

No. 748,231.

PATENTED DEC. 29. 1903.

J. M. STUART.

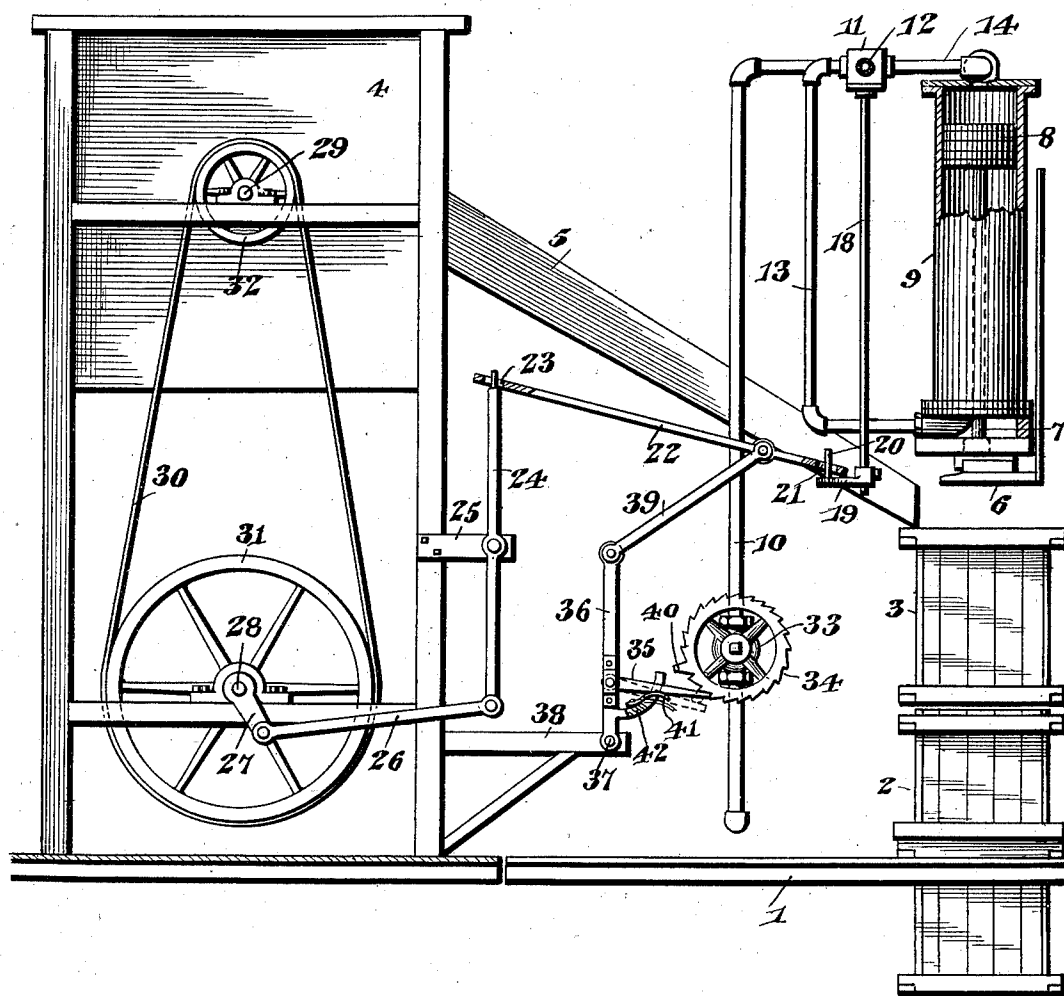
VALVE OPERATING MECHANISM FOR PRESSES.

APPLICATION FILED DEC. 31, 1902.

NO MODEL:

2 SHEETS—SHEET 1.

Fig. 1.



J. M. Stuart, Inventor

 $\mathcal{B}_4$

E. G. Liggers

Attorney

Witnesses
Jas. E. McCathran
Lauris E. Juelihn

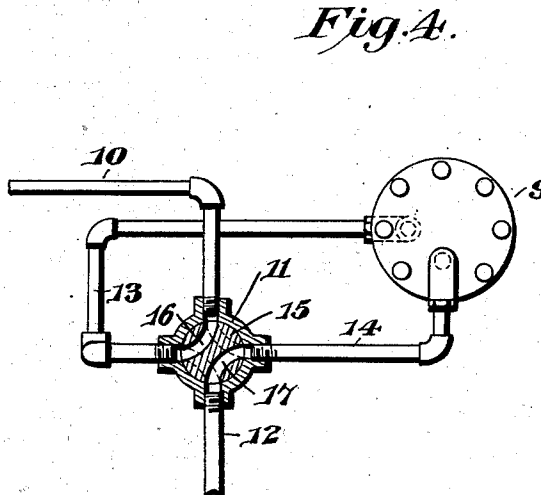
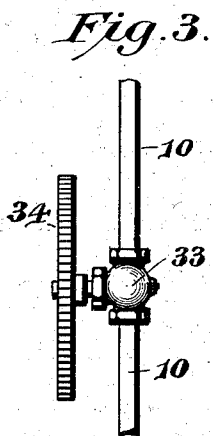
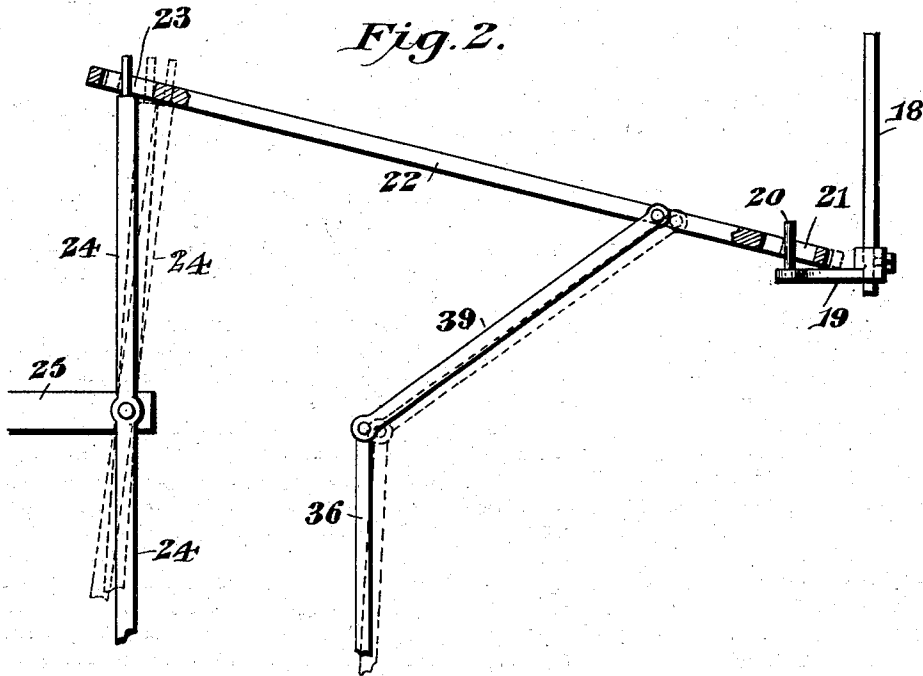
No. 748,231.

PATENTED DEC. 29, 1903.

J. M. STUART.
VALVE OPERATING MECHANISM FOR PRESSES.
APPLICATION FILED DEC. 31, 1902.

NO MODEL.

2 SHEETS—SHEET 2.



J. M. Stuart, Inventor

By

E. G. Figgers

Attorney

Witnesses
Jas. E. McCathran
Louis E. Julihn

UNITED STATES PATENT OFFICE.

JOHN MARCUS STUART, OF ELMO, TEXAS.

VALVE-OPERATING MECHANISM FOR PRESSES.

SPECIFICATION forming part of Letters Patent No. 748,231, dated December 29, 1903.

Application filed December 31, 1902. Serial No. 137,347. (No model.)

To all whom it may concern:

Be it known that I, JOHN MARCUS STUART, a citizen of the United States, residing at Elmo, in the county of Kaufman and State of Texas, have invented a new and useful Valve-Operating Mechanism for Presses, of which the following is a specification.

This invention relates to improvements in baling mechanism, and more particularly to means for effecting the automatic regulation and control of the motive fluid of a trampler or packer through the operation of the mechanism which feeds the material to the charging-chamber or press-box in which it is packed or tramped.

The invention has for its object to effect the automatic control of fluid-operated baling or packing mechanism by the feeding apparatus—as, for instance, a cotton-condenser—so that the operation of the packer or other baling device will be regulated in accordance with the quantity of material to be operated upon by it.

The invention has as a subordinate object to provide automatic means for properly timing the supply and exhaust of the motive fluid to and from the cylinder in which the packer-piston operates and to additionally provide for the automatic regulation of the quantity of motive fluid supplied to the cylinder, so that the operation of the trampler will be timed in accordance with the speed at which the condenser or other feeder is operating and will be driven under increasing pressure as the resistance of the material opposed thereto increases.

To the accomplishment of these and other objects the invention in its preferred embodiment resides in that construction and arrangement of parts to be hereinafter described, illustrated in the accompanying drawings, and succinctly defined in the appended claims.

In said drawings, Figure 1 is a general elevation, partly in section, showing the arrangement of my regulating and controlling apparatus applied to a Munger press and condenser. Fig. 2 is a detail view of certain of the connections. Fig. 3 is a detail view of the throttle or regulating-valve and its ratchet-wheel, and Fig. 4 is a detail view showing the

controlling-valve in section and illustrating its relation to the cylinder.

Like numerals of reference are employed to designate corresponding parts throughout the several views.

The mechanism with which my invention is particularly concerned is capable of use in connection with various presses and condensers; but since it is designed with special reference to the regulation and control of a press of the Munger type I have illustrated in the accompanying drawings what is known as a "Munger outfit," comprising a press constructed and arranged as described in Patent No. 680,164 to R. S. Munger in connection with a condenser of ordinary construction.

The Munger "baling-machine" includes a suitably-mounted turn-table 1, carrying two baling-chambers or press-boxes, one only of which (indicated by the numeral 2) is shown in the drawings. Above one of these press-boxes is located an independently-mounted charging-chamber 3, through which the cotton is fed to the box, while the other press-box, in which cotton has been previously packed, is disposed in coöperative relation with hydraulic or other suitable baling appliances. (Not shown.) Provision is made for the intermittent rotation of the table 1, so that each press-box is first presented below the charging-chamber and after being filled is shifted to the baling appliance while the other press-box is moved under the charging-chamber, one box receiving a supply of cotton while the cotton in the other box is being baled and discharged. The cotton to be baled is fed from the condenser 4 through a chute 5 to the charging-chamber 3, through which it is forced into the subjacent press-box by a fluid-operated trampler or packer 6. The packer 6 is connected to the lower end of a piston-rod 7, operated by a piston 8, reciprocating in a cylinder 9, supported in any suitable manner above the charging-chamber. The piston 8 is designed to be operated by fluid-pressure received from a fluid-supply pipe 10, leading to a controlling-valve casing 11 at a point diametrically opposite an exhaust-pipe 12. From diametrically opposite points of the casing 11 are led the pipes 13 and 14, communicating with the opposite ends of the cylinder 9.

Within the casing 11 is mounted a rotary controlling-valve 15, provided with a pair of arcuate ports 16 and 17. In one position of the valve the port 16 establishes communication between the pipes 10 and 13 to supply steam or other motive fluid to the lower end of the cylinder, while the other port 17 establishes communication between the pipes 14 and 12 to permit the exhaust of the upper end thereof. When the valve is shifted to the position indicated in dotted lines in Fig. 4, the lower end of the cylinder is put in communication with the exhaust, while communication between its upper end and the supply-pipe is established. Thus it will be seen that by partially rotating the controlling-valve alternately in opposite directions the motive fluid will be alternately supplied to and exhausted from each end of the cylinder to drive the piston 8 in opposite directions and reciprocate the packer 6.

The valve described is one of those forms shown in the Munger patent and has been selected for illustration in this application because of its extreme simplicity. It is to be understood, however, that the specific form of valve mechanism constitutes no part of my present invention, since any type of valve or arrangement of valves capable of controlling the supply of motive fluid to the cylinder and of being operated by the feeding mechanism might be employed with equal facility.

From the controlling-valve 15 is extended downwardly a valve-stem 18, having at its lower end a crank-arm 19, carrying at its outer end a pin 20. The pin 20 extends upwardly through a slot 21, adjacent to one extremity of a connecting-bar 22, provided with a similar slot 23 at its opposite end for the reception of the upper extremity of a lever 24, fulcrumed upon a bracket 25, preferably attached to one of the several supports of the condenser 4. The lower end of the lever 24 is connected, by means of a link 26, with the wrist of a crank 27 on a counter-shaft 28, said shaft being geared to the condenser or drum shaft 29 by a belt 30, passing around a band-wheel 31 on the shaft 28 and a pulley 32 on the drum-shaft. It will be observed that as the counter-shaft 28 rotates the lever 24 will be oscillated and the connecting-rod 22 reciprocated. As the rod 22 is connected to the crank-arm at the lower end of the valve-stem, the arm will be oscillated in opposite directions to effect the partial rotation of the controlling-valve 15 necessary to effect the alternate supply of the motive fluid to the opposite ends of the cylinder 9 and its exhaust therefrom. Obviously, however, it is necessary to provide for more or less dwell of the packer 6 after its retraction to permit a predetermined quantity of cotton to be fed from the condenser to the charging-chamber 3. This dwell is secured by providing for the intermittent actuation of the valve by the continuously-operating counter-shaft 28, the slots 21 and 23 in the connecting-rod permitting suf-

ficient lost motion to accomplish this result. As is best shown in Fig. 2 of the drawings, a portion of the oscillatory movement of the lever 24 is consumed by the travel of the upper end thereof from one end of the slot 23 to the other. The connecting-rod is then moved; but it does not immediately operate the crank-arm 19, because the slot 21 will permit additional lost motion. As soon, however, as the play of the two loose connections has been taken up the crank-arm 19 will be swung and the controlling-valve will be rotated to effect the supply of motive fluid to one end of the cylinder and its exhaust from the opposite end thereof. The piston will thus be driven downwardly, for instance, to force the tramper 6 through the charging-chamber to pack the cotton in the press-box. As soon as the opposite oscillation of the lever 24 has again taken up the lost motion in the opposite direction the crank-arm 19 will be swung back to its first position to effect the exhaust of the motive fluid from the upper end of the cylinder 9 and its supply to the lower end thereof to elevate the tramper.

It will be noted that the operations of the packer are controlled by the feeding mechanism, and it therefore follows that the packing operation will always bear a definite relation to the quantity of material fed in position to be forced into the press-box. With the present form of gearing the packer will be given one complete reciprocation for each complete rotation of the counter-shaft 28 of the condenser; but of course by multiplying the gearing a larger number of reciprocations of the packer may be obtained or a less number of reciprocations may be provided for in an equally obvious manner. The period of rest of the valve may also be lengthened or shortened by providing for more or less lost motion in the connections, and instead of supplying the motive fluid to both ends of the cylinder it may be supplied to one end only thereof. In this latter event the tramper would be retracted by suitable mechanical means, as suggested in the patent to Munger hereinbefore identified.

It should also be understood that while the employment of the charging-chamber 3 is desirable it is not an essential feature of my invention in its broadest aspect. Nor is it essential that the packer 6 be employed merely as an initial packing device facilitating the formation of a bale to be subsequently subjected to further compression. On the contrary, the invention resides, broadly, in effecting the automatic control of the packer or pressing member by the operation of a condenser or other feeding appliance, so that the feed of the material and the operation of the packing or baling device will bear a definite relation.

It is evident that as successive charges of cotton are packed in the press-box the resistance opposed to the downward movement of the packer increases. At first comparatively

slight pressure is sufficient to reciprocate the packer; but after a considerable quantity of cotton has been forced into the box greater pressure is required to drive the packer down with sufficient force to effect the proper compression of the bale. I have therefore devised an automatic regulator for regulating the quantity of steam or other motive fluid which may be admitted to the cylinder by the opening of the controlling-valve. This regulator includes a throttle-valve 33, located in the supply-pipe 10 and having its stem equipped with a ratchet-wheel 34. This wheel is designed to be advanced step by step by a pawl 35, pivoted to a lever 36, fulcrumed, as indicated at 37, upon a bracket 38. The upper end of the lever 36 is connected by a link 39 with the connecting-rod 22. As the rod is reciprocated the lever 36 will be oscillated to cause the pawl 35, engaging a tooth of the ratchet-wheel, to advance the same one step and to thereafter engage the next succeeding tooth in a manner well understood by those skilled in the art. The throttle-valve is so arranged that by the time, say, for instance, one-half of the bale has been packed in the box it will be wide open to permit the subsequent reciprocation of the packer under maximum pressure. It is therefore desirable to provide for throwing the pawl 35 out of engagement with the wheel 34 when the valve has been completely opened, so that said wheel will not thereafter obstruct the movement of the parts. While any suitable means might be employed for this purpose, a simple embodiment thereof resides in providing upon the wheel 34 a lug 40, which as the valve reaches its open position will engage the pawl 35 and depress it out of engagement with the wheel, as shown by dotted lines in Fig. 1, so that the pawl may reciprocate idly during the completion of the bale. Normally the pawl is urged into engagement with the wheel by a spring 41, secured to a guide 42, extending from the lever 36.

Briefly, the operation of the device is as follows: The condenser being in operation, the rotation of its driving-shaft 28 will through the intermediate connections effect the intermittent rotary movement of the controlling-valve 15 in opposite directions, admitting and exhausting steam or other motive fluid to and from the cylinder 9 at opposite sides of the piston 8 to reciprocate the packer 6. The quantity of motive fluid admitted to the cylinder will be regulated by the valve 33 and will be increased gradually as the valve-wheel 34 is rotated step by step through the medium of the pawl 35, operated from the condenser-shaft through the intermediate connections. When the bale is about half formed, the valve 33 will be wide open, and the lug 40 on the wheel 34 will move the pawl 35 out of engagement with the wheel to permit the succeeding operation of the apparatus under a full head of steam until the baling operation is complete.

It is thought that from the foregoing the construction and operation of my valve-operating mechanism for presses will be clearly comprehended; but while the illustrated embodiment of the invention is believed at this time to be preferable I do not wish to be understood as limiting myself to the structural details defined, as, on the contrary, I reserve the right to effect such changes, modifications, and variations of the illustrated structure as may be fairly embraced within the scope of the protection prayed.

What I claim is—

1. The combination with a fluid-operated packer and controlling mechanism therefor; of means for feeding the cotton to the packer to be tramped thereby, and an operative connection between the cotton-feeding means and the controlling mechanism, whereby the speed of the controlling mechanism is governed by the speed of the cotton-feeding means.

2. The combination with a baling appliance including a press-box and fluid-operated packer; of valve mechanism controlling the fluid-supply, a cotton-condenser arranged to deliver cotton to the packer, a constantly-operating driving-shaft for the condenser, and connections between said driving-shaft and the valve mechanism of the baling appliance to effect the intermittent operation of said valve mechanism.

3. The combination with a baling appliance including a baling-chamber and a fluid-operated packer; of valve mechanism controlling the fluid-supply, a cotton-condenser arranged to deliver the cotton to the chamber, a stem connected to the valve mechanism and provided with a crank-arm, and connections between said arm and the driving-shaft of the condenser.

4. In baling mechanism, the combination with a baling appliance including a press-box and a fluid-operated packer, of valve mechanism controlling the fluid-supply, a condenser having a chute arranged to deliver cotton or the like beneath the packer, a constantly-operating driving-shaft for the condenser, and connections between said driving-shaft and the valve mechanism of the baling appliance to effect the intermittent operation of the valve mechanism.

5. In baling mechanism, the combination with a baling appliance including a baling-chamber and a fluid-operated packer, of valve mechanism controlling the fluid-supply, a condenser having a chute disposed to deliver cotton or the like to the chamber, a stem connected to the valve mechanism and provided with a crank-arm, a connecting-rod engaging said arm, a lever engaging the connecting-rod, a crank extending from the driving-shaft of the condenser, and a link connecting said crank with the lever, whereby the condenser constituting the feeder of the baling appliance will operate the valve mechanism of the latter.

6. In baling mechanism, the combination with a baling appliance including a fluid-operated packer, of controlling-valve mechanism for controlling the supply of motive fluid, and a regulator-valve for regulating the quantity of motive fluid to be supplied to the packer.
7. In baling mechanism, the combination with a baling appliance including a fluid-operated packer, of controlling-valve mechanism for controlling the fluid-supply, means for automatically operating said valve mechanism, and a regulating-valve for regulating the quantity of motive fluid to be supplied.
8. In baling mechanism, the combination with a baling appliance including a fluid-operated packer, of controlling-valve mechanism for controlling the fluid-supply, a regulating-valve for controlling the quantity of fluid to be supplied, and means for automatically operating both the regulating-valve and the controlling-valve mechanism.
9. In baling mechanism, the combination with a baling appliance including a fluid-operated packer, of controlling-valve mechanism for controlling the fluid-supply, means for operating said valve mechanism, a regulating-valve for regulating the quantity of motive fluid to be supplied, and means for gradually opening the regulating-valve to increase the fluid-pressure under which the packer is operated.
10. In baling mechanism, the combination with a baling appliance including a fluid-operated packer, of controlling-valve mechanism, a regulating-valve, means for intermittently operating the controlling-valve mechanism to effect the intermittent operation of the packer, and means for automatically operating the regulating-valve to increase the supply of motive fluid after each operation of the packer.
11. In baling mechanism, the combination with a baling appliance including a fluid-operated packer, of controlling-valve mechanism, regulating-valve mechanism, a feeder for feeding the material to be baled opposite the packer, and mechanism operated by the feeder for automatically actuating one of the valve mechanisms.
12. In baling mechanism, the combination with a baling appliance including a fluid-operated packer, of controlling-valve mechanism and regulating-valve mechanism, one controlling the supply of motive fluid to operate the packer and the other regulating the quantity of motive fluid to be supplied, a feeder for feeding the material to be baled opposite the packer, and operating connections between the feeder and both valve mechanisms.
13. In baling mechanism, the combination with a baling appliance, of controlling-valve mechanism, regulating-valve mechanism, a feeder for supplying the material to be baled opposite the packer, and mechanism operated by the feeder for intermittently actuating the controlling-valve mechanism and for progressively operating the regulating-valve mechanism.
14. In baling mechanism, the combination with a baling appliance including a fluid-operated packer, of controlling-valve mechanism for controlling the supply of motive fluid to operate the packer, a valve-stem having a crank-arm, a rod connected to said crank-arm to operate the same, a lever connected to said rod, a pawl operated by the lever, a regulating-valve, a ratchet-wheel connected to the regulating-valve and disposed to be engaged by the pawl, and means for reciprocating the rod to effect the operation of the regulating-valve and the controlling-valve mechanism.
- In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.
- JOHN MARCUS STUART.
- Witnesses:
T. A. STUART,
R. E. PRATT.