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FEED MECHANISM FOR COMPOSING TYPE MACHINES.

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1,094,627. Patented Apr. 28, 1914.

Fig. 1.

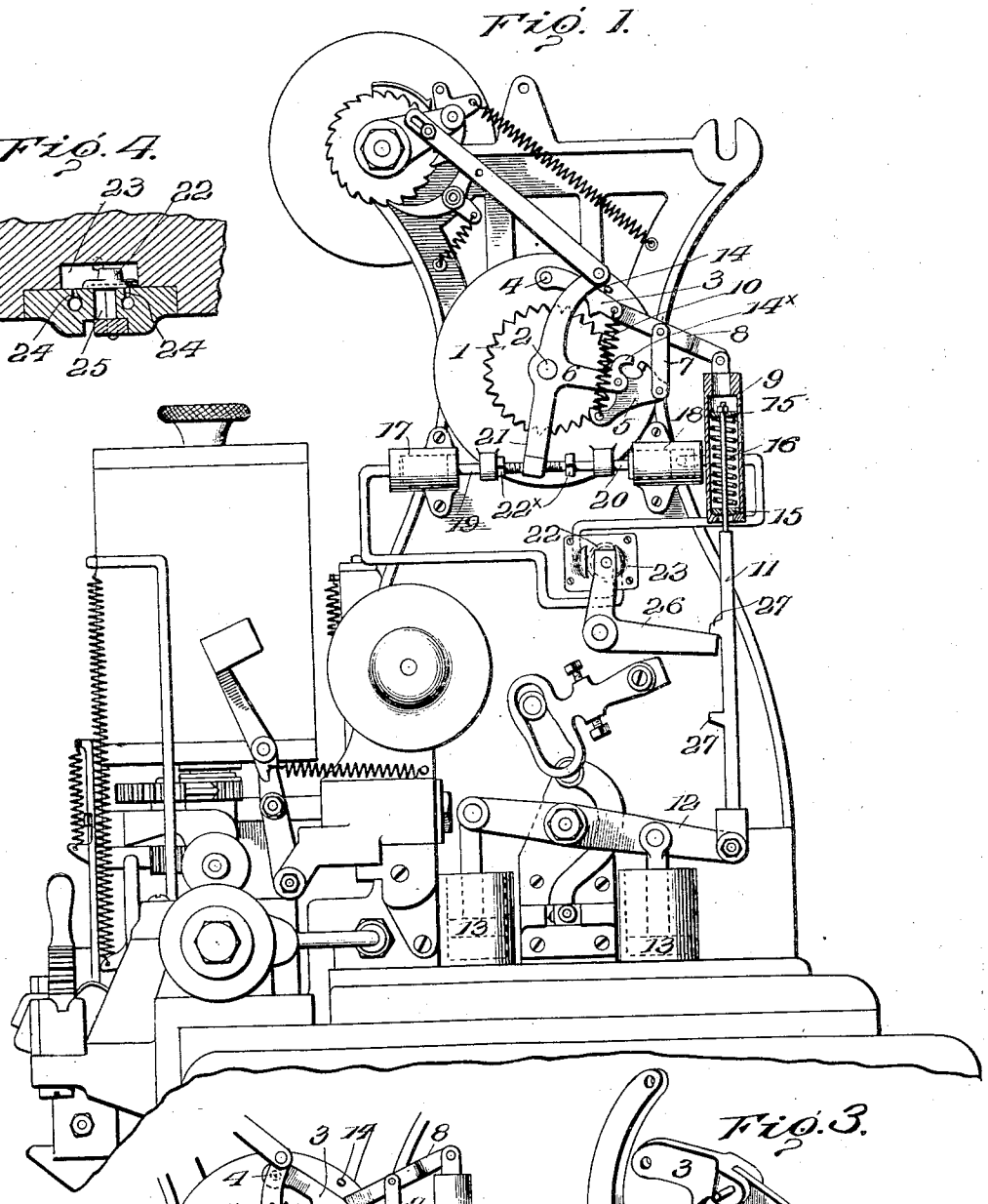
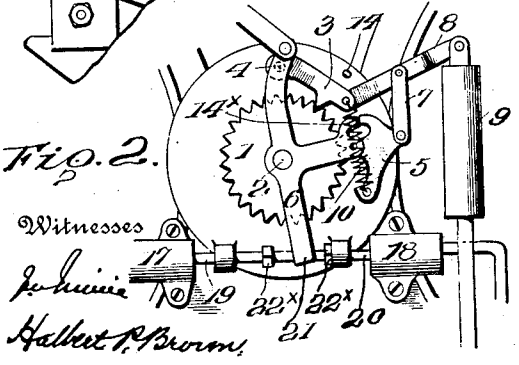


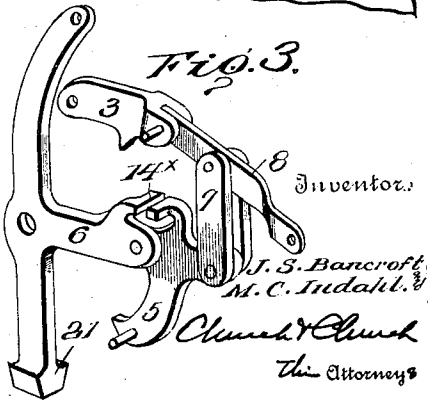
Fig. 4.

Fig. 2.



Witnesses

Fig. 3.



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FEED MECHANISM FOR COMPOSING TYPE-MACHINES.

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To all whom it may concern:

Be it known that we, JOHN SELLERS BANCROFT and MAURITZ C. INDAHL, citizens of the United States, and residents of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Feed Mechanism for Composing Type-Machines; and we do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, and to the figures and letters of reference marked thereon.

This invention relates to the class of feeding mechanisms employed in connection with record strip composing and type casting and composing machines for effecting an intermittent advance of the ribbon or strip for the reception or presentation of successive signals, and it has for its principal object to increase the speed capacity and reliability of the feeding devices in effecting successive measured advances of the material.

In the accompanying drawings illustrating a preferred form of embodiment of said invention,—Figure 1 is an end elevation of part of a record strip composing machine with the improved feed mechanism applied thereto; Fig. 2 is a detail view of the ratchet mechanism with the parts at the opposite extreme position to that represented in Fig. 1; Fig. 3 is a perspective view of the actuating and holding pawls detached; and Fig. 4 is a section of the controlling valve.

Corresponding numerals designate like parts in the several views.

The ratchet mechanism in which the present improvements are embodied is generically similar to that of Patent No. 674,362, dated May 21, 1901, save as to the means for controlling and sustaining the support or carrier for the driving pawl, and they are shown applied to the paper feed mechanism of the record strip composing machine of Patent No. 944,405 dated December 28, 1909, instead of the paper feed of a type casting and composing machine as in the first named patent. When it was sought to utilize the positively interlocking or seating ratchet mechanism of Patent No. 674,362, (whose practical value had been fully demonstrated in the casting machine) to the paper feed of a composing machine such as illustrated in Patent No. 944,405, difficulties were encountered in the way of an occasional skipping or failure to effect the required positive feed movement when and to the extent required, and upon investigation this was found to be due to the variability of the frictional resistance between the driving pawl carrying ring and its support which rendered the action of the pawls uncontrollable and unreliable at the much higher rate of speed attained in the composing machine. To overcome this defect, and at the same time preserve the advantages of the positively acting pawl movement, it was found desirable to supplement or supplant the frictional by a more positive and dependable resistance medium, and this has been accomplished by the means and in the manner about to be described.

The ratchet wheel 1 through which motion is transmitted is secured to the driving shaft or spindle 2 of the paper feed mechanism, and is alternately engaged by the holding pawl 3 pivoted at 4 to the frame, and the driving pawl 5, the latter, in this instance, pivotally connected to one arm of a lever or frame 6 journaled upon the shaft of the ratchet wheel or one coincident therewith. Driving pawl 5 is connected by a link 7 with a lever 8 at a point intermediate the latter's connection with pawl 3 at one end and spring box 9 at the opposite end. The engaging ends of pawls 3 and 5 are connected by a spring 10, and the spring box 9 is coupled through a rod 11 with a driving lever 12 acted upon by two opposed pistons 13, to positively advance and retract said rod 11. The unseating movement of pawl 3 is limited by a stop 14 on the frame and the like movement of pawl 5 is limited by a stop or abutment $14^{\times}$ carried by lever or frame 6. The spring box 9 is of a well known construction comprising a cylinder within which the reduced end of rod 11 projects, said rod passing through washers 15 engaging opposite ends of the cylinder and through a spring 16 interposed between said washers and operating to yieldingly hold the latter in contact with the ends of the cylinder. The shoulder 30 on the rod engages one washer and a collar 31 on the end of the rod engages the other washer, the arrangement being such that when the rod is moved

longitudinally in either direction its motion is transmitted through the spring to the cylinder.

As thus far described the ratchet mechanism does not differ essentially from that disclosed in Patent No. 674,362, save in the substitution of lever 6 for the friction ring or member of the prior patent. It is essential to the correct operation of the ratchet mechanism that the support for pawl 5 should be yieldingly held against displacement at each end of the stroke of the driving mechanism (represented in this instance by spring box 9), so that in the one case (Fig. 2) the full engagement of the driving pawl 5 shall be effected before the unseating of the locking pawl 3 begins, and in the other case (Fig. 1) the seating of the locking pawl shall precede the unseating of the driving pawl preparatory to the return of the latter, as fully set forth in Patent No. 674,362. Heretofore a frictional resistance has been applied to the driving pawl support, but, as before stated, it has proved inefficient at high speeds, owing to its instability or variable quality, hence it is proposed to supplant or supplement it by a more stable and controllable medium. With this end in view a positively acting reversible motor device or mechanism is applied to or coupled with the driving pawl support 6 in such manner that at the beginning of the movement of the driving mechanism in either direction said driving pawl support will be positively held under yielding pressure against the power applied in a direction to shift said support, thereby insuring the interchange of pawls before the feeding or retrograde movement of the feeding pawl is inaugurated, and at the same time retaining the engaged pawl in contact with the ratchet wheel during the excursion of frame 6 in either direction. A motor device suitable for the purpose is illustrated herein, the same including two cylinders 17, 18 between whose opposed piston rods 19, 20, is interposed an arm 21 of the driving pawl supporting frame 6. Suitable means such as adjustable nuts 22^{x} applied to the piston rods are provided for limiting the stroke in either direction, and the movements of the pistons are controlled by a valve 22 located within a pressure chamber 23 and alternately covering one or the other of two ports 24 connected to the respective cylinders and an exhaust port 25. The stem of the valve passes through the exhaust port and is engaged by one arm of a lever 26, the other arm whereof projects between two spaced abutments 27 carried by rod 11 of the pawl driving mechanism.

The parts are so constructed, proportioned and arranged that at the conclusion of the impressed movement of frame 6 in either direction, the cylinder opposed to the return motion of said frame will be energized to hold the latter against its limiting stop and resist retrograde movement of said frame during the reversal of the pawls and until the effective stroke has been completed. For example, in Fig. 1, wherein the parts are shown in positions assumed at the end of the feeding movement of the driving mechanism, the holding pawl 3 is held from engagement with the ratchet wheel and the driving pawl 5 in engagement therewith by the pull exerted upon the outer end of lever 8, the latter for the time being fulcrumed on the driving pawl. Frame 6 has been arrested through the contact of stop or nut 22^{x} on piston rod 19 with its bearing, and the continued movement of rod 11 after the arrest of frame 6 has shifted valve 22 to uncover port 24 pertaining to cylinder 18 and connect port 24 pertaining to cylinder 17 with the exhaust. As a result driving pawl 5 is held in engagement with the ratchet wheel to prevent further movement of the latter and frame 6 is held under pressure toward cylinder 17. If now the driving mechanism is actuated to elevate rod 11 and retract driving pawl 5, the first effect will be to tilt lever 8 on pawl 5 until pawl 3 is seated, after which driving pawl 5 will be tilted to withdraw the same from the ratchet wheel and until arrested by stop 14^{x}, when the continued upward movement of rod 11 will turn frame 6 on its axis, thereby retracting pawl 5 until frame 6 is arrested by the engagement of nut 22^{x} of piston rod 20, as illustrated in Fig. 2.

During the upward motion of rod 11 and until after nut 22^{x} is engaged, pressure is maintained in cylinder 18 to hold frame 6 stationary until the described interchange of pawls has been effected and thereafter to resist the movement of said frame and insure engagement of the holding pawl 3, during the retrograde movement of the driving pawl. Immediately nut 22^{x} of piston rod 20 is thus engaged to arrest the movement of frame 6, valve 22 is shifted to apply pressure to piston 17, as illustrated in Fig. 2, thereby placing the members in position for the return or feeding movement of rod 11, whereupon the action is repeated save that in this case the driving pawl 5 is seated and then the locking pawl 3 is withdrawn prior to the movement of frame 6, which latter is now held under pressure of piston 19 instead of 20.

The pressure exerted by pistons 19, 20 upon frame 6 is less than that transmitted from the driving mechanism through rod 11 so that immediately preceding as well as during the effective stroke of said frame in either direction its motion is impeded or resisted by direct pressure, sufficient in degree to absolutely prevent displacement of the frame while the transposition of the pawl

is taking place and yielding to superior pressure exerted by rod 11 only after the one pawl has been fully engaged with and the other fully withdrawn from the ratchet wheel. In yielding, however, the motor serves to retard the frame and through the resistance of the connections maintains the seated pawl in operative position and the unseated pawl free of the ratchet wheel so that all danger of skipping is eliminated.

Having thus described our invention, what we claim and desire to secure by Letters Patent of the United States, is:

1. A ratchet mechanism such as described, including a ratchet wheel, a holding pawl, a driving pawl, a movable frame supporting the driving pawl and actuating devices connected to the two pawls to seat the one before the other at the time in engagement with the ratchet wheel is withdrawn therefrom, and in combination therewith a motor device coupled with said driving pawl frame and operating in opposition to said actuating devices to yieldingly resist the movement of said frame while under pressure from said actuating devices.

2. A ratchet feed mechanism such as described, provided with a ratchet wheel, holding pawl, driving pawl, a movable support for the driving pawl and actuating devices coupled with the pawls to alternately seat the latter and reciprocate the driving pawl and its support, and in combination therewith, a reversible motor connected with the driving pawl support to oppose the advance of the latter in response to the actuating devices.

3. In a ratchet feed mechanism, the combination of the following elements to wit: a ratchet wheel, a holding pawl mounted in the frame; a driving pawl mounted on a movable frame, a lever coupled with both of said pawls in a manner to fulcrum alternately upon each, and an elastic connection between the active ends of the two pawls, actuating devices coupled with said lever, a reversible motor coupled with the driving pawl frame to resist the movement of the latter in either direction, and means controlled by the actuating devices for reversing the motor.

4. A ratchet feed mechanism such as described, provided with a ratchet wheel, holding and driving pawls and connecting and actuating means including a movable support for the driving pawl for alternately engaging said pawls with the ratchet wheel and in combination therewith, a reversible motor connected with the driving pawl support to retard the movement derived from the actuating means, the same including opposed cylinders and pistons and valve mechanism for alternately admitting pressure to one cylinder and exhausting from the other.

5. A ratchet feeding mechanism such as described, including a ratchet wheel, holding and driving pawls, a movable support for the driving pawl, means coupled with the pawls for alternately engaging the latter with the ratchet wheel, and actuating devices provided with a yielding coupling, and in combination therewith, a reversible motor connected with the support of the driving pawl and valve mechanism controlling said motor and in turn controlled by the pawl actuating devices to reverse the direction of pressure after the pawl support or cam has reached the limit of its motion in one or the other direction.

6. The combination with a driving pawl support or frame, of a ratchet feed mechanism including holding and driving pawls, means for bringing said pawls alternately into engagement with the ratchet wheel and for reciprocating the driving pawl and its support, and a reversible motor coupled with the driving pawl support and operating in opposition to the driving pawl actuating devices thereof.

7. A ratchet feed mechanism including a ratchet wheel, holding and driving pawls, the last named pawl carried on a movable frame, means connected to the pawls for alternately engaging the latter and reciprocating the driving pawl, and actuating devices for said pawl operating means including a yielding coupling, and in combination therewith, a reversible motor opposing the advance of the driving pawl in both directions.

8. A ratchet feed mechanism provided with a ratchet wheel, holding and driving pawls, a movable support for the driving pawl, means for alternately engaging the pawls and reciprocating the driving means, and actuating devices for said pawl support, including a yielding member, and in combination therewith, a reversible motor opposing the advance of the pawl support provided with limiting stops, a reversing valve and valve operating means connected with the actuating devices to reverse the motor after the driving pawl has completed its stroke in one direction, and preliminary to the movement in the opposite direction.

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