No. 711,154. Patented Oct. 14, 1902.

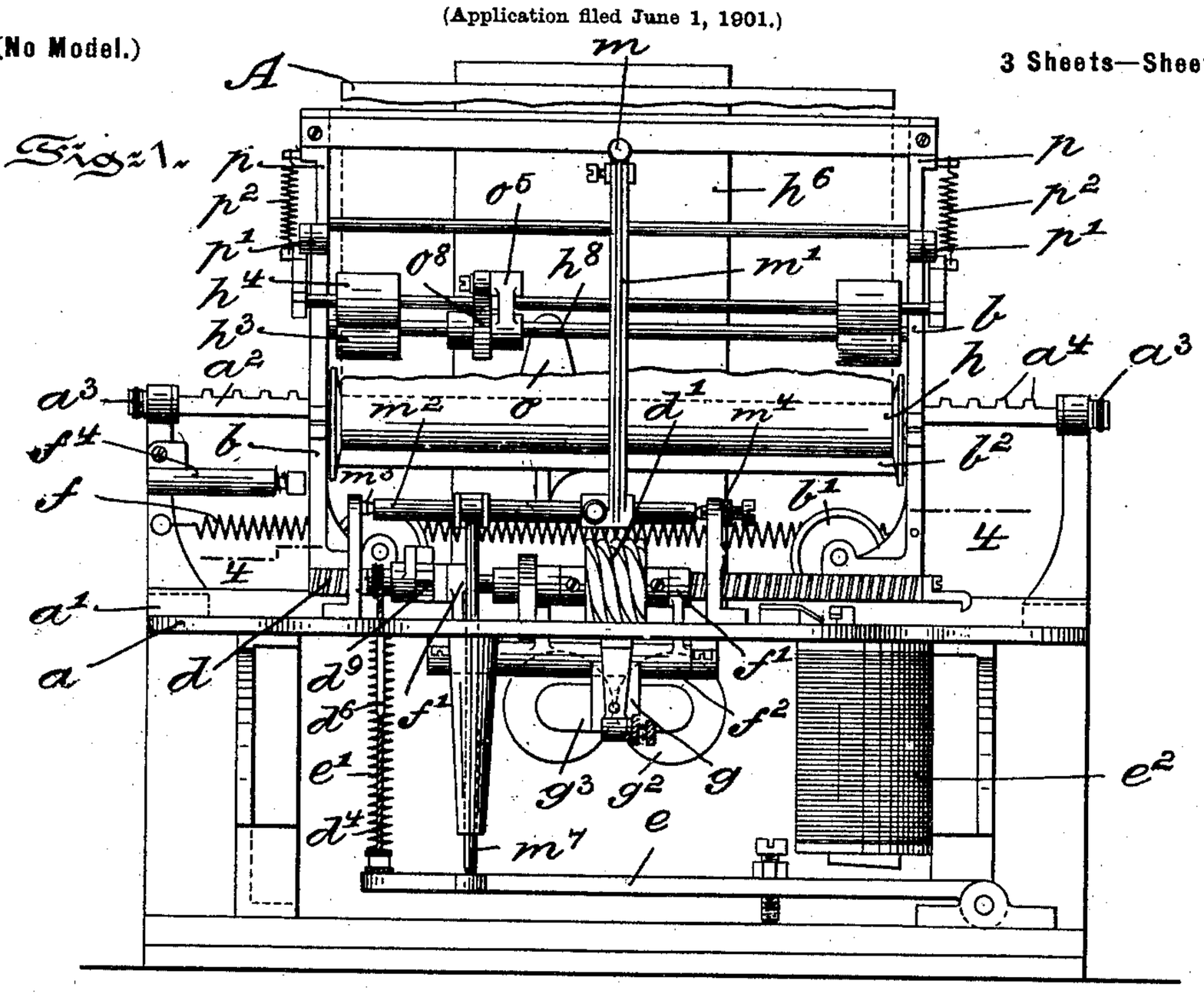
R. A. FOWDEN.

PAPER CARRIAGE FOR TYPE PRINTING MACHINES AND MECHANISM FOR CONTROLLING SAME.

(Application filed June 1, 1901.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1.



A

Fig. 2.

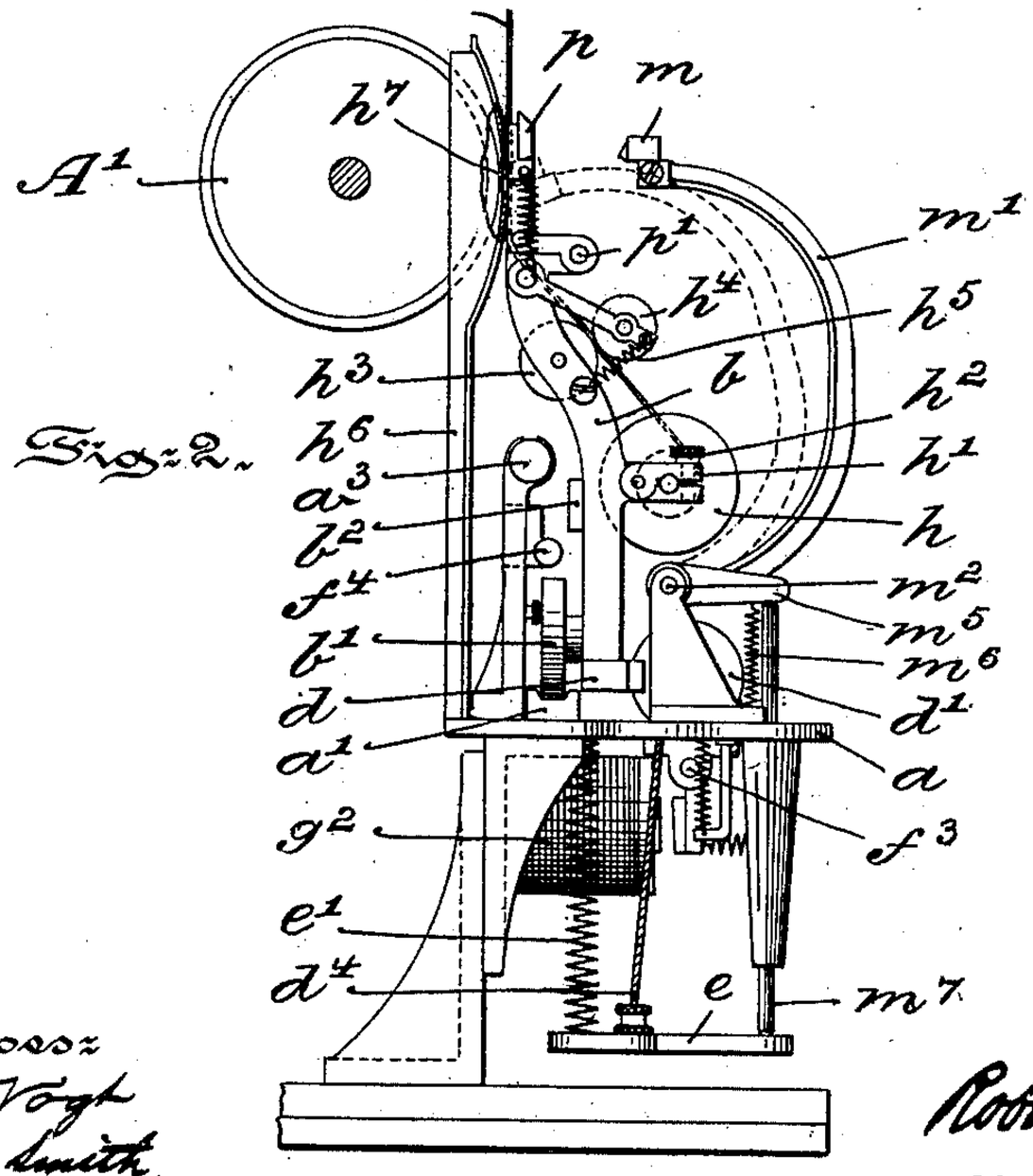


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Fig. 3.

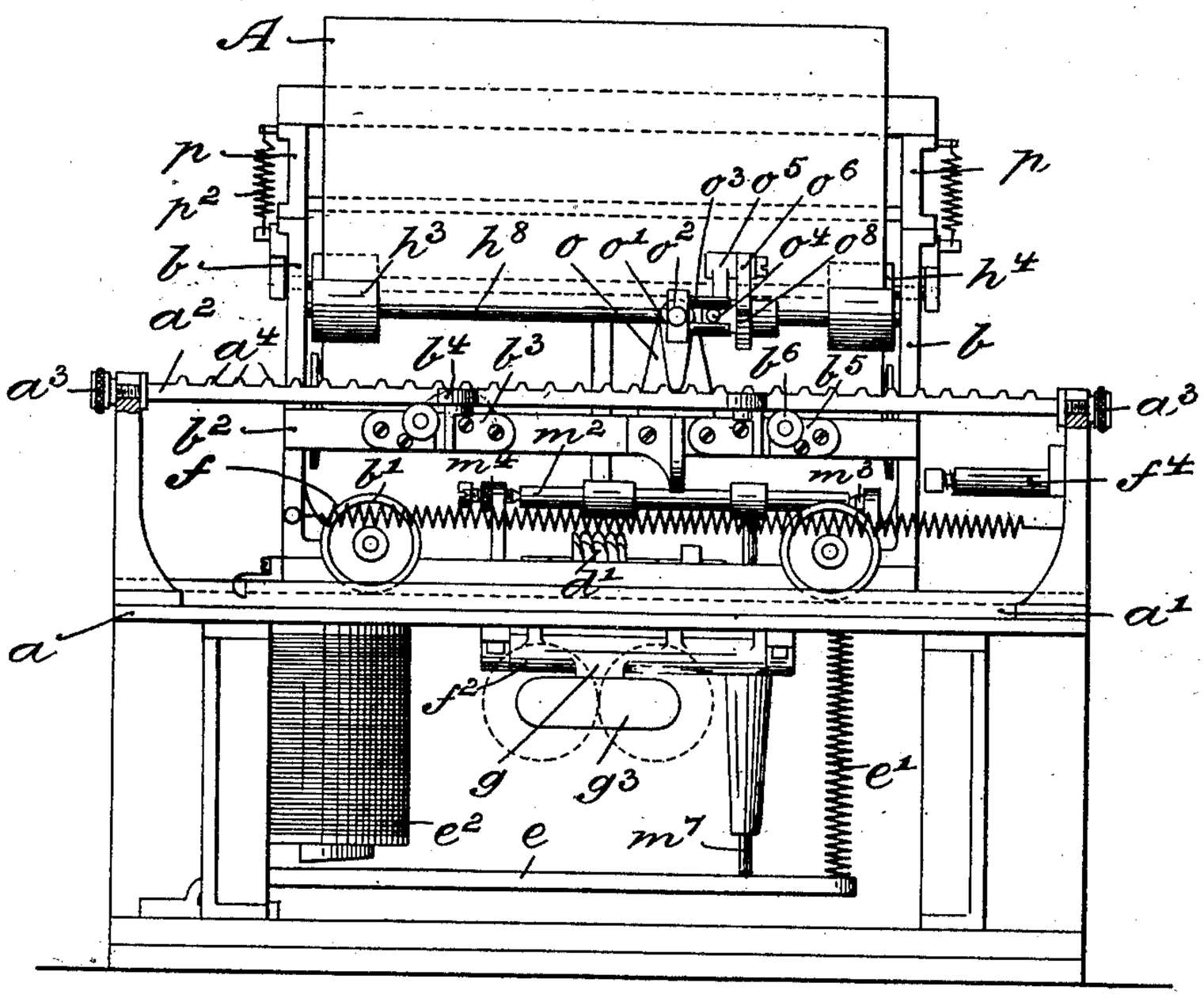
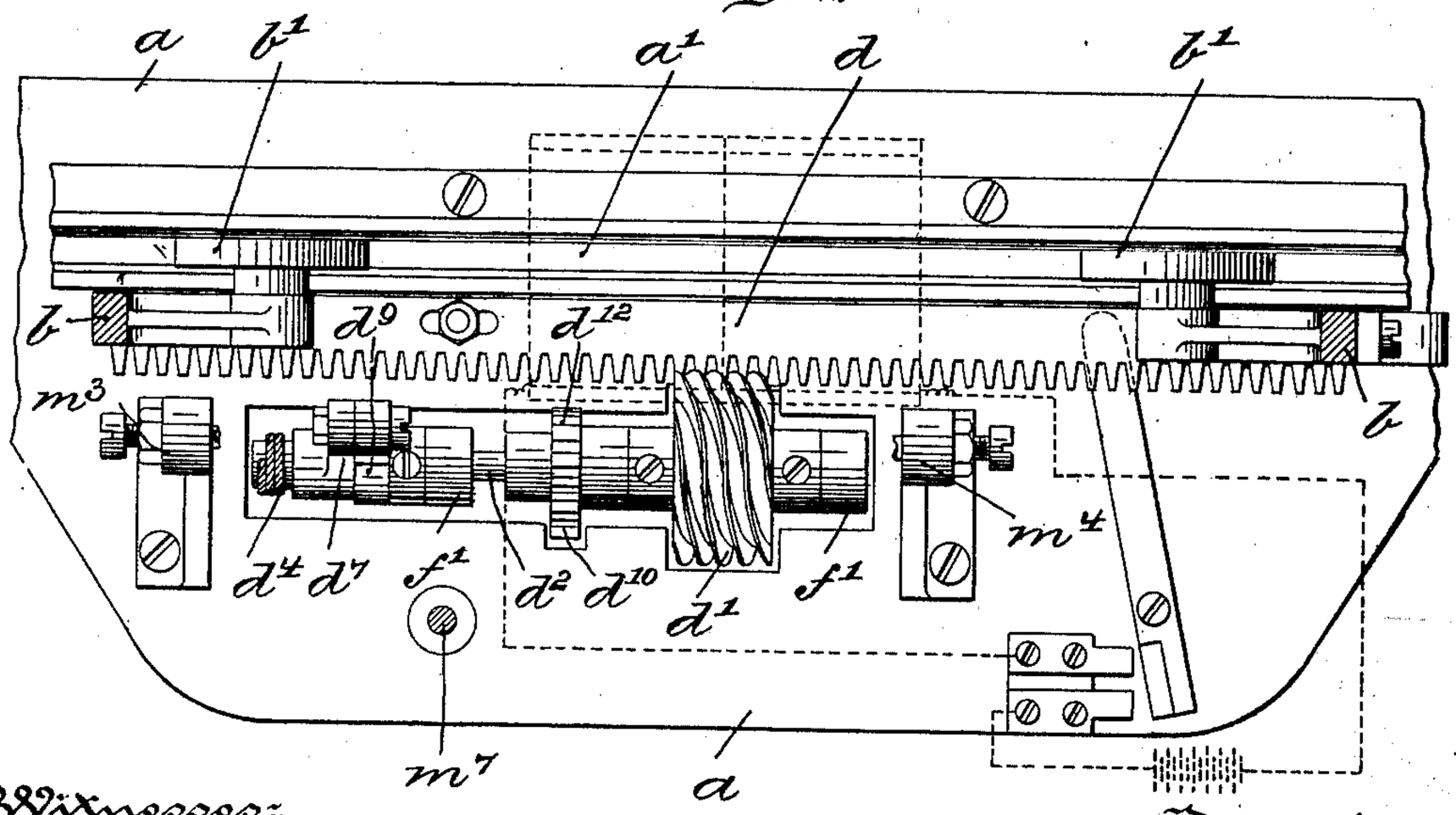


Fig. 4.



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(No Model.) 3 Sheets—Sheet 3.

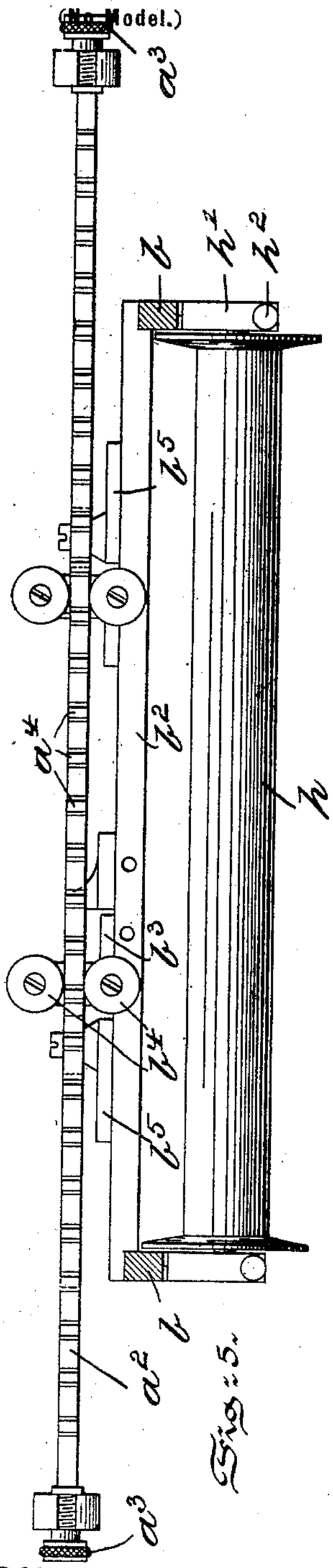

Fig. 5.

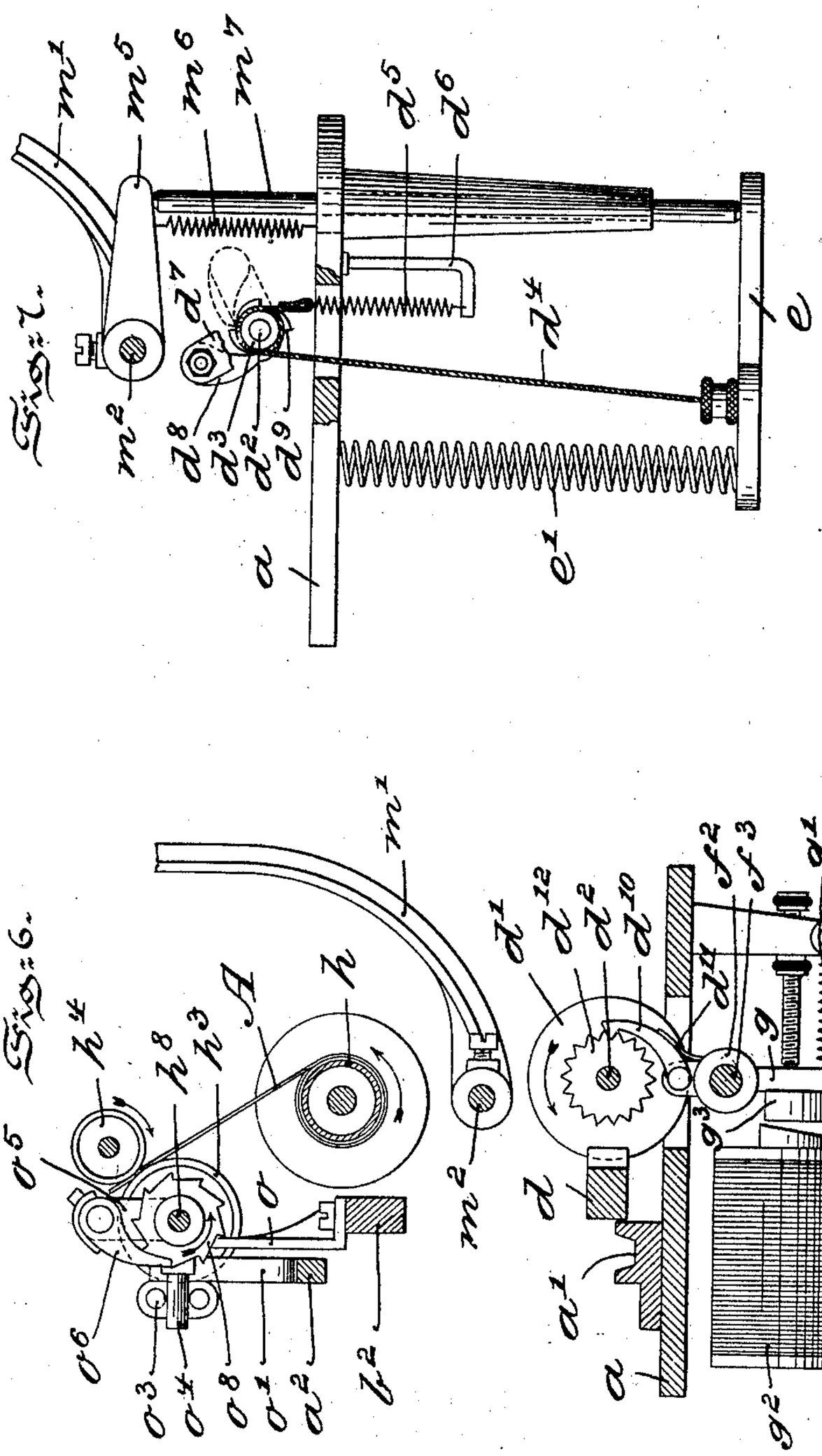

Fig. 6.

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UNITED STATES PATENT OFFICE.

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PAPER-CARRIAGE FOR TYPE-PRINTING MACHINES AND MECHANISM FOR CONTROLLING SAME.

SPECIFICATION forming part of Letters Patent No. 711,154, dated October 14, 1902.

Application filed June 1, 1901. Serial No. 62,694. (No model.)

To all whom it may concern:

Be it known that I, ROBERT A. FOWDEN, a citizen of the United States, residing at the city of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Paper-Carriages for Type-Printing Machines and Mechanism for Controlling the Same, of which the following is a specification.

My invention is relation to an improved carriage for holding, feeding, shifting, and otherwise automatically controlling the paper of a type-printing machine during the operation of the same, and in such connection it relates to the construction and arrangement of the carriage and of the mechanism controlling the same.

In type-writing, type-printing, and printing-telegraph machines or machines of analogous construction and use it is essential that the paper and its carriage be shifted step by step laterally as the paper receives the imprint of each type or character, that the paper be fed at the end of each line or portion of a line to present a surface upon which the next line may be printed, and that after each line or portion of a line is completed by a step-by-step movement of the carriage the carriage be returned to its initial position to begin another line of printing. All these movements of the carriage and paper as well as the printing movement should be controlled automatically by the movement of manually, mechanically, or electrically controlled means; and it is the object of my present invention to provide mechanism for giving the required movements to the carriage, paper, and printing device by a means of simple yet efficient construction and arrangement for such purposes.

The nature and scope of my invention will be more fully understood from the following description, taken in conjunction with the accompanying drawings, forming a part hereof, in which—

Figure 1 is a rear elevational view of such parts of a type-printing machine as are necessary to illustrate and embody main features of my invention. Fig. 2 is an end elevational view of Fig. 1. Fig. 3 is a front elevational view of the same. Fig. 4 is an enlarged horizontal sectional view on the line 4 4 of Fig. 1. Fig. 5 is an enlarged detail view illustrating in plan means for maintaining the paper-carriage in proper vertical position. Fig. 6 is a detail view illustrating means for feeding the paper at the end of each line as well as the means for shifting the paper and carriage by a step-by-step movement, and Fig. 7 is a detail view of the means for controlling the step-by-step movement of the paper and carriage and the movement of the printing-hammer.

Referring to the drawings, a represents the framework of the type-printing machine, upon which is supported a rail a', preferably fixed. Above the fixed rail a' is detachably supported a second rail a^2. The frame b of the paper-carriage has at or near its base the wheels b', riding upon the lower stationary rail a', and above the wheels b' is arranged a cross-piece b^2, carrying two sets of brackets, whereof one set b^3 carries horizontally-arranged wheels b^4, inclosing the upper detachable rail a^2, and the other set of brackets b^5 carries vertically-arranged wheels b^6, engaging the under face of the rail a^2. The wheels b^4, in conjunction with the wheels b^6 and wheels b' and the two rails a' and a^2, serve to maintain the carriage-frame b in proper vertical or operative position and at the same time permit the frame b to shift laterally on the rails a' and a^2 with scarcely any friction. To permit of the removal of the carriage and its frame b from the machine, the detachable rail a^2 may be lifted out of its supports by unloosening the end set-screws a^3, whereupon the frame b and the auxiliary parts carried thereby can be lifted off the stationary rail a'. This construction is advantageous when it is necessary to quickly and easily remove the carriage for the purpose of repairing or cleansing the parts.

The frame b and the auxiliary parts carried thereby (which parts will be hereinafter more particularly described) are caused to shift laterally upon the rail a' with a step-by-step

movement by means of the following preferred mechanism: The lower portion of the frame b is provided with a rack d, (clearly illustrated in Figs. 1, 2, and 4,) and the teeth of this rack are engaged by a worm-gear d', turning with a shaft d^2. To give the proper revolution to the shaft d^2, so that the worm-gear d' will turn just sufficiently to shift the carriage-frame b through the rack d the required distance, the following preferred mechanism is used: Loosely secured to the shaft d^2 is a collar or sleeve d^3, around which is wound a rope or cord d^4, one end of which is secured to a lever arm or key e. The other end of the cord d^4 is depressed under the tension of a spring d^5, connecting the cord to a fixed part d^6 of the machine. The sleeve d^3 carries an arm d^7, to the free end of which is pivoted a pawl d^8, engaging the notched periphery of a ratchet-wheel d^9, secured directly to the shaft d^2. The lever arm or key e is normally held in depressed condition by means of a spring e', interposed between the key e and the framework of the machine. As clearly illustrated in Fig. 7, when the lever arm or key e is elevated to compress the spring e' the cord d^4 responds to its spring d^5 and turns the sleeve d^3, arm d^7, and pawl d^8 around to the position indicated in dotted lines, the pawl d^8 sliding over the notched periphery of the ratchet-wheel d^9 without moving the same. When the key e is released, its spring e' forces the key downward, the cord d^4 being moved against its spring d^5. The sleeve d^3, arm d^7, and pawl d^8 are now returned to the normal position (indicated in full lines) and in turning operate or turn the ratchet-wheel d^9, and consequently the shaft d^2 and worm-gear d'. This movement of the shaft d^2 is sufficient to cause the gear d' to advance the rack d a required distance or step. To prevent accidental movement of the shaft d^2 or excessive response to the movement of the ratchet d^9, a detent d^{10} under tension of the spring d^{11} engages the toothed wheel d^{12}, fixed to the shaft d^2, as clearly illustrated in Fig. 6. As illustrated in the drawings, the upward movement of the key e is controlled by the energization of an electromagnet e^2. While in electric type-printing instruments, such as printing-telegraphs, such a means of control is advantageous; yet it is obvious that the key e may be manually or mechanically controlled without departing from the spirit of my present invention.

As the carriage-frame b and auxiliaries are shifted step by step by the mechanism hereinbefore described, the line may be wholly or partly completed before it is necessary to shift the carriage backward to its initial or starting point to begin a new line. When, however, the line is complete, the frame b and auxiliaries may be quickly and easily returned by means of the following preferred mechanism: The frame b is advanced step by step against the tension of a spring f, normally tending to return the frame b to its initial position. While the worm-gear d' is in engagement with the rack d the spring f cannot shift the frame b. Hence the gear d' and rack d must first be brought out of mesh. To accomplish this, the shaft d^2, with which the gear d' turns, is mounted upon the upper or free ends of two rocking arms f'. These arms f' constitute the sole bearings or supports for the shaft d^2 and its appurtenances, and their lower ends are connected together by a sleeve f^2, oscillating upon a fixed shaft f^3, properly supported by the frame of the machine. The sleeve f^2 carries an arm or key g, normally under tension of a spring g', which serves to throw the arms f' forward to force the shaft d^2 and gear d' into operative relationship with the rack d. As illustrated in the drawings, an electromagnet g^2 has its armature g^3 secured to the key g and serves when energized to move said key against the tension of its spring g' to thereby rock the arms f', so that the shaft d^2 and worm d' are drawn out of operative engagement with the rack d. It is, however, within the scope of my invention to replace the magnet g^2 by suitable mechanical means, or, in fact, to so shape and arrange the key g that it can be readily manipulated by the hand of the operator. As soon as the worm d' has been withdrawn from the rack d the spring f exerts its tension upon the frame b to shift said frame and auxiliaries to their initial position. The return of the frame b under tension of its spring f may be checked by a suitable buffer f^4.

In the drawings a type-printing machine has been illustrated wherein the printing is done by forcing the paper A into contact with the periphery of a type-wheel A'. The means for controlling this type-wheel have not been illustrated, since such forms no part of my invention, and many well-known ways illustrated in the art may be used. The paper A is wound upon a roll h, mounted in the bearings h' in the frame b, these bearings h' being adjustable by means of thumb-screws h^2, so that the roll h may revolve with more or less freedom in the frame b. The paper A after it leaves the roll h passes between two sets of feed-rollers h^3 and h^4, respectively, one set, h^3, being positively driven by mechanism to be hereinafter described, whereas the other set, h^4, is held frictionally down upon the paper by means of springs h^5, as clearly illustrated in Fig. 2. After the paper A passes from the feed-rollers h^3 and h^4 it passes over a shield-plate h^6, supported by the framework of the machine and which is interposed between the paper A and the periphery of the type-wheel A'. A notch or slot h^7 in the shield-plate h^6 permits the proper portion of the paper being forced against a type or character on the type-wheel A' by means of a type-hammer m. This hammer m is supported upon the free end of a curved arm m', which is supported at its other end by a shaft m^2, osciliating or rocking in trunnions m^3 and m^4, one or both of which is or are made adjustable, being in

the form of a set-screw. From the shaft m^2 projects a rock-arm m^5, normally held down under tension of a spring m^6 upon one end of a vertically-disposed rod m^7, the other end of said rod resting upon the key e, which serves to control the step-by-step movement of the carriage-frame and auxiliaries, as hereinbefore described. When this key e responds to the depressing action of its spring e', the rod m^7 drops and the hammer m and arm m' are retracted by means of the spring m^6 and rock-arm m^5 to the position indicated in full lines in Fig. 2, whereas when the key e either responds to the magnet e^2 or is otherwise raised by mechanical or manual means the rod m^7 is raised and the hammer m strikes the paper A and forces it through the recess or slot h^7 into printing contact with the type-surface of the type-wheel A', as illustrated in dotted lines in Fig. 2. The feeding of the paper from the roll h is accomplished preferably when the carriage-frame and auxiliaries are shifted backward to their initial position under the influence of the spring f. As illustrated in the drawings, the preferred means of accomplishing this result consists as follows: The upper surface of the detachable rail a^2 is provided with a series of teeth a^4. The cross bar or piece b^2 is provided with an upwardly-extending bracket o, in the upper end of which is pivoted one end of a downwardly-extending finger o', the free end of which engages the teeth a^4 of the rail a^2 and is shifted thereby from right to left when the carriage-frame travels from left to right by a step-by-step movement and from left to right when the carriage-frame responds to its spring f. As illustrated in detail in Fig. 6, the pivot-pin o^2 of the finger o' carries the pins or projections o^3, extending parallel to the face of the finger o', and between these projections o^3 extends a pin o^4, projecting from an arm o^5, loosely turning upon the shaft h^8, connecting the feed-rollers h^3. This arm o^5 carries at its upper end a pawl o^6, arranged to slide over the periphery of a ratchet-wheel o^8, secured to the shaft h^8, when the arm o^5 is raised by the movement of the finger o' and the projections o^3 are controlled by the step-by-step movement of the carriage-frame along the toothed rail a^2. When, however, the arm o^5 is depressed by the opposite movement of the finger o', it engages a tooth of the ratchet-wheel o^8 and turns said wheel o^8 and shaft h^8, and hence operates the feed-rollers h^3, which feed the paper A forward. For the purpose of inspecting the printing upon the paper A the upper part p of the carriage-frame b may be made separate from the lower part and hinged thereto, as at p', as illustrated in Figs. 1, 2, and 3. Springs p^2 normally keep the upper part p in alinement with the main frame b, but permit the upper part to be bent back with the paper away from the shield-plate h^6 to inspect the printing.

Having thus described the nature and object of my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a machine of the character described, a paper-carriage frame, a fixed rail whereon said frame is adapted to slide, a rack projecting from the frame, a worm-wheel meshing with said rack, a shaft to which the worm-wheel is secured, a collar loosely turning upon the shaft, a cord and spring adapted to oscillate said collar on said shaft, a ratchet means controlled by the movement of said collar and adapted to turn the worm-wheel shaft in one direction, and a key controlling the cord and spring.

2. In a machine of the character described, a paper-carriage frame, a fixed rail whereon the frame is adapted to slide, a rack projecting from the frame, a worm-wheel adapted to mesh with said rack, a shaft to which said worm-wheel is secured, a collar loosely turning upon said shaft, means for oscillating said collar on the shaft, a ratchet mechanism controlled by the collar and adapted to turn the worm-wheel and shaft in one direction, a key controlling the means for oscillating the collar, an oscillating support for the worm-wheel shaft and means controlled by a key for oscillating said support to thereby throw the worm-wheel into and out of mesh with the paper-carriage rack.

3. In a machine of the character described, a paper-carriage frame, a fixed rail whereon the frame is adapted to slide, a rack projecting from said frame, a worm-wheel adapted to mesh with said rack, a shaft to which said worm-wheel is secured, a collar loosely turning upon said shaft, means for oscillating said collar on said shaft, a ratchet mechanism controlled by the collar and adapted to turn the worm-wheel and shaft in one direction, a key controlling the means for oscillating the collar, supporting-arms for the worm-wheel shaft each pivoted so as to oscillate in the framework of the machine, and means controlled by a key for oscillating the supporting-arms to thereby throw the worm-wheel into and out of mesh with said rack.

4. In a machine of the character described, a paper-carriage, a worm-gear adapted to advance said carriage step by step in the machine, a shaft carrying said worm-gear, a sleeve loosely mounted on said shaft, a band or cord wrapped around said sleeve, a key to which one end of said cord is secured, a spring holding the other end of said cord under tension, an arm turning with the sleeve, a pawl carried by said arm, and a ratchet secured to the shaft and adapted to be advanced to turn the shaft when the cord, sleeve and key are actuated in one direction, substantially as described.

5. In a machine of the character described, a paper-carriage frame, a fixed rail whereon said frame is adapted to slide, means for shifting the frame on the fixed rail step by step in one direction, means for retracting the frame

in an opposite direction when the shifting means is inoperative, a paper-roll supported in the frame, two sets of feed-rollers adapted to advance the paper from the paper-roll, a ratchet mechanism for positively driving one set of feed-rollers, a detachable rail having a notched upper face along which the paper-carriage frame is adapted to travel, and a finger pivoted to the carriage-frame and adapted to slide on the notched surface of said rail, said finger controlling the ratchet mechanism for operating the feed-rollers.

6. In a machine of the character described, a paper-carriage frame, a fixed rail whereon the frame is adapted to slide, a rack projecting from the frame, a worm-wheel adapted to mesh with said rack, a shaft to which said worm-wheel is secured, a collar loosely turning upon said shaft, means for oscillating said collar on the shaft, a ratchet mechanism controlled by said collar and adapted to turn the worm-wheel and shaft in one direction, and a key adapted when operated in one direction to control the oscillating means for the collar, in combination with a type-wheel, a paper-roll, means for feeding the paper from the paper-roll toward the periphery of the type-wheel, a type-hammer, and means controlled by the opposite movement of the key for operating said type-hammer.

7. In a machine of the character described, a paper-carriage frame, a fixed rail whereon the frame is adapted to slide, a rack projecting from the frame, a worm-wheel adapted to mesh with said rack, a shaft to which said worm is secured, a collar loosely turning on said shaft, means for oscillating said collar on said shaft, a ratchet mechanism controlled by said collar and adapted to turn the worm-wheel and shaft in one direction, a key controlling the oscillating means and an electromagnet controlling said key.

8. In a machine of the character described, a paper-carriage frame, a fixed rail whereon said frame is adapted to slide, a rack projecting from said frame, a worm-wheel adapted to mesh with said rack, a shaft to which said worm-wheel is secured, a collar loosely turning upon said shaft, means for oscillating said collar on said shaft, a ratchet mechanism controlled by the collar and adapted to turn the worm-wheel and shaft in one direction, a key controlling the means for oscillating the collar, an electromagnet controlling said key, an oscillating support for the worm-wheel shaft, means controlled by a second key for oscillating said support to thereby throw the worm-wheel into and out of mesh with the paper-carriage rack, and a second electromagnet controlling said second key.

9. In a machine of the character described, a mechanism for shifting the paper-carriage step by step, comprising a shaft, a worm-wheel secured thereon, a collar loosely turning on said shaft, a cord and spring adapted to oscillate said collar, a key controlling the cord and spring, an arm carried by said collar, a pawl depending from said arm, and a ratchet secured to said shaft and adapted to be moved in one direction by said pawl.

In testimony whereof I have hereunto set my signature in the presence of two subscribing witnesses.

ROBERT A. FOWDEN.

Witnesses:
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THOMAS M. SMITH.