

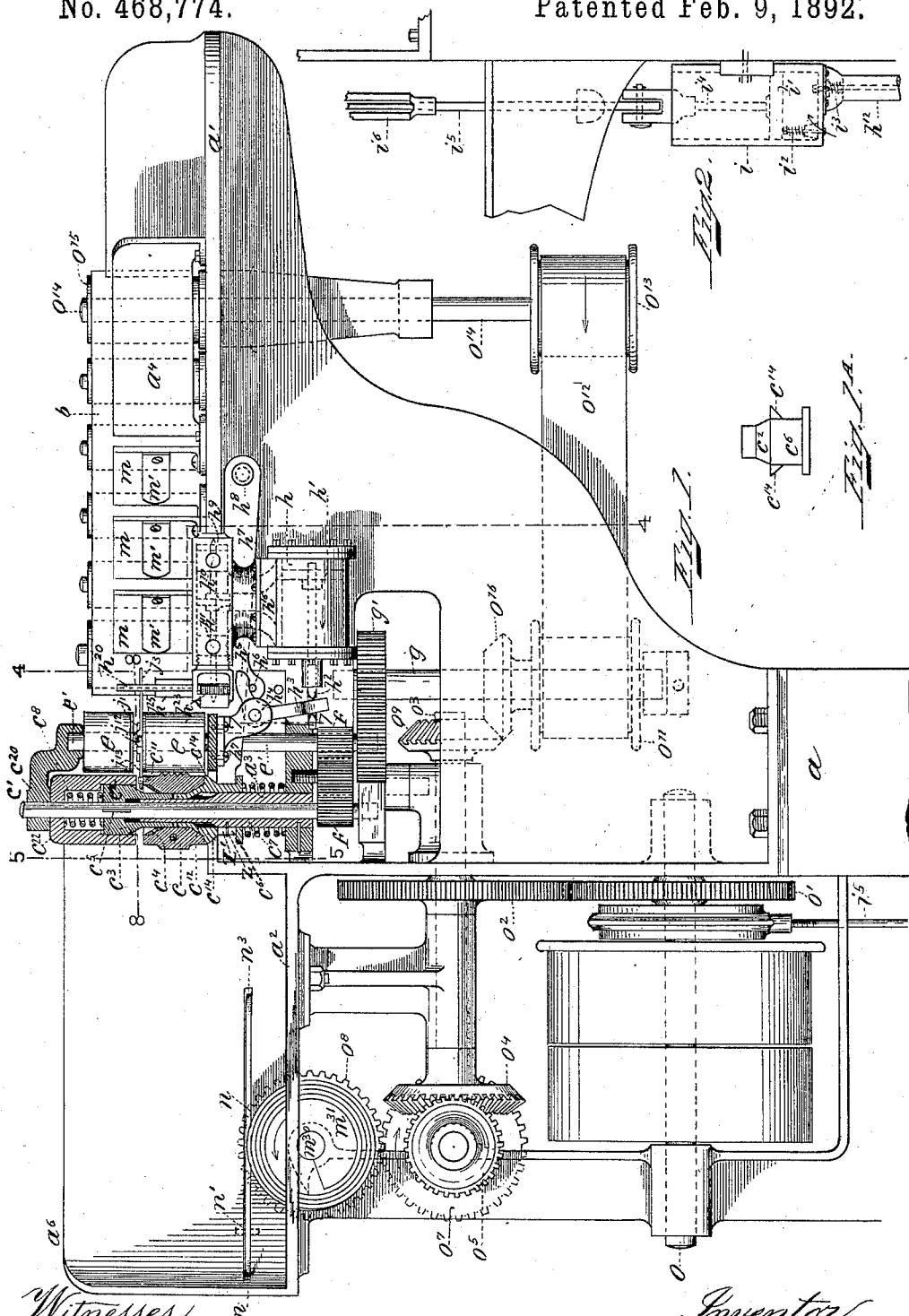
(No Model.)

5 Sheets—Sheet 1.

M. V. B. ETHRIDGE.
MACHINE FOR MARKING MAIL MATTER.

No. 468,774.

Patented Feb. 9, 1892.



Witnesses.
H. A. Hall.
Grothendike

Inventor.
M. V. B. Ethridge
by Night Brown & Co. Attys.

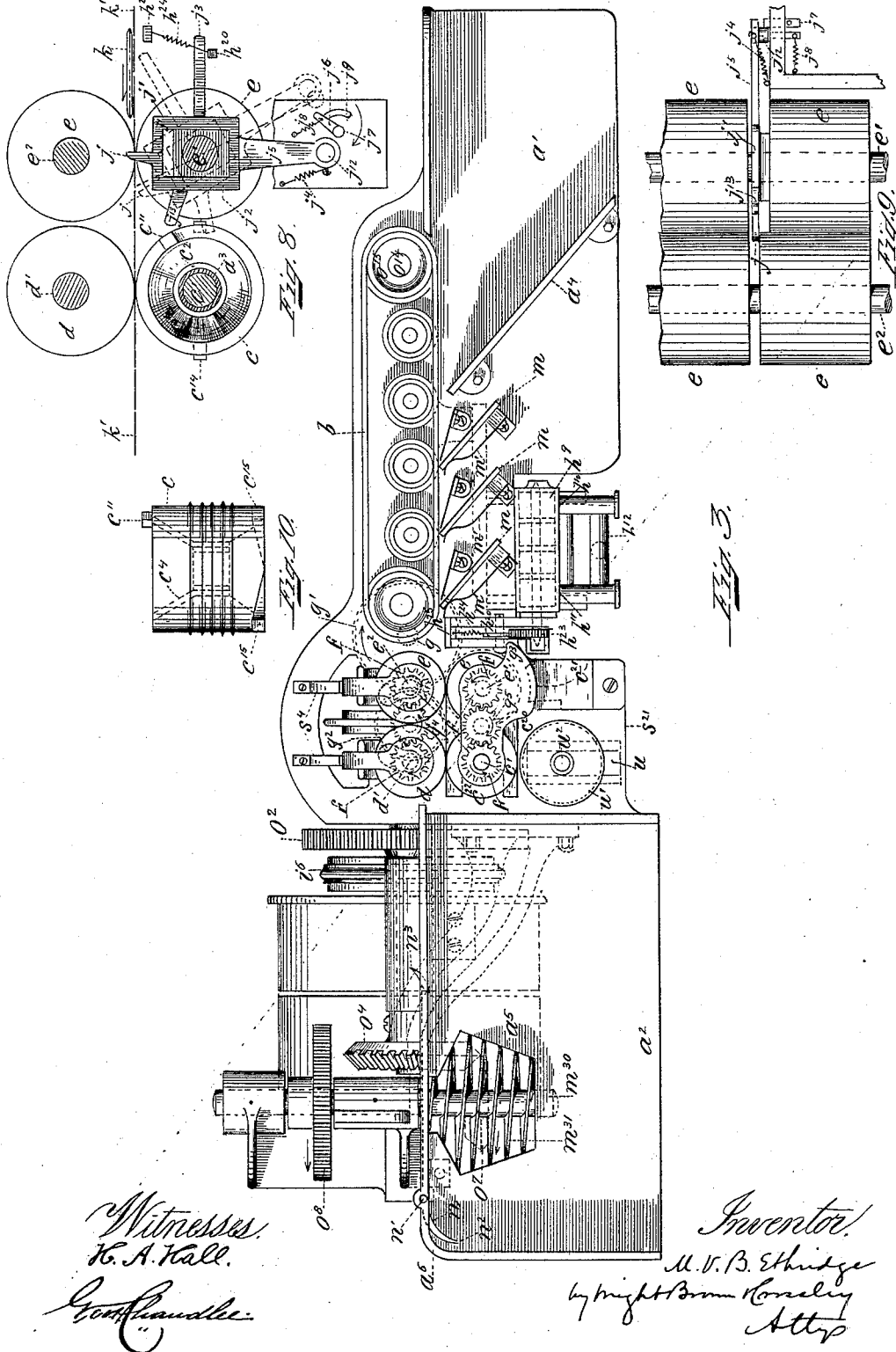
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M. V. B. ETHRIDGE.
MACHINE FOR MARKING MAIL MATTER.

No. 468,774.

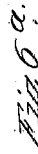
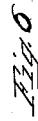
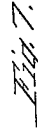
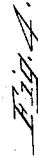
Patented Feb. 9, 1892.



5 Sheets—Sheet 3.

No. 468,774.

Patented Feb. 9, 1892.



Inventor!
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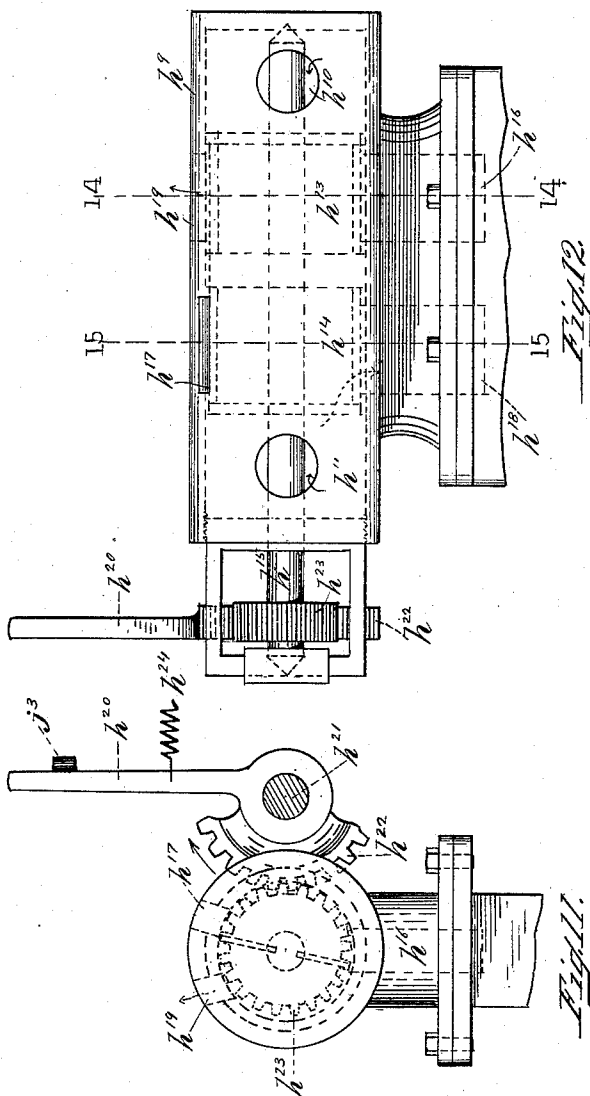
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5 Sheets—Sheet 4.

M. V. B. ETHRIDGE.
MACHINE FOR MARKING MAIL MATTER.

No. 468,774.

Patented Feb. 9, 1892.



Witnesses:
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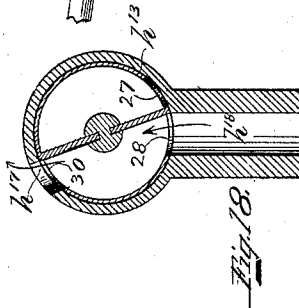
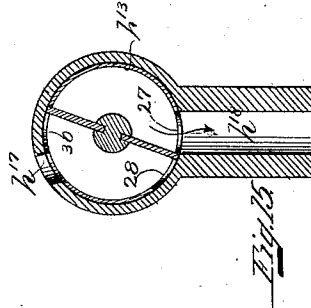
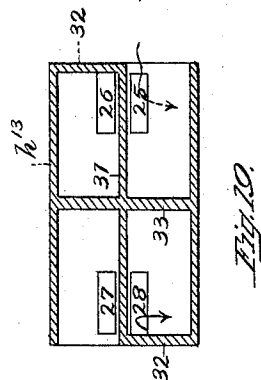
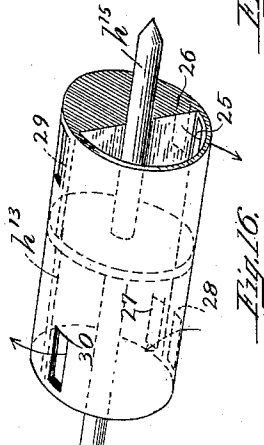
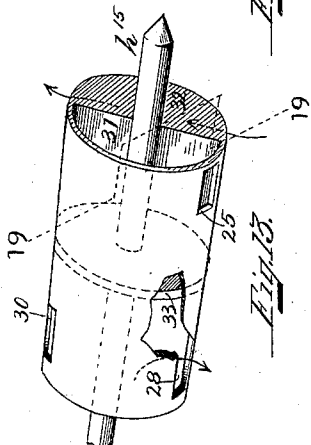
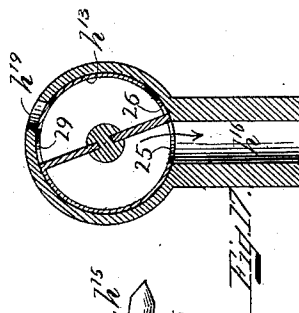
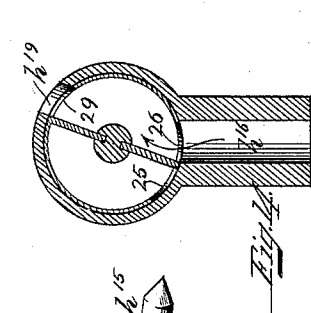
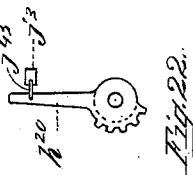
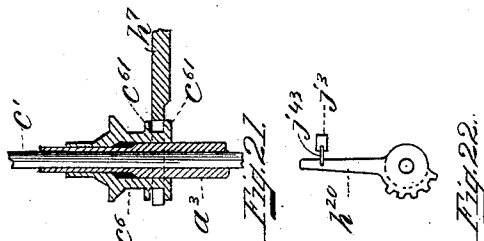
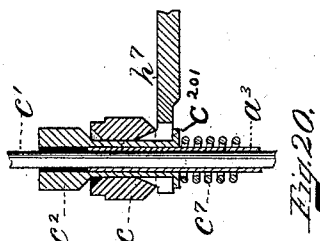
(No Model.)

5 Sheets—Sheet 5.

M. V. B. ETHRIDGE.
MACHINE FOR MARKING MAIL MATTER.

No. 468,774.

Patented Feb. 9, 1892.



Witnesses.
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P. A. McShane.

Inventor:
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by Knight Brown Horsley
Atty.

UNITED STATES PATENT OFFICE.

MARTIN V. B. ETHRIDGE, OF EVERETT, MASSACHUSETTS, ASSIGNOR TO THE
AMERICAN POSTAL MACHINES COMPANY, OF PORTLAND, MAINE.

MACHINE FOR MARKING MAIL-MATTER.

SPECIFICATION forming part of Letters Patent No. 468,774, dated February 9, 1892.

Application filed October 16, 1891. Serial No. 408,943. (No model.)

To all whom it may concern:

Be it known that I, MARTIN V. B. ETHRIDGE, of Everett, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Machines for Marking Mail-Matter, of which the following is a specification.

This invention relates to that class of machines for marking letters and other mail-matter in which a printing-roll or die-cylinder is caused to rotate by the movement of a letter toward it, the letter acting on a suitable starting device, which indirectly causes the die-cylinder to rotate at the proper time to print an impression upon the passing letter.

The invention has for its chief object to provide means for more efficiently operating the die-cylinder than heretofore and for causing the rotation of the die-cylinder by the action of a motor supplied with power in any suitable way, the motor acting to engage a driver with the die-cylinder, which is thus more positively and effectively operated than in machines of this class heretofore used, in which the die-cylinder is engaged with a driving-shaft and caused to rotate by the direct action of a trigger or starting device located in the path through which the letters pass to the die-cylinder, my improvement involving the employment of a starting device which acts only to release or set in operation the motor which performs the operation of starting the die-cylinder.

My invention therefore consists mainly in the combination, with a die-cylinder which is adapted to be connected with and disconnected from the shaft or driver that rotates it, of a motor adapted to establish the connection between the die-cylinder and its driver, a starting device located in the path through which the letters pass to the die-cylinder and adapted to release or start the motor, which is adapted to impart a given movement to the driver of the die-cylinder and thus connect said driver and cylinder, and means operated by the resulting rotation of the die-cylinder, whereby the motor is reset for its next operation.

The invention also includes the provision of means for arresting the rotation of the die-cylinder after it has performed its allotted

work, and thus holding it positively in a predetermined position preparatory to the next operation.

The invention also includes certain combinations and the construction of certain elements of an organized machine embodying my invention.

Of the accompanying drawings, forming a part of this specification, Figure 1 represents a side elevation of a machine embodying my invention, that portion of the machine which includes the die-cylinder, its driver, and locking or arresting devices being shown in section. Fig. 1^a represents a part detached. Fig. 2 represents a detached view of a portion of the machine, showing the air-pump which supplies power to the motor. Fig. 3 represents a top view of the machine. Fig. 4 represents a section on line 4 4 of Fig. 1, looking toward the left. Fig. 5 represents a section on line 5 5, Fig. 1, looking toward the right. Fig. 6 represents a side elevation of a portion of the machine, showing movable bearings or holders which support the impression-roll and one of the feed-rolls hereinafter referred to. Fig. 6^a represents an enlarged section on line 6^a 6^a, Fig. 5. Fig. 7 represents a section on line 7 7, Fig. 1, looking toward the right. Fig. 8 represents a section on line 8 8, Fig. 1, and a plan view of the parts below said line. Fig. 9 represents a side elevation of parts of the machine shown in Fig. 8. Fig. 10 represents a side view of the die-cylinder. Fig. 11 represents an end view, and Fig. 12 a side view, of the valve-chest and the valve-operating devices. Fig. 13 represents a perspective view of the valve. Figs. 14 and 15 represent sections on lines 14 and 15, Fig. 12. Fig. 16 represents a perspective view of the valve in a different position. Figs. 17 and 18 are sections on lines 14 and 15, Fig. 12, showing the valve in the position shown in Fig. 16. Fig. 19 represents a longitudinal section of the valve on the plane indicated by line 19 19, Fig. 16. Figs. 20, 21, and 22 represent modifications hereinafter referred to.

The same letters and numerals of reference indicate the same parts in all the figures.

In the drawings, *a* represents the supporting-frame, having a shelf or table *a'*, along which the letters to be marked are carried by

means such as a conveying-belt *b* and pressure devices co-operating therewith to the feed-rolls and printing mechanism presently described, and another table *a*², which receives the printed letters and is provided with a packing device, the packing-table being preferably located at a lower plane than the feeding or supply table, so that the printed letters, after leaving the table *a*¹, descend onto the packing-table. The feed-table is preferably formed to continuously support the letters not only while they are being impelled by the carrying-belt, but also while they are under the positive control of the feed-rolls and printing and impression rolls next described.

c represents the printing-roll or dye-cylinder, which is located above the table *a*¹ and is mounted on a fixed tubular journal or sleeve *a*³ and rotated by a continuously-rotating driver, which is composed of a shaft or spindle *c*¹, passing through said journal or sleeve, and a movable clutch on said shaft, the die-cylinder receiving motion from said driver only when connected therewith by the clutch, which is caused to connect the die-cylinder with the shaft by a letter approaching the die-cylinder, as hereinafter described, and maintains the connection until the die-cylinder has made a complete rotation, the connection being then automatically discontinued, so that the rotation of the die-cylinder ceases. A clutch or locking device is provided to arrest the die-cylinder and prevent it from rotating loosely at the moment of its disconnection from the shaft, so that the die is at all times positively controlled.

An impression-roll *d* co-operates with the die-cylinder in printing the letters, and the letters are positively presented to the impression-roll and die-cylinder by means of feed-rolls *e e*, arranged to receive the letters from the conveyor *b*. The impression-roll is affixed to a shaft *d*¹, and the feed-rolls *e e* are affixed to shafts *e*¹ *e*². The said shafts *c*¹, *d*¹, *e*¹, and *e*² are provided with gears *f* at their lower ends and are rotated by power communicated from a shaft *g* by means of a gear *g*¹ on said shaft meshing with an independent gear *g*² (shown in dotted lines in Fig. 3) and a gear *g*³, affixed to the shaft *e*¹, a gear *g*⁴, affixed to the independent gear *g*² and meshing with the gears *f f* on the shafts *e*² and *d*¹, and a gear *g*⁵, meshing with the gears *f f* on the shafts *e*¹ and *c*¹, as shown in Fig. 3, the feed-rolls, die-cylinder, driver, and impression-roll being rotated simultaneously by said gearing and all receiving motion from the shaft *g*. The shafts *e*¹ *c*¹ are journaled in bearings in an ear or flange *c*²⁰, formed on or attached to a standard or bracket *c*²¹, affixed to the supporting-frame. Said flange *c*²⁰ is shown in Figs. 1 and 4 as offset to accommodate the roll *c*²², hereinafter referred to, on the shaft *c*¹. The shafts *d*¹ and *e*² are journaled in bearings in yokes or frames *s s*, having ears *s*² *s*³, which are mounted to swing on a stud *s*³, Fig.

6, affixed to the supporting-frame, the lower end of said stud being attached to a bracket or ear *s*²⁰, Figs. 5 and 6, formed on a vertical plate *s*²², forming a part of the supporting-frame, while its upper end is engaged with the horizontal plate *s*²¹ of the supporting-frame. The lower end of one of the frames *s* rests and turns freely on the bracket *s*²⁰. The swinging movement of the frames *s s* enables the impression-roll and the feed-roll on the shaft *e*² to yield to the extent required by variations in the thickness of letters passing between the feed-rolls and between the impression-roll and die-cylinder. Springs *s*⁴, bearing on the frames *s*, act to normally press the rolls carried by said frames against the parts with which they co-operate.

The letter-operated mechanism that engages the die-cylinder with its driver is as follows: *c*², Fig. 1, represents a sleeve adapted to slide on the shaft *c*¹ and connected therewith by means of a feather or spline *c*⁵ on the shaft engaging a groove (not shown) in the sleeve, this connection causing the sleeve to rotate with the shaft and permitting it to slide thereon. The sleeve *c*² is provided with a clutch surface or member *c*³, formed to engage a corresponding clutch surface or member *c*⁴ on the die-cylinder *c*, said members being preferably formed to act as a clutch of the frictional type, although they may be formed to act positively, if preferred. In the construction shown in Figs. 1 and 6^a the sleeve *c*² is normally held in the position shown in Fig. 1 to make the clutch members inoperative by means of a sleeve *c*⁶, which is mounted to slide on the fixed bearing or sleeve *a*³, and is normally raised by a spring *c*⁷ into contact with the sleeve *c*². A spring *c*⁸ is arranged to press the sleeve *c*² in the opposite direction, and thus operatively connect the two clutch members; but said spring is weaker than the spring *c*⁷. Hence it acts only when the spring *c*⁷ and sleeve *c*⁶ are retracted, as presently described. The clutch members *c*³ *c*⁴ are therefore normally separated by the spring *c*⁷ leaving the die-cylinder loose upon its driving-shaft.

*c*²² is a roll or drum mounted on the shaft *c*¹ and having a cavity which receives the spring *c*⁸, said roll being formed to cover the driver-clutch collar *c*² and to co-operate with the impression-roll *d* in supporting and guiding the letters. The sleeve *c*⁶ is prevented from rotating by means of a pin or stud *z*, affixed to the sleeve or bearing *a*³ and passing through a slot *z*¹ in said sleeve.

To engage the die-cylinder with the driver above described I employ a motor which is caused to act by starting device operated by the movement of a letter toward the printing-die, and acts to forcibly retract the sleeve *c*⁶ and spring *c*⁷, thus permitting the driver-clutch to engage and rotate the die-cylinder, said motor being reset for another action by the resulting rotation of the die-cylinder. I have here shown as the motor a cylinder *h*,

suitably affixed to the supporting-frame, and a piston h' in said cylinder, means being provided, as presently described, to introduce compressed air or other fluid under pressure into the cylinder in such a manner as to move the piston first in one direction and then back. The piston has a rod h^2 extending through one end of the cylinder and engaged with a lever h^3 , which is affixed to a rock-shaft h^4 , mounted in fixed bearings and provided with an arm h^5 , which bears on a stud h^6 on a lever h^7 . One end of said lever h^7 is pivoted at h^8 to the supporting-frame, and its other end bears on a flange on the lower end of the sleeve c^6 . When the piston and its rod are moved in the direction indicated by the arrow in Fig. 1, the arm h^5 is moved to depress the lever h^7 , said lever being thus caused to retract the sleeve c^6 and spring c^7 and permit the spring c^8 to force the driver-clutch c^2 into engagement with the die-cylinder.

The motor-cylinder h is provided with a valve chest or casing h^9 , having inlets at h^{10} h^{11} for the reception of the piston-impelling fluid, said inlets being connected by a suitable arrangement of pipes h^{12} with a source of supply of the impelling-fluid, which source is here shown as a pump i , (see Fig. 2,) the piston of which is operated by a connection with the driving-shaft of the machine, as hereinafter described, said pump being connected with the conducting-pipe h^{12} in such a manner as to force compressed air therethrough to the inlets h^{10} h^{11} . In the valve-chest h^9 is a rotary cylindrical valve h^{13} , affixed to a shaft or spindle h^{15} , adapted to oscillate in bearings in the valve-casing, said valve being constructed and arranged so that when said shaft is turned to the position shown in Figs. 16, 17, and 18 the impelling-fluid will pass to one end of the cylinder through a passage h^{16} , and thus impel the piston in the direction indicated by the arrow in Fig. 1, the fluid in the opposite end of the cylinder at the same time exhausting through a passage h^{18} and an exhaust-port h^{17} , which is connected therewith by the valve h^{13} . When the shaft h^{15} is turned to its other position, (shown in Figs. 13, 14, and 15,) the impelling-fluid is permitted to pass through the passage h^{18} into the opposite end of the cylinder, thus retracting the piston, the fluid exhausting from the other end of the cylinder through the passage h^{16} and an exhaust-port h^{19} , which is then connected by the valve with the last-named passage. The valve is provided at one end with ports 25 26 in its lower portion, which connect alternately with the passage h^{16} and with a port 29 in its upper portion, which in one position of the valve connects with the exhaust-port h^{19} . (See Figs. 14 and 17.) The opposite end of the valve has ports 27 28 in its lower portion, connecting alternately with the passage h^{18} and a port 30 in its upper portion, which in one position of the valve connects with the exhaust-port h^{17} . (See Figs. 15 and 18.) The interior of the valve is divided by partitions 31 and 33 into cham-

bers, two of which are closed at the ends of the cylinder by walls 32 32. One of said chambers connects the exhaust-ports 26 and 29 at one end of the valve, Fig. 14, while the other chamber connects the exhaust-ports 28 and 30 at the other end of the valve, Fig. 18. The chambers containing the inlet-ports 25 and 27 are open at the ends of the valve and both receive the impelling-fluid.

The valve-chest is longer than the valve (see Fig. 12) and contains chambers at the ends of the valve which receive the impelling-fluid from the inlet h^{10} h^{11} , the valve being therefore at all times balanced, so that it may be easily turned from one position to the other by the spring h^{24} and arm j^3 , as next described.

The valve is normally held in the position shown in Figs. 13, 14, and 15 by means of an arm j^3 and devices co-operating therewith, as hereinafter described, said arm acting on the valve through a lever h^{20} , pivoted at h^{21} to the supporting-frame and provided with a gear-segment h^{22} , meshing with a gear or pinion h^{23} , affixed to the shaft h^{15} .

h^{24} represents a spring engaged at one end with the lever h^{20} and at its other end with a fixed arm or other support h^{25} , the stress of said spring being exerted to move the lever h^{20} from the position in which it is held by the arm j^3 when said arm is displaced by a moving letter, as presently described, the shaft h^{15} and its valve being moved by the spring to the position required to admit the impelling-fluid to the right-hand end of the cylinder, as viewed in Fig. 1, and permit the fluid to exhaust from the opposite end of the cylinder.

j represents a finger or projection, which is arranged in the path through which a letter moves in entering between the feed-rolls, said finger being preferably arranged at about the point of nearest approach of said rolls, as shown in Fig. 8. Said finger is formed on a yoke or frame j' , which has a sliding motion on a block j^2 , mounted loosely on the shaft e' , the slot or opening in the frame j' , that receives the block j^2 , being longer than said block, so that the frame j' and the projection j thereon are adapted to move toward and from the path of the letter, the loose connection of the block to the shaft e' permitting said block and the frame j' to turn or oscillate on the shaft e' . The yoke or frame j' is provided with an arm j^3 , which is arranged to bear upon the lever h^{20} , as shown in Fig. 8. When the letter k is advancing in the direction indicated by the arrow along the path indicated by the dotted line $k' k'$ in Fig. 8 and strikes the finger or projection j , it moves the said finger and the yoke or frame j' and its attachments from the position shown in full lines to that shown in dotted lines in Fig. 8. This movement causes the arm j^3 to move toward the fixed support h^{25} of the spring h^{24} , and thus permits said spring to move the lever h^{20} to the position required to change the valve h^{13} to the position required to give

the piston its forward or clutch-operating motion. As the finger or projection j is moved in the arc of a circle by the letter, it is gradually displaced out of the path of the letter, as shown by dotted lines, so that the letter passes by the projection on its way to the die-cylinder. A spring j^4 is connected to the arm j^5 , formed on the yoke or frame j' , said spring being connected at one end with the supporting-frame and arranged so that it normally holds the yoke or frame and its projection j in the position shown in full lines in Fig. 8, the spring yielding to permit the displacement of the projection and frame by the letter.

j^6 represents a finger, which is pivotally connected at j^7 to the supporting-frame, and is normally held by the spring j^8 in position to encounter a stud j^{12} on the lower end of the arm j^5 when the latter is moving from its full-line to its dotted-line position. The swinging end of said finger has a projection which enters a segmental slot j^9 in the supporting-frame, and is held by the spring j^8 against one end of said slot. When the arm j^5 is moving to its dotted-line position, its stud j^{12} passes over the finger j^6 , the latter yielding and swinging horizontally until the stud passes over it, the spring j^8 returning the finger j^6 to the position shown after the arm j^5 has passed to its dotted-line position. When the yoke or frame j' is restored to its normal position by the spring j^4 , the arm j^5 strikes the under side of the finger j^6 and is caused thereby to move downwardly, thus carrying the yoke or frame j' and finger j downwardly during the return movement of said finger, so that the finger assumes a position at right angles to the path of the letter and is ready to re-enter said path as soon as the passing letter has passed on, the spring j^4 pressing the finger upwardly against the letter and raising it to its operative position after the passage of the letter.

The operation of the mechanism above described is as follows: The letters are presented to the belt or carrier b by a clerk standing by the table a' , the letters being guided toward the belt by a diagonal guide a^4 , attached thereto. (See Fig. 3.) A series of swinging arms or fingers m , pressed by springs m' toward the belt, press the letters against the belt as they pass along and thus insure the frictional contact between the letters and belt necessary for the carrying of the letters forward by the belt. Each letter is thus delivered to the feed-rolls $e e$, which are continuously rotated by the means above described. The feed-rolls impart a positive forward movement to the letter and force it against the projection or finger j , which is displaced by the letter, as described, so that the lever h^{20} is released by the arm j^3 . The spring h^{24} thereupon acts through the lever h^{20} , segment h^{22} , gear h^{23} , and shaft h^5 on the valve h^{13} and changes its position so that compressed air is admitted through the passage h^{16} to the right-hand end of the cylinder.

The piston being normally at this end of the cylinder, the admission of air thereto forces the piston and its rod in the direction indicated by the arrow in Fig. 1, thus moving the lever h^7 and causing it to retract the clutch-displacing sleeve. The driver-clutch c^3 is then engaged by the spring c^8 with the die-cylinder clutch c^4 , and the die-cylinder thereupon commences to rotate positively with the shaft c' , the printing characters or surfaces on the die-cylinder being thus caused to act on the letter at a given point in the forward movement thereof. The impression-roll d , which is continuously rotated, co-operates with the die-cylinder during the rotation thereof in feeding the letter forward and delivering it upon the packing-table a^2 . The die-cylinder is provided with a tooth or projection c^{11} at its upper end, which strikes an arm j^{18} on the yoke or frame j' when the die-cylinder has nearly completed its rotation and restores the said yoke and the finger j to their operative position just at the completion of a full rotation of the die-cylinder. This movement of the yoke or frame j' causes the arm j^3 to move the lever h^{20} against the stress of the spring h^{24} , thus shifting the valve to the position required to retract the piston and release the lever h^7 , whereupon the spring c^7 raises the sleeve c^6 and disconnects the driver-clutch from the die-cylinder. The sleeve c^6 is provided with a clutch-surface c^{12} , which is brought in contact with a similar clutch-surface c^{13} on the die-cylinder by the upward movement of the sleeve, thus stopping the rotation of the die-cylinder. At the same time two lugs or ears $c^{14} c^{14}$, Fig. 1^a, on the sleeve c^6 enter recesses $c^{15} c^{15}$, Fig. 10, in the lower end of the die-cylinder, and by bearing against shoulders at the ends of said recesses determine with exactness the position in which the die-cylinder stops, so that when said cylinder is again rotated its printing characters are exactly timed as to the point where they commence to print the letter.

It will be seen from the foregoing that each letter on its way to the die-cylinder actuates the finger j and arm j^3 , the latter releasing the lever h^{20} and permitting the spring h^{24} to shift the valve, thus causing the motor to perform the operation of connecting the die-cylinder with its driver. It will also be seen that the die-cylinder in completing the resulting rotation acts by its tooth c^{11} to restore the motor-starting device to its operative position, and thus by again changing the position of the valve reset or prepare the motor for its next operation.

By the employment of a motor set in operation by a letter-operated starting device to connect the die-cylinder with its driver, I enable each moving letter to quickly make the marking device operative without imposing any excessive and injurious duty on the moving letters, the only force or pressure required of the letters against the finger j to shift the valve being that involved in overcoming the

slight excess of force of the spring j^4 over that of the spring h^{24} , the spring j^4 being sufficiently stronger than the spring h^{24} to enable the arm j^3 to hold the device h^{20} against the force of the spring h^{24} when there is no pressure against the finger j . The motor therefore makes the machine more reliable and positive in its operation than a machine in which the die-cylinder is connected with its driving-shaft wholly by the force or pressure exerted by the moving letters against a starting device or trigger.

I do not limit myself to the particular motor and the means for starting and resetting the same here shown, but may employ any other suitable motor and starting and resetting devices without departing from the spirit of my invention. An equivalent motor is shown and described in another application filed by me concurrently herewith, which consists of an electro-magnet, the armature of which is secured to the lever h^7 , said magnet being energized by the action of a circuit-closer operated by the movement of the finger j by a letter, and thus caused to attract the armature with sufficient force to give the lever h^7 the movement which connects the driver-clutch with the die-cylinder, the circuit being broken by the return of the finger j to its starting position, thus releasing the armature and permitting the separation of the driver-clutch from the die-cylinder.

The packing-table a^2 has an opening a^5 , in which is located the packing-screw m^{31} . Said screw is attached to a shaft m^{30} , arranged at right angles with the path in which the letters are moved forward by the feeding and printing mechanism. The letters as they are forced upon the packing-table enter the spaces between the convolutions of the screw, and are moved by the rotation of the latter in the direction indicated by the arrow in Fig. 3. A guard or wall a^6 extends along two sides of the table to prevent the letters from falling off. A finger n is pivoted at n' to said wall and has a curved end n^2 arranged to be struck by the forward end of an advancing letter, the blow of the letter causing the part n^3 of said finger to swing against the side of the letter and force it laterally out of the path in which it advances to the screw, so that it will not obstruct the succeeding letter.

o represents the driving-shaft of the machine, which is connected by gears o' o^2 with a shaft o^3 . One end of the shaft o^3 is connected by bevel-gears o^4 o^5 with a shaft o^6 , which in turn is connected by gears o^7 o^8 with the shaft m^{30} , that rotates the packing-screw. The other end of the shaft o^3 is connected by bevel-gears o^9 o^{10} with the shaft g , which operates the feed-rolls, impression-roll, and die-cylinder driver, as above described. The shaft g has a pulley o^{11} , which is connected by a belt o^{12} with a pulley o^{13} on a shaft o^{14} , on which is a pulley o^{15} , which drives the conveying-belt b .

The air-pump i , Fig. 2, comprises a cylinder

attached to the supporting-frame, a piston i' in said cylinder, and spring-controlled inlet and outlet valves i^2 and i^3 , the valve i^2 yielding inwardly to admit air to the cylinder when the piston is raised, while the valve i^3 yields to permit the air to pass under pressure to the pipe h^{12} when the piston descends. The rod i^4 of the piston is connected by a rod i^5 with a strap i^6 on an eccentric on the driving-shaft o .

The construction of various parts of the above-described mechanism may be modified in several particulars without departing from the spirit of the invention.

In Fig. 20 I show the driver-clutch sleeve c^2 extended down to the lever h^7 , the spring bearing directly against the lower end of said sleeve, the sleeve c^6 being omitted. In this case the lever h^7 bears on a flange c^{201} on the clutch-sleeve, and is therefore adapted to depress said sleeve without the aid of the spring c^8 , the latter being omitted. It will be seen, therefore, that the motor may act directly in connecting the driver-clutch with the die-cylinder instead of acting only to release the clutch, so that the latter may be connected with the die-cylinder by the spring c^8 .

In Fig. 21 I show the sleeve c^6 provided with two flanges c^{61} and c^{62} , arranged to bear on opposite sides of the lever h^7 , so that said lever moves the sleeve c^6 positively in both directions, the spring c^7 being omitted, it being understood that with such construction suitable means will be employed to insure the operation of the lever h^7 positively in both directions by the motion of the lever h^3 .

In Fig. 22 I show the arm j^3 connected by a link j^{43} with the lever h^{20} , and thus adapted to move said lever in both directions, the spring h^{24} being omitted.

u , Figs. 3 and 5, represents a slide, which is movable toward and from the die-cylinder c on guides on the plate s^{21} and carries an inking-roll u' , having a handle u^2 , by which the operator can remove the ink-roll into contact with the die-cylinder. A spring u^3 , attached at one end to an arm n^4 on the slide u and at the other end to a fixed arm u^5 , normally separates the inking-roll from the die-cylinder.

I claim—

1. In a machine for marking mail-matter, the combination, substantially as hereinbefore set forth, of a die-cylinder, a driver having a clutch normally separated from the die-cylinder, a motor, a motor-starting device arranged in the letter-path, devices controlled by the motor, whereby the clutch is connected with the die-cylinder when the motor is operated, and means for resetting the motor by the rotation of the die-cylinder, as set forth.

2. In a machine for marking mail-matter, the combination of a die-cylinder, a driver having a clutch normally separated from and adapted to be engaged with the die-cylinder, a motor, a motor-starting mechanism operated by an advancing letter, devices controlled by the motor, whereby the clutch is connected

with the die-cylinder when the motor is operated, devices operated by the resulting rotation of the die-cylinder to reset the motor for its next operation, and a die-cylinder-locking device engaged with the motor and adapted to be displaced by the clutch-operating movement of the motor and made operative by the resetting movement of the motor, as set forth.

3. In a machine for marking mail-matter, the combination of a die-cylinder mounted on a fixed sleeve or journal, a driver comprising a rotating shaft or spindle and a clutch rotating with and movable on said spindle, a spring adapted to engage the clutch with the die-cylinder, a stronger spring adapted to normally displace the driver-clutch, a motor adapted to displace said stronger spring and thereby permit the connection of the driver-clutch with the die-cylinder, a motor-starting device operated by a moving letter, and means operated by the rotation of the die-cylinder for resetting the motor and permitting the displacement of the driver-clutch, as set forth.

4. In a machine for marking mail-matter, the combination of a die-cylinder mounted on a fixed sleeve or journal, a driver comprising a rotating shaft or spindle, and a clutch rotating with and movable on said spindle, a spring adapted to automatically engage the clutch with the die-cylinder, a stronger spring adapted to displace the driver-clutch, a lever adapted to retract said stronger spring and thus permit the operation of the driver-clutch, and means, substantially as described, for operating the said lever, as set forth.

5. In a machine for marking mail-matter, a die-cylinder mounted on a fixed sleeve or journal, combined with a driver comprising a rotary shaft or spindle and a clutch rotating with and movable on said spindle, a spring adapted to engage the driver-clutch with the die-cylinder, a stopping-sleeve having means for engaging and locking the die-cylinder and provided with an actuating-spring which is stronger than the driver-clutch spring, a motor adapted to displace the stopping-sleeve and permit the operation of the driver-clutch, a motor-starting device operated by a moving letter, and means operated by the rotation of the die-cylinder for resetting the motor and permitting the action of the stopping-sleeve, as set forth.

6. In a machine for marking mail-matter, the combination, with letter-feeding mechanism and an impression-roll, of a die-cylinder, a driver having a clutch adapted to engage the die-cylinder and normally separated therefrom, a motor, including a cylinder, a piston and a lever operated by movements of said piston, connections between said lever and the driver-clutch, whereby said clutch is made operative by a movement of the piston in one direction, means for operating the clutch, a motor-starting device, including a valve and a casing therefor controlling the admission and exhaust of an impelling-fluid to and from

said cylinder, a finger normally in the letter-path, connections between the finger and valve, whereby the valve is held in one position when the finger is in the letter-path and in another position when the finger is out of the letter-path, the valve being turned to its motor-starting position by the displacement of the finger from the letter-path, and a tooth or projection on the die-cylinder adapted to co-operate with said motor-starting mechanism in resetting the motor during the rotation of the die-cylinder, as set forth.

7. In a machine for marking mail-matter, the combination, with letter-feeding mechanism and an impression-roll, of a die-cylinder, a driver having a clutch adapted to engage the die-cylinder and normally separated therefrom, a motor, including a cylinder, a piston and a lever operated by movements of the piston, connections between said lever and driver-clutch, whereby said clutch is made operative by a movement of the piston in one direction, means for operating the clutch, the motor-starting mechanism, including an oscillatory valve and a casing therefor adapted to control the admission and exhaust of an impelling-fluid to and from the cylinder, a valve-operating lever engaged with the shaft of said valve, a movable yoke or frame having a finger arranged to stand in the letter-path, a spring whereby said finger is yieldingly held in the letter-path and an arm arranged to bear on the valve-operating lever, said arm holding the valve in its motor-resetting position through the operating-lever when the finger is in the letter-path, and means, such as a spring h^{24} , whereby the valve is caused to assume its motor-starting position when the finger is displaced from the letter-path by an advancing letter, as set forth.

8. In a machine for marking mail-matter, the combination, with letter-feeding mechanism and an impression-roll, of a die-cylinder, a driver having a clutch adapted to engage the die-cylinder and normally separated therefrom, a motor, including, first, a cylinder; secondly, a piston therein; thirdly, a lever adapted to be moved by said piston, and, fourthly, connections between said lever and the piston, whereby the lever is given an operating movement by the forward movement of the piston, devices controlled by the motor, whereby the clutch is connected with the die-cylinder when said operating movement takes place, motor-starting mechanism operated by an advancing letter to give the piston its forward movement, and means operated by the rotation of the die-cylinder to give the piston a backward movement, as set forth.

9. In a machine for marking mail-matter, the combination, with a die-cylinder, a driver having a clutch normally separated from and adapted to be engaged with the die-cylinder, a motor, including a cylinder, a piston therein, and a lever adapted to be moved by said piston, of devices controlled by the motor whereby the clutch is connected with the die-

cylinder when the motor is operated, motor-starting mechanism consisting of a movable yoke or frame having a finger yieldingly held in the letter-path, an oscillatory valve and a casing therefor adapted to control admission and escape of an impelling-fluid to and from said cylinder, a valve-operating lever having a gear-segment meshing with a gear in the shaft of the valve, a spring arranged to move the valve through said lever to position to give the motor its clutch-operating movement, an arm on said yoke or frame arranged to prevent the action of said spring when the finger is in the letter-path, the spring being permitted to act by the displacement of said finger, and a tooth or projection on the die-cylinder adapted to engage another arm on said yoke or frame during the rotation of the die-cylinder and thereby move the yoke or frame to its starting position; thus causing the movement of the valve to the position for resetting the motor, as set forth.

10. The combination, with a die-cylinder, a driver having a clutch normally separated from and adapted to be engaged with the die-cylinder, a motor which includes a cylinder, a piston therein, and a lever adapted to communicate motion from said piston, and devices controlled by the motor whereby the clutch is connected with the die-cylinder when the motor is operated, of a motor-starting mechanism, including a valve chest or casing connected with the opposite ends of the cylinder by two passages and provided with two inlets for an impelling-fluid and two exhaust-ports, a valve in said casing having two pairs of ports, each adapted to coincide alternately with one of said passages and with two exhaust-ports adapted to coincide alternately with the exhaust-ports of the casing, said valve being subdivided, as described, so that one port of each pair is separated from the other, a spring-pressed operating-lever engaged with the shaft of the valve and adapted to hold the valve in one of its positions, a spring-controlled lever-actuating yoke or frame having a finger yieldingly held in the letter-path, and an arm arranged to force the valve through the operating-lever to its other position against the stress of the operating-lever spring, as set forth.

11. The combination, with the feed-rolls, impression-roll, and die-cylinder, of a driver having a clutch normally separated from and adapted to be engaged with the die-cylinder, a motor, devices controlled by the motor adapted to connect the clutch with the die-cylinder, said motor including a cylinder, a piston therein, a lever adapted to communicate motion from said piston, a valve chest or casing, and a valve therein, an operating-lever engaged with said valve, the yoke or frame mounted to both slide and oscillate on the shaft of one of the feed-rolls and provided with a finger arranged to move the valve-operating lever, a spring to yieldingly retain said yoke or frame in the position from which it is adapted to be moved by a letter, and a deflector, such as j^b , arranged to yield to the movement imparted to the yoke or frame by a letter and to obstruct the return movement caused by the spring, whereby the yoke or frame is retracted during its return movement and prepared to re-enter the letter-path in the proper position, as set forth.

12. In a machine for marking mail-matter, the combination of a die-cylinder, a driver therefor having a clutch which is normally disconnected from the die-cylinder, a motor, including a cylinder and a piston therein, a lever adapted to communicate motion from said piston, devices controlled by the motor, whereby the clutch is connected with the die-cylinder when the motor is operated, an air-pump or compressor operated by the power of the machine to supply the motor with compressed air, a motor-starting mechanism including a valve controlling the admission and exhaust of the compressed air, and devices operated through the agency of an advancing letter to give the motor its clutch-operating movement, as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 3d day of October, A. D. 1891.

MARTIN V. B. ETHRIDGE.

Witnesses:

C. F. BROWN,
A. D. HARRISON.