3 Sheets—Sheet 1.

J. F. WOOLDRIGE, J. F. NYSTROM & L. D. HOWARD.

Lump Tobacco Machine.

No. 204,871. Patented June 11, 1878.

Fig. 2.

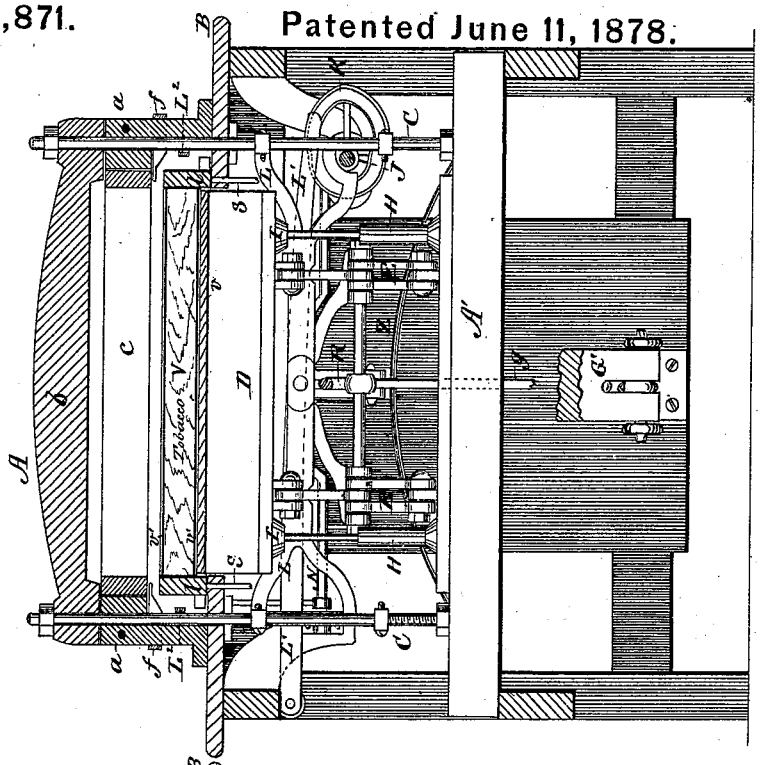

Fig. 1.

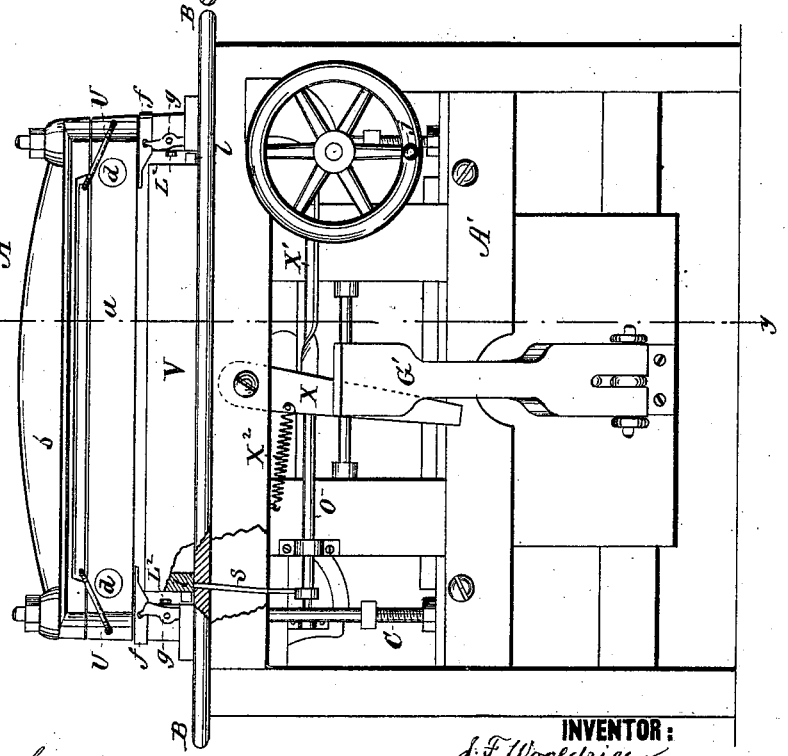

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Fig. 4.

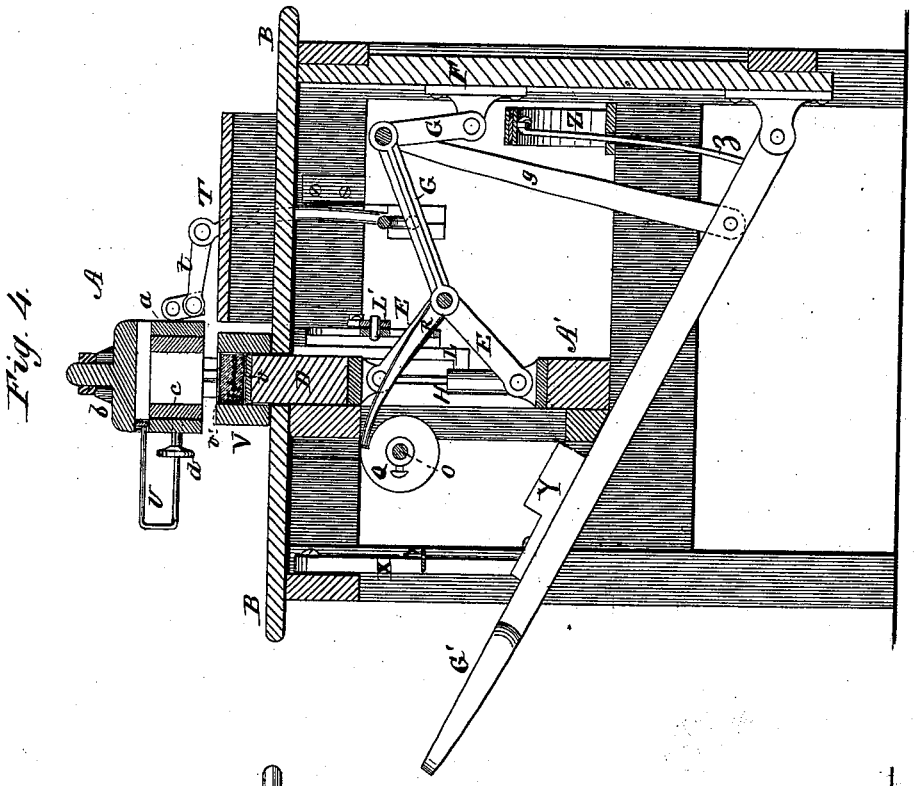

Fig. 3.

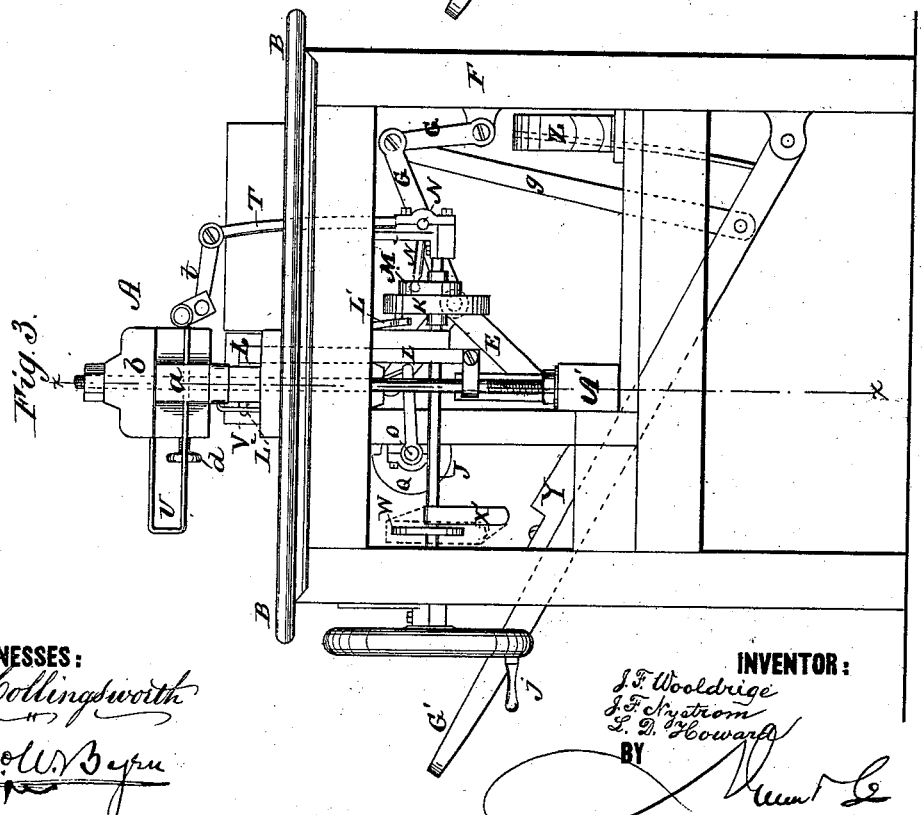

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Fig. 12.

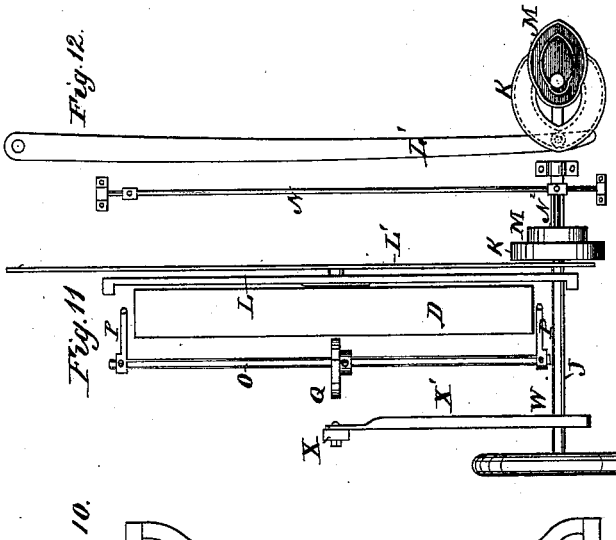

Fig. 11.

Fig. 10.

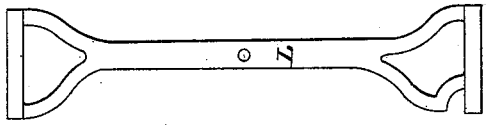

Fig. 5.

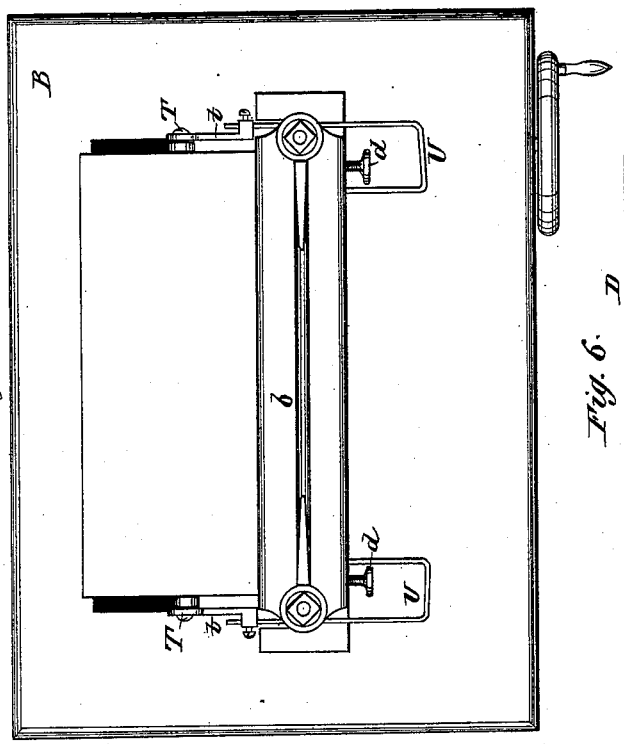

Fig. 6.

Fig. 7.

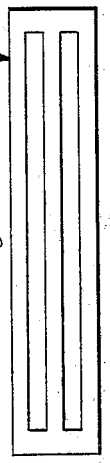

Fig. 8.

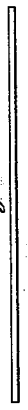

Fig. 9.

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UNITED STATES PATENT OFFICE.

JOSEPH F. WOOLDRIGE, JOHAN F. NYSTROM, AND LYMAN D. HOWARD, OF RICHMOND, VIRGINIA.

IMPROVEMENT IN LUMP-TOBACCO MACHINES.

Specification forming part of Letters Patent No. **204,871**, dated June 11, 1878; application filed April 9, 1878.

To all whom it may concern:

Be it known that we, JOSEPH FLOOD WOOLDRIGE, JOHAN FREDRICK NYSTROM, and LYMAN DEAN HOWARD, of Richmond, in the county of Henrico and State of Virginia, have invented a new and Improved Machine for Making Plug-Tobacco; and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing, forming part of this specification, in which—

Figure 1 is a front elevation with a portion of the table broken away. Fig. 2 is a vertical longitudinal section through line *x x* of Fig. 3; Fig. 3, an end elevation; Fig. 4, a vertical transverse section through line *y y* of Fig. 1. Fig. 5 is a plan view; and Figs. 6, 7, 8, 9, 10, 11, and 12 are details.

Our invention relates to means for making plug-tobacco, designed more particularly for giving an initial pressure to the filler or body of the plug before the binder or wrapper is put on, and for discharging said lumps continuously and consecutively from the machine without loosening, breaking, or destroying in any way the integrity of the lump, which, after being provided with a wrapper and dried, is subjected to a heavy final pressure in another machine. This giving to the lump an initial pressure reduces its bulk and involves a saving in wrappers by requiring a less quantity of this expensive stock, and also makes a plug of more homogeneous color, the pressure being so controllable as to prevent discoloration due to over-squeezing or the squeezing out of the flavoring, which discoloration is a great objection in light-colored tobacco, and is difficult to obviate when pressure is applied before drying.

The general construction of the machine for effecting the pressing of the lump is that in which an upper head is rigidly connected with a lower head, and a movable platen arranged between, to be operated by toggle-arms to force the platen up to secure the requisite pressure.

Our improvements consist in the particular arrangement and adaptation to a table of the said heads, toggle-arms, and movable platen; in the construction of the heads, and the combination, with the same, of removable frames for containing the tobacco, removable platen corresponding thereto for compressing the tobacco, and removable frames for receiving the compressed plug; in the means for discharging the lumps from the machine as fast as they are formed; in the means for advancing or lifting the containing-frames simultaneously with the platen to bring it flush with and tight against the hollow head through which the plug is discharged; and in other minor details of construction and arrangement, as hereinafter more fully described, and pointed out in the claims.

In the drawing, B represents the table, arranged upon a rectangular frame. A A′ are the heads, of which A is arranged above the table, and A′ below the same, the said heads being strongly connected by tie-rods C C, Figs. 1 and 2, or by side pieces cast with the two heads, as may be desired.

Moving vertically between the two heads is the platen D, Figs. 2 and 4, which is connected to the lower head A′ by the toggle-arms E E, and to the rear abutment F by the second set of toggle-arms G G. This platen has a movement up through a corresponding opening in the table, and is guided during said movement in true vertical line by means of the telescopic guides H, consisting of tubes attached to the lower head and rods attached to the platen arranged in said tubes, and having rubber buffer-springs I, to arrest the downward movement of the platen.

To operate this platen with an up-and-down movement, a treadle, G′, is hinged to the back portion of the frame or the abutment F, and is connected through rod *g* with the center joint of the toggle-arms G G, so that as the treadle is depressed from the front the toggles G G and E E are spread out and the platen elevated upon its guides. To bring down the platen again and restore the treadle to its normally-elevated position, a semi-elliptical spring, Z, is arranged in the rear portion of the frame-work, and is connected with the treadle by rod *z*.

V are the press-frames. These consist of rectangular boxes having their sides and ends closed and their tops and bottoms open. In these frames are arranged wooden strips *v*

and metal strips *v'*, between which, and in contact with the wooden strips, the tobacco, after being weighed, is placed. The frame is then placed beneath the upper head A, and immediately over the opening in the table through which the platen rises, so that the platen may enter the same and operate upon the tobacco to press it. These frames are made interchangeable, and have one, two, or more compartments, according to the size of plug to be made. For every different form of frame a similar form of platen is provided, having faces which correspond to and enter the compartments of the frame—as, for instance, for the form of frame shown in Fig. 4, a plain platen is required, and for the form of frame shown in Fig. 7 a double-faced platen, Fig. 6, is employed. For this reason the platen and frames are made readily removable and interchangeable.

In constructing the upper head A, it is made in two parts—a hollow rectangular part, *a*, having supporting-feet resting upon the table, and an upper cap-piece, *b*, recessed upon its under side throughout its length, so as to leave, when applied to the part *a*, a horizontal slot, through which a plunger is designed to work to discharge the plug. In the portion *a* of the head is arranged a rectangular removing-frame, *c*, secured in place by binding-screws *d*, which receiving-frame is made receivable in order to correspond to the removable platen and frame V used, and receives the plugs from the frames V, to which they conform exactly.

In pressing the tobacco, as the plugs are to be forced up into the hollow portion *a* of the head before delivery, the frame V must be held tightly up against the portion *a* of the head just at this time. To effect this result, a pawl-arm, R, Fig. 4, is fixed to the bolt-rod, connecting toggles E E to toggles G G, so that as the toggles are spread to lift the platen this pawl is made to engage with a toothed cam, Q, on a longitudinal rock-shaft, O, so as to rotate said shaft partially and cause its arms R, Fig. 11, to lift rods S S, Figs. 1 and 2, which extend up through the table and bear against the lower sides of the ends of the frame V, to force the latter up against the hollow portion of the head. At a suitable time the pawl-arm R slips off the tooth of the cam and allows the frame to be brought down again.

The devices for discharging the plug and pulling down the frames will now be described.

J is a transverse shaft, arranged in bearings at the end of the table-frame and adapted to be rotated by a crank, *j*. Upon this shaft is fixed a grooved cam, K, in the groove of which is arranged a pin attached to the end of a lever, L^1, Figs. 3, 11, 12, which lever is pivoted at its opposite end to the frame-work, and in its center is pivoted to a yoke-shaped frame, L. This frame has its ends perforated and arranged to slide upon and be guided by the tie-rods C in its vertical reciprocation. The upper portion of this frame, at each end, is extended through the tables at the ends of the open space for the platen, and said ends of the frame are provided with horizontal arms, L^2, Figs. 1, 2, 3, adapted to engage with lugs *l* on the ends of the frames V. As the shaft J rotates it will be seen that the cam K acts upon the yoke shaped frame through the lever L^1, and in drawing down said frame causes its arms L^2 to strike upon the lugs *l* of the frame V and pull it with its elevating-rods S down. Upon the same shaft J is arranged a second grooved cam, M, Figs. 3, 11, 12, whose groove opens upon the opposite side from K, and in which plays the end of an arm, N^2, which is rigidly fastened to a longitudinal rock-shaft, N, journaled in hangers from the table. At each end of this rock-shaft are rigidly attached arms T, which extend up through slots in the table. To the ends of these arms are attached links *t*, which links, in turn, are attached to the opposite ends of a plunger, U. The end portions of this plunger extend laterally through guide-holes in the ends of the head A, while the middle portion is arranged to pass from the front to the rear through the slot in the head, to discharge the top layer of tobacco upon the raised platform in the rear. It will be seen, then, that the same shaft J, through cam M and rock-shaft N, operates the plunger U.

X is a detent, pivoted to the table immediately above the treadle, and held by a spiral spring, X^2, to a position which causes it to stop the upward movement of the treadle. This detent is removed from the range of the treadle by a bar, X^1, bent around a cam, W, on the shaft J.

Y is an adjustable block, fastened to the treadle G, which block is provided with graded steps, either of which may be brought beneath the detent to stop the treadle at different points.

The various parts of the machine having been properly timed as to their offices, their conjoint operation is as follows: A frame, V, having been filled with tobacco, is placed above the platen on the table and the treadle depressed. The platen then rises, and simultaneously the rods S lift the frame V and fit it tightly against the lower surface of the head. As the platen moves up through the frame V it pushes the compressed plug up into the receiving-frame *c*, which latter is, when the machine is first started, filled with one or more strips to block it up and afford a face against which the first plug of tobacco is pressed. The treadle is then released and allowed to rise until stopped by the swinging detent X, which relieves somewhat the pressure of the platen. Crank *j* is then turned a whole revolution, which, through cam K, causes the yoke-shaped frame to pull down the frame V and its lifting-rods S, causing at the same time also, through cam M, the plunger U to pass laterally through the slot in the head and discharge the strip above the

plug upon the raised platform in the rear, the pressure upon the plug being sufficiently relieved by the partial retraction of the treadle and platen. At the end of the revolution of shaft J the cam W presses against the curved end of bar X^1, and by pulling off the detent X from the treadle allows the platen to descend to allow the lateral removal of the frame V and the insertion of another. Then, as the same action just described is repeated, the next movement of the plunger discharges the first-formed plug of tobacco, which plugs are then successively discharged with their alternating strips as fast as the operation of the machine is repeated, the said head A and receiving-frame *c* being designed to contain a number of pressed lumps of tobacco during the pressure of others, so that the top lump is the one which is discharged, and each lump, in reaching the top, receives several pressures.

To support the lumps and their subjacent metallic strip when retained in the receiver *c*, pending the downward and upward movement of the plunger, horizontally-sliding catches *f* are arranged to embrace the feet of the portion *a* of the upper head, and are pivoted to and supported upon levers *g'*. Both these catches and levers have beveled faces, which are struck by the tappets L^2 of the vertically-reciprocating yoke-shaped frame. As the tappets L^2 descend with the frame V the beveled faces of the levers *g'* are struck by said tappets and the catches projected so as to rest beneath and support the metallic strips beneath the plug, which has been left in the receiver *c*. As, however, the tappets rise with the elevation of the platen for the compression of another plug, the tappets strike the beveled faces of the catches *f* and throw them outwardly, so that the newly-formed plug can be forced up flush against the next upper strip and plug which the catches previously held.

With respect to the construction of the plunger U, it will be seen that the guideways in the head in which it moves are arranged midway between the upper and lower faces of the portion *a*, so that the plunger may operate at the top of the same through the slot, or below the portion *a* and between the same and the frame V, according to whether heavy or light pressed tobacco is being made. When the upper head is arranged with its lower edge a slightly-greater distance from the table than the thickness of the frames V, it will be seen that there is sufficient room between the table and the head for the play of the frames V in being lifted to fit against the head to register with the same, and alternately pulled down again. This fitting of the frames against the head is always necessary to secure the even passage of the lump from the frame to the head when heavy-pressed lumps are being formed, and to form an abutment for the frame when light-pressed lumps are being made. The down pull, however, is only necessary when light-pressed lumps are being formed, and when making light-pressed lumps the hollow head is blocked up by strips, so that practically it is not hollow, and the discharging-plunger is adjusted to play at right angles just beneath the head. Now, when a frame with its contents is fitted against the practically solid head, the lump receives but one pressure, and the frame is pulled down by the devices hereinbefore described just low enough to allow the plunger to pass between the frame and head and discharge the lump held between the platen in the frame and the wooden strips in the head. The plunger is arranged in guides in the side of the head A, and is bent or formed in such manner that it can be adjusted to eject either through the upper discharging-opening or below the head.

If desired, the machine can be adapted to be run by power by substituting for the treadle a shaft having a fast and loose pulley and connecting the same by cam or crank with the system of toggle-arms.

As a modification, also, of the means of applying power, the guide-tubes H and slide-rods may be adapted for use as a cylinder and piston or ram for either steam or hydraulic pressure.

Having thus described our invention, what we claim as new is—

1. The combination, with a movable platen and a head to form an abutment, of the removable frame V, having the within-described or equivalent lifting devices to adjust it against the head, and a plunger arranged to operate at right angles to the line of pressure, as set forth.

2. The combination of the hollow head A, the platen D, and the removable frame V, the distance between the bottom of the hollow head and the top of the table B being greater than the thickness of the removable frame V, whereby the plug may be discharged between the removable frame and hollow head, substantially as described.

3. The combination, with the table having head A above and head A' below the same, connected together, substantially as described, of the platen D, toggle-arms E E, secondary toggles G G, treadle G', connecting-rod *g*, and a lifting-spring for the treadle, substantially as described.

4. The combination, with the removable frames V, of the lifting device for the same, consisting of the rods S, rock-shaft O, cam Q, and-pawl arm R, located upon the toggle-joint, substantially as described.

5. The combination of the head A, the removable frame V, and the plunger U, constructed and arranged as described.

6. The combination, with the plunger U, of the links *t*, arms T, rock-shaft N, arm N^2, and cam M, located on shaft J, substantially as and for the purpose described.

7. The combination, with the frames V, having lugs or projections upon the ends thereof, of the vertically-moving frame L, having hori-

zontal tappets L^2, adapted to engage with the lugs on the frames, the lever L^1, and cam K, located on shaft, substantially as described.

8. The sliding catches *f*, mounted on levers *g'*, pivoted to the upper head, combined with the vertically-moving tappets L^2, and adapted to sustain the plugs in the hollow head, substantially as described.

9. The swinging detent X, combined with the curved bar X^1, cam W, and treadle G', as described.

10. The adjustable block Y, having steps, combined with the treadle and the swinging detent, as and for the purpose described.

The above specification of our invention signed by us this 7th day of February, A. D. 1878.

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JOHAN FREDRICK NYSTROM.
LYMAN DEAN HOWARD.

Witnesses:
SAMUEL P. WADDILL,
GEO. W. CARTER.