of steam supply, and the said supply pipe H is provided with a throttle valve H′ and a shut-off valve H^2, as indicated in Fig. 3. A by-pass H^3 is arranged on the supply pipe H on opposite sides of the throttle valve H′, and the said by-pass H^3 is provided with a gate valve H^4, the stem H^5 of which is pivotally connected with the resistance arm E previously mentioned. Now the gate valve H^4 is held normally closed and is only opened during the last portion of the compression period of the follower C, so that more steam is admitted to the engine cylinder G, as hereinafter more fully described. The shut off valve H^2 is connected with a hand lever H^7 under the control of the operator to allow the latter to start and stop the machine whenever desired.

In the upper cylinder head G′ is secured a cylindrical valve seat I in which is mounted to oscillate a valve J having a depending stem J′ extending down through the cylinder G and through a sleeve F^2 secured on the piston F. The lower end of the stem J′ is stepped in the lower cylinder head G^4 and opens into a channel G^5 leading to the lower end of the cylinder G, as plainly indicated in Fig. 4. On the valve stem J′ are secured the pins J^2, J^3 adapted to engage inclines F^3 and F^4 formed on the sleeve F^2 and leading to vertical slots F^5 and F^6 formed on the sleeve F^2. Now when the piston F moves downward the incline F^4 of the sleeve F^2 engages the pin J^3 and turns the stem J′, thus turning the valve J in one direction, and when the piston F is on the upstroke the incline F^3 engages the pin J^2, thus turning the stem J′ and the valve J in the reverse direction.

The valve seat I is provided with vertically disposed channels I′ and I^2 connected with the hollow trunnions G^2 and G^3, the said channels terminating a distance from the upper and lower ends of the valve seat I. The latter is also provided with channels I^3, I^4 closed at their upper ends and opening at their lower ends into the upper end of the cylinder G. The valve J is provided at or near its middle with a transverse partition J^4 to form the upper and lower chambers J^5 and J^6, of which the lower chamber J^6 is in communication with the hollow valve stem J′. The upper chamber J^5 is adapted to connect by the ports *a* and *b* with the channels I′ and I^3, respectively, as indicated in Fig. 5, and the said upper chamber J^5 is also adapted to connect by ports *c d* with the channels I^4, I^2; that is, when the several parts are in the position shown in Figs. 4, 5, 6 and 7 then the ports *a* and *b* are in communication with the channels I′ and I^3, while the ports *c d* are disconnected from their channels I^4, I^3. Now when the valve J is turned, the ports *a* and *b* are disconnected from the channels I′, I^3 and the ports *c d* are connected with the channels I^4, I^2. The lower chamber J^6 is adapted to connect by ports *e* and *f* with the channels I′, I^2; that is, when the several parts are in the position as illustrated in Figs. 4, 5, 6 and 7 then the port *e* is disconnected from the channel I′

while the port *f* is connected with the channel I^2, and when the valve J is turned, as previously explained, then the port *e* is connected with the channel I′ while the port *f* is disconnected from the channel I^2.

Now when the piston F is in the uppermost position illustrated in Fig. 4 and the valve J is in the position shown in Figs. 4, 5, 6 and 7, then the steam can readily pass by way of the supply pipe H and hollow trunnion G^2 into the channel I′, from which the steam can pass by way of the port *a* into the upper chamber J^5 and from the latter by way of the port *b* into the channel I^3 leading into the upper end of the cylinder G. Thus the steam passing into the upper end of the cylinder G forces the piston F downward so that the toggle bars D and D′ are opened up and consequently the follower C is pushed outward in the baling box A to compress the material therein.

Now the steam in front of the piston F passes through the channel G^5 into the hollow piston stem J′ and up through the same into the lower chamber J^6 from which the steam can pass by way of the port *f* into the exhaust channel I^2 and into the hollow trunnion G^3, from which the steam can pass by an exhaust pipe H^6 to a suitable place of discharge. When the piston F nears the end of its downward stroke then the incline F^4 comes in contact with the pin J^3, whereby the stem J′ and consequently the valve J are turned in the direction of the arrow *b′*, so that the ports *a*, *b* and *f* are disconnected from the channels I′, I^3 and I^2, respectively, while the ports *c d* and *e* are connected with the channels I^4, I^2 and I′, respectively, and when this takes place the motive agent from the supply pipe H can pass by way of the hollow trunnion G^2, the channel I′ and the port *e* into the lower chamber J^6, from which the steam passes down the hollow stem J′ into the channel G^5, from which the steam passes into the lower end of the cylinder G to force the piston F upward on the return stroke. When this takes place the toggle bars D and D′ are pulled into a closing position, and in doing so the follower C is returned to the position shown in Fig. 2.

The steam in the upper end of the cylinder G passes during the upward stroke of the piston F through the channel I^4 and port *c* into the upper chamber J^5 now connected by the port *d* with the exhaust channel I^2 in register with the trunnion G^3 connected with the exhaust pipe H^6. When the piston F nears the end of its upward stroke then the incline F^3 comes in contact with the pin J^2 thus turning the stem J′ and the valve J back to the original position illustrated in Figs. 4, 5, 6 and 7.

When the piston F has traveled downward about two-thirds of its stroke then the toggle arm D′ begins to swing the resistance arm E outward against the tension of the spring F^2 for the stem H^5 to open the slide valve H^4, so that live steam can pass by way of the by-pass H^3 around the throttle valve H′ to supplement the pressure of the steam in the upper end of the cylinder G, that is, to increase the pressure of the steam to equal that approximately of the boiler pressure, and consequently during the last portion of the compression period of the follower C the latter is acted upon with an increased force at the time the final compression takes place, and the toggle bars D and D′ move into an open position and consequently the material in the baling box A is compressed to the fullest extent.

The inner end of the baling box A is provided with the usual hopper A′ for filling the baling box in front of the follower C, and in order to insure the proper feeding of the material from the hopper A′ into the baling box a feeding arm K is provided pivotally connected by links L and L′ with an arm L^2 fulcrumed at L^3 on the vehicle body B′. The link L is provided with an extension L^4 pivotally connected with the outer end of the piston rod F′, so that when the piston F is in its lowermost position, as indicated in dotted lines in Fig. 2, then the feeding arm K is outside of the hopper A′ and consequently the material can be readily thrown into the hopper A′. Now when the piston F is on the return or upward stroke the link extension L^4 imparts a swinging motion to the arm L^2 so that the feed arm K is swung downward in engagement with the material in the hopper A^1, to force the material from the hopper down into the baling box A in front of the follower C. When the piston F begins its down stroke and the follower C starts forward in the direction of the arrow *a′* then the feeding fork K is lifted out of the baling box A and the hopper A′; that is, during the forward movement of the follower C the feeding arm K is inactive as far as the material is concerned, and only becomes active during the return movement of the follower C.

The baling press shown and described is simple in construction and very effective in operation, especially as the follower C acts with increased power on the material in the baling box A during the last portion of the compression period and while the toggle bars D, D′ move into an open and most effective horizontal position.

By constructing the engine in the manner described, the steam is used economically, that is, the throttle valve H′ is but partly opened to allow sufficient steam to enter the cylinder G and act on the piston F during the return or upward stroke of the piston F and the first two-third part of the down stroke for the piston to return the follower C and to press the loose material lightly during the first two-third portion of the compression stroke, it being understood that very little power is required for this purpose. When, however, the final compression takes place more steam is admitted to the cylinder G by the automatic opening of the gate valve H^4 and hence a powerful final compression takes place.

The throttle valve H′ regulates the speed of the press and prevents the engine from running too fast when the machine is empty due to irregular feeding.

By constructing the valve J in the manner described, it is completely balanced as the steam enters at one side and exhausts on the opposite side, and consequently little power is required to turn the valve.

Although I have shown a preferred form of my baling press I do not limit myself to the detail construction thereof, as the same may be varied without deviating from the spirit of my invention.

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

1. A baling press comprising a baling box, a follower reciprocating therein, toggle bars of which one is connected with the said follower, a spring-pressed movable member connected with the other toggle bar, and an engine connected with the said toggle bars.

2. A baling press comprising a baling box, a follower reciprocating therein, toggle bars of which one is con-

nected with the said follower, a spring pressed movable member connected with the other toggle bar and a valve controlled by the said movable member for admitting more steam to the engine during the last portion of the compression period of the said follower.

3. A baling press comprising a baling box, a follower reciprocating therein, toggle bars of which one is connected with the said follower, a spring pressed movable member connected with the other toggle bar a steam supply pipe for the said engine and having a throttle valve, and a by-pass containing a valve, and a connection between the said by-pass valve and the said movable member.

4. A baling press comprising a baling box, a follower reciprocating therein, toggle bars of which one is connected with the said follower, a swing arm connected with the other toggle bar, a spring pressing the said swing arm to give resistance to the toggle bars, an engine connected with the toggle bars, a steam supply pipe having a throttle valve, and a by-pass containing a gate valve, and a connection between the said gate valve and the said swing arm.

5. A baling press comprising a baling box, a follower, toggle bars connected with the said follower, an engine cylinder mounted to oscillate, a piston reciprocating in the said cylinder and having its piston rod connected with the said toggle bars, a valve for controlling the admission and exhaust of the motive agent to both ends of the said cylinder, and means whereby an increase of resistance to the movement of the follower will open said valve.

6. A baling press, comprising a baling box, a follower reciprocating therein, toggle bars one of which is connected with the said follower, an oscillating engine connected with the toggle bars, and means connected with the other of said toggle bars for increasing the admission of the motive agent during the last portion of the compression of the said follower.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HIRAM BRUCE TROUT.

Witnesses:
E. J. TROUT,
R. J. TROUT.