

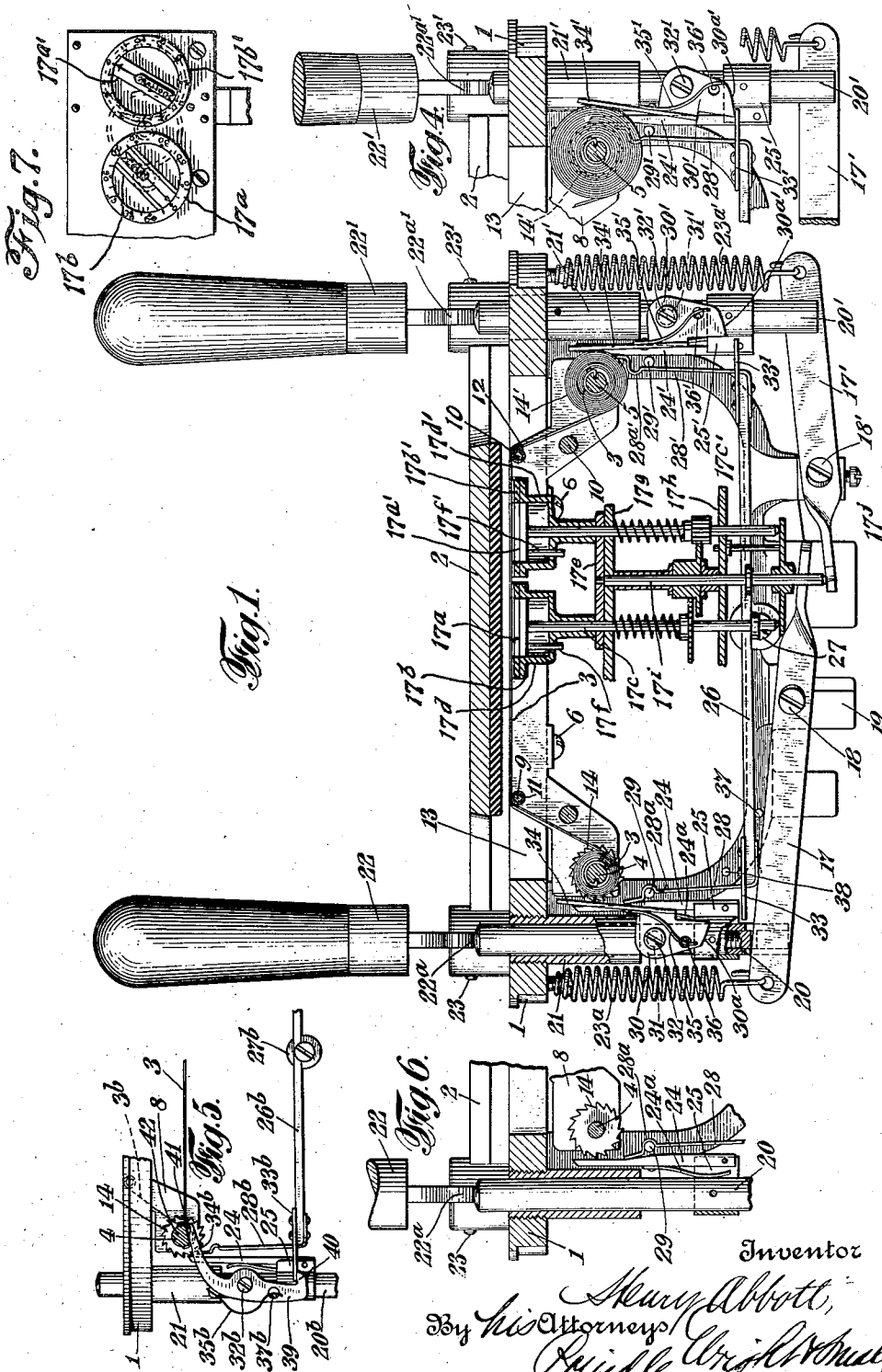
April 27, 1926.

1,582,651

H. ABBOTT
DEVICE FOR AUTOMATICALLY SHIFTING THE DIRECTION OF
FEED OF AN INK RIBBON IN PRINTING MACHINES

Filed June 22, 1922

2 Sheets-Sheet 1



Inventor
Henry Abbott,
By his Attorneys,
Pride, Wright & Smith.

April 27, 1926.

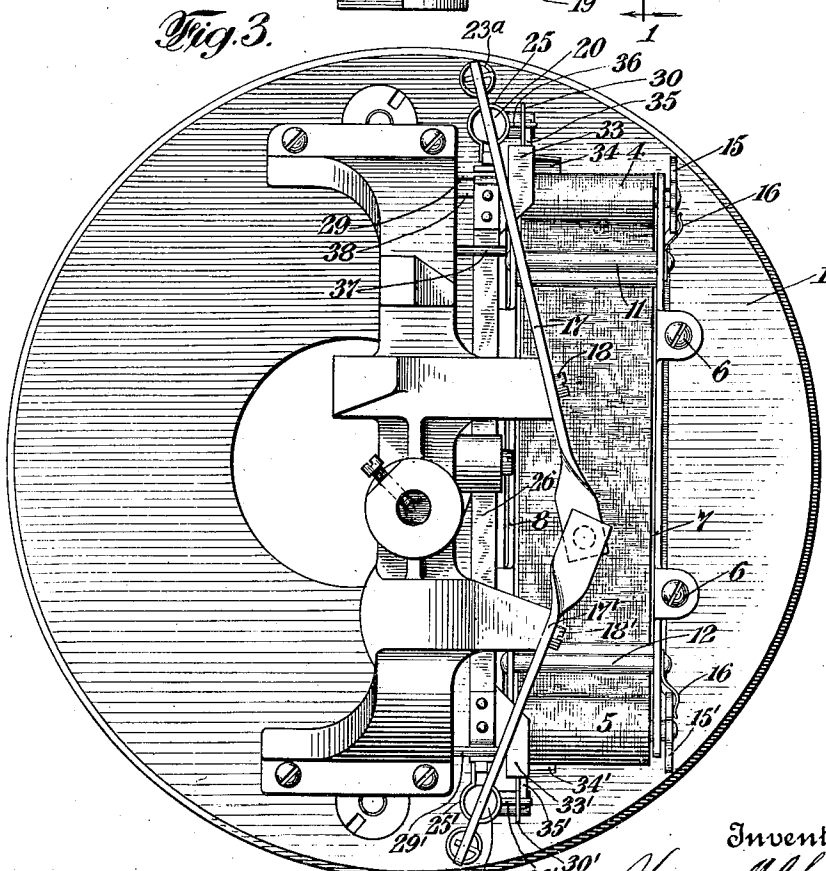
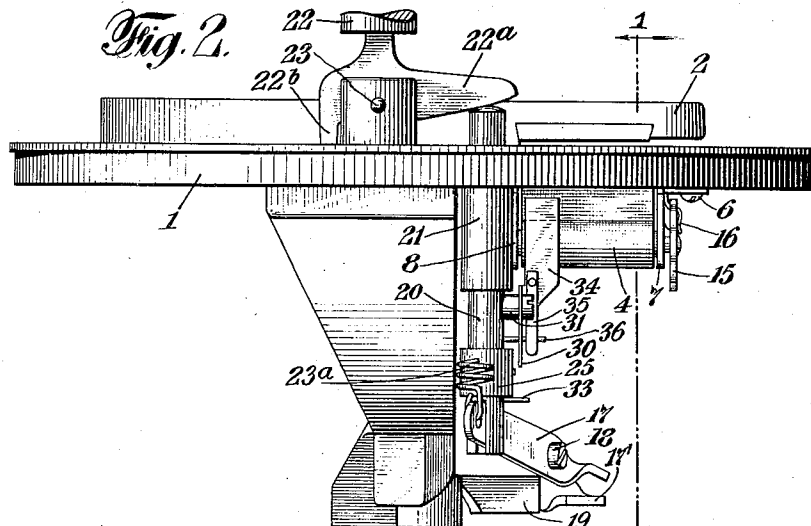
1,582,651

H. ABBOTT

DEVICE FOR AUTOMATICALLY SHIFTING THE DIRECTION OF
FEED OF AN INK RIBBON IN PRINTING MACHINES

Filed June 22, 1922

2 Sheets-Sheet 2



Inventor

Henry Abbott

By *his* Attorneys

Prindle Wright & Hall

Patented Apr. 27, 1926.

1,582,651

UNITED STATES PATENT OFFICE.

HENRY ABBOTT, OF EAST ORANGE, NEW JERSEY, ASSIGNOR TO THE CALCULAGRAPH COMPANY, A CORPORATION OF NEW JERSEY.

DEVICE FOR AUTOMATICALLY SHIFTING THE DIRECTION OF FEED OF AN INK RIBBON IN PRINTING MACHINES.

Application filed June 22, 1922. Serial No. 570,275.

To all whom it may concern:

Be it known that I, HENRY ABBOTT, a citizen of the United States, a resident of East Orange, in the county of Essex and State of New Jersey, have invented a certain new and useful Improved Device for Automatically Shifting the Direction of Feed of an Ink Ribbon in Printing Machines, of which the following is a specification.

The object of my invention has been to provide a device for automatically shifting the direction of feed of an ink ribbon in printing machines which shall have, among others, the following advantages: those of certainty in action, simplicity in construction, freedom from undue wear, of being capable of ready adjustment, and of not interfering with the insertion or removal of ribbons, and to such ends my invention consists in the device for automatically shifting the direction of feed of an ink ribbon in printing machines hereinafter specified.

In the accompanying drawings—

Figure 1 is a vertical, longitudinal, sectional view of a time printing machine embodying my invention, said view being taken on the line 1—1 of Fig. 2;

Fig. 2 is an end elevation of the machine shown in Fig. 1, as seen from the left of the said figure;

Fig. 3 is a bottom plan view from below of the machine shown in Fig. 1;

Fig. 4 is a fragmentary view of the trigger in position succeeding that shown in Fig. 1;

Fig. 5 is a diagrammatic view of another embodiment of my invention;

Fig. 6 is a partial sectional view corresponding to Fig. 1 showing the ribbon feeding parts of the left-hand spool of said figure in operative position,

Fig. 7 is a top plan view of two pairs of elapsed time dies.

Although the said drawings illustrate all of the parts of the printing machine which are necessary in order that the present invention may be understood, it may be stated that the machine to which the illustrated embodiment of my invention is applied, is the machine of my Patent No. 583,320, dated May 25, 1897.

While I have chosen the said embodiment of my invention as the best embodiment

known to me with which to illustrate the invention, it is to be understood that my invention is capable of many embodiments and of application to all types of machines using printing ribbons, and the invention is not to be restricted to the illustrated embodiment nor beyond the necessary intentment of the claims.

In the illustrated embodiment of my invention there is a base plate 1 upon which the card or paper to be printed is supported, there being an overhanging abutment plate 2 against which the said card or paper is forced by pressure of dies that are raised from below and that impinge upon an ink ribbon which is interposed between them and the card.

In the illustrated embodiment the ends of the ribbon 3 are respectively secured to the spindles or spools 4 and 5 that are mounted in bearings in the ends of a frame that is secured to the base plate by screws 6 which pass through ears on said frame. The said frame consists of side plates 7 and 8 that are spaced apart and held together by rods 9 and 10 and that have rollers 11 and 12 mounted therein, over which the ribbon runs between the said spindles. The said side plates have ears formed thereon by which the frame is secured to the said base plate by means of the said screws 6 before mentioned. Said side plates are bowed upwards, so to speak, between the spools so that the ribbon is carried upward through a slot 13 in the base plate approximately to the level of the upper surface of the plate, while leaving the spools and their accompanying parts well below the base plate for convenience of access.

Each spool is provided on its rearward end (as seen in Fig. 1) with a ratchet wheel 14 or 14', by which it may be driven, and on its forward end has a star wheel 15 or 15' for manually turning the spindles when putting a fresh ribbon into the machine, and each of the said star wheels is in the present instance borne upon by a spring 16 that is secured to the frame, said springs affording sufficient friction to keep the ribbon taut as it is drawn off of one spool by the operation of the ratchet wheel of the other spool as later described.

The machine to which the illustrated em-

bodiment of my invention is shown as applied is a machine for recording elapsed time and it has two printing dies, one of which is operated at the beginning of the interval of elapsed time and the other at the close of said interval. In the machine of the said patent there are two pairs of elapsed time printing dies for printing elapsed time in units of different dimensions, such as, dollars and cents. The two pairs of dies are the same in principle. The dies for recording the value of elapsed time in cents per unit of time, say at the rate of \$1.00 per hour, comprise an arrow-shaped die 17^a and an annular dial 17^b, the arrow being mounted on the upper end of an arbor 17^c while the dial die is mounted on a cup 17^d that is slidably mounted upon the said arbor and rests upon a vertically movable plate 17^e. The arrow carries a vertical pin 17^f which passes freely through a hole in the cup, so that, while the arrow and dial may be separately printed, the arrow will always point to zero on the dial. The corresponding parts of the other pair of dies, which are for recording the value of elapsed time in dollars, are designated in the same manner as the parts relating to the cents dies except that the letters are primed. The arbors have bearing in frame plates 17^g and 17^h. The plate 17^e is secured to the upper end of a rod 17ⁱ which is vertically movable in bearings in the said frame plates. The rod 17ⁱ rests on the lever 17^j by which it is vertically moved for printing the two dial dies. The arbors 17^c and 17^{c'} rests upon a disk 17^k that is slidably mounted upon the rod 17ⁱ and the said disk can be raised by the lever 17 for the purpose of printing the arrows. Springs are mounted on the arbors for the purpose of tending to keep them in lowered positions, and a spring is also mounted on the vertical rod 17ⁱ to tend to keep the dials in lowered position. The lever 17 is fulcrumed on the screw 18 on the frame 19 depending from the base plate. The inner end of the lever raises the printing die and its outer end is depressed for that purpose by a rod 20 having a slot in its lower end which straddles the said lever. The said rod is slidably mounted in a sleeve 21 which is secured to the base plate. A hand lever 22 is fulcrumed on a pin 23 that is secured in a stud mounted on the base plate and said lever has an arm 22^a which contacts with and serves to depress the upper end of said rod, and a shoulder 22^b which contacts with the base plate and limits the backward movement of the said lever. A spring 23^a is secured to the base plate and to the outer end of the said lever 17 and tends to elevate said lever and also said rod and to hold the hand lever 22 in its backward position. On the opposite side of the machine,

as seen in Fig. 1, are parts for operating the said other printing die, which parts correspond to those just described and are consequently designated by the same reference numerals, except that they are primed.

A clock mechanism and gearing (not shown) are provided for rotating the two pairs of dies at a uniform rate such that, if the time is to be charged for at the rate of \$1.00 per hour, the pair of cents dies will have made one complete rotation in an hour, and the dollar dies will have made one complete rotation in 12 hours. In recording the money value of elapsed time by means of the said machine, at the beginning of an interval of time a card is placed against the guides in the machine in order to hold it in a fixed position relative to the dies, and the dial dies are elevated by movement of the right hand handle 22' and a complete annular series of figures is printed upon the card in whatever phase of rotation the dials may then happen to occupy. At the end of the interval of elapsed time to be measured, the card is replaced against the guides in the original position and the arrows are printed by means of the rod in handle 22. When the dials were printed the arrow dies were, as always, at zero on the dial dies, and consequently at the moment of imprinting of the dial dies the arrow dies were at zero on the imprints. During the interval of elapsed time the arrow dies traveled along the imprint of the dial dies, which of course is stationary on the paper, and consequently when the arrow dies were printed at the end of the interval of elapsed time, their imprints point to the figures on the dial imprints which represent the value of the arc through which the arrows have traveled from zero during the interval of time. Thus the arrows will point to the dollar and cents value of the interval of elapsed time. The initial imprint at the beginning of the period of elapsed time and also the final imprint are shown in Fig. 7. In order that ink ribbon may be wound upon the respective spools 4 and 5, the rods 20 and 20' are in the present instance each provided with pawls 24 and 24' to engage the respective ratchet wheels 14 or 14', said pawls respectively being pivoted to said rods as by being mounted upon pins that are secured to bands 25 or 25', which are fixed upon the said rods. Each pawl has a spring 24^a which tends to throw it against its said ratchet wheel.

In order that the ribbon may be wound upon one spool and free to unwind from the other spindle, it is necessary that the pawl of the first spindle shall be in engagement with its ratchet wheel and that the other pawl shall be held from such engagement. In the present instance, this is ac-

complished by the following means: A lever 26 is fulcrumed on a screw 27 that is screwed into the said frame 19 and at each end it carries a spring 28 that bears against the adjacent pawl and said spring is provided with a recess or bend 28^a which so cooperates with a pin 29 on the frame 18 that when the spring is in the lowest position to which the lever carries it, the said depression will be at the level of the pin 29 and thus permit the spring to move against the pawl and hold it away from its ratchet wheel, the spring 28 being stronger than the spring 24^a. When, however, the spring 28 is in its uppermost position the bend or depression therein rides up on the pin 29 and thus retracts the said spring from contact with the pawl and permits the latter, under the action of the spring 24^a, to come into contact with its ratchet wheel. The same action, of course, occurs in connection with the spring 28' at the opposite end of the lever, and as the raising of one end of the said lever depresses the opposite end thereof, and vice versa, a tilting of the lever each time that it is desired to reverse the winding of the ribbon will accomplish the desired result. In order, however, to secure effective operation, the requirements of mechanism for tilting the said lever are considerable.

I have desired to provide means which will with certainty completely release one pawl and surely permit the opposite pawl to engage its ratchet wheel, and which cannot stop when it has only partly accomplished those functions and thus leave both pawls engaged or both pawls released at the same time. For this purpose I have provided means for throwing the lever 26 from one to the other of its extreme positions, which means are operated by a part that has a full movement every time that a printing operation occurs, and I have depended upon the change in diameter of the spool of ribbon only for the purpose of in some way putting said part in operative relation with said lever 26 or with other means for controlling the spindle-actuating device.

In the present instance I have shown what I shall term a "trigger" 30 having a sleeve 31 attached thereto by which it is mounted on a screw 32 that is threaded into the rod 20, and a plate 33 is formed on or secured to the lever 26 for co-operation with said trigger 30. A wing 34 is carried by said trigger and is adapted to be engaged by the roll of ribbon on the spool as said roll changes in size (in the present instance, increases in size), and thus to position the trigger. A spring 35 is secured to the wing or the trigger and by engagement with a pin 36, mounted in a rod 20 and passing through a hole in the trigger, tends to hold the wing toward the roll of ribbon. The trigger, by

engagement with the said pin, limits the movement of the wing relative to the roll of ribbon, in the present instance toward the roll, and, in the present instance, holds the wing sufficiently away from the spool so that the wing does not interfere with securing the ribbon to or removing it from the spool. The trigger is preferably provided with a toe 30^a which is adapted to engage the plate 33, and in order to insure that said engagement shall be firm and secure and that the said toe will not slip off the said plate, the said toe is offset, so to speak, vertically with reference to the pivot of the trigger and in the direction toward the plate 33, and the said toe is beveled on its under side. Thus, upon engagement with the plate, the toe tends to slide well over on the plate and is thus prevented from slipping off and wearing the edge of the plate.

A corresponding trigger controlled by a wing and adapted to engage the pawl-throwing lever is provided at the opposite end of the machine, the said parts being similarly numbered except that they are primed.

In describing the illustrated embodiment of the invention, the parts will be assumed to be in the position shown in Fig. 1, in which the left-hand arm of the lever 26 is in its lower position in which it rests upon a pin 37 on the frame which determines that position. The bend or depression 28^a of the spring 28 is at the level of the pin 29 and the said spring is consequently permitted to go far enough to engage its pawl and force the latter away from the ratchet wheel of said pawl. The right-hand arm of the said lever is in its upper position and its spring 28' has consequently ridden up on the pin 29' so that the end of the said spring is retracted from its pawl and the latter is consequently free to engage its ratchet wheel.

The roll of ribbon on the spool 5 is shown in the said Fig. 1 to have grown to sufficient size to touch the wing 34' but not yet to be of sufficient diameter to swing the wing far enough to bring its trigger into engagement with the plate 33' on the lever. Consequently, although the trip reciprocates every time that the rod 20' is operated it does not have any effect on the position of the pawl-control lever 26. When, however, the roll of ribbon has increased in diameter sufficiently to cause the wing to swing the toe of the trigger a little over the said plate (as shown in Fig. 4), the trigger will engage the plate on the next downward movement of the rod 20', and, owing to its beveled nose, will slide well over upon the plate and surely carry the latter downward until it is in the lowest position that is permitted by the pin 38 on the frame, which limits the upward movement of the opposite arm of the lever. Thus, by the means just described, the pawl-control lever is thrown

fully from the position in which the right-hand pawl is operated and the left-hand one is inoperative to a position in which the right-hand pawl, although reciprocating is prevented from engaging its ratchet wheel while the left-hand pawl is completely released for engagement with its ratchet wheel.

The illustrated embodiment of my invention has the following advantages:

When the roll of ribbon on either spool has reached a predetermined diameter, that spool is released from its driving mechanism and the driving mechanism of the opposite spool is with certainty set into operation and the winding of the ribbon reversed.

By making the wings of suitable metal, they can, by bending, be adjusted so as to operate their respective triggers when the roll of ribbon has reached any desired diameter.

The controlling means, for alternately permitting and restraining the operation of the actuating means, of each spool is operated through the movement of a device (in the present instance, the trigger) that is actuated by a part which has a movement every time that printing occurs which is sufficient to fully actuate the controlling means, and my mechanism only depends upon a change in size of the roll of ribbon to set the trigger into and out of position to engage the controlling means, and not, as heretofore, to furnish the power for operating said controlling means. The change in size of the said roll would furnish a movement which is not only yielding but slow and one which, if used to actuate, extensive experience has shown is likely to leave the operating means of the two spindles either both engaged or both disengaged at the same time, so that the ribbon will not be shifted in either direction.

The trigger in the above-described embodiment of my invention engages the pawl-control lever with certainty, and does not slip off and wear the lever one or more times before finally engaging the latter.

While the wings are always in position to do their work, they are not permitted to move toward the arbor sufficiently close to prevent fastening a ribbon to or removing it from the spindle.

As before stated, my invention is capable of embodiment in many different forms.

In Fig. 5, I have illustrated one variation of many that can be made in its embodiment. In the said figure, I have shown one arm of a lever 26^b which is like the lever 26 of Fig. 1, and which carries a spring 28^b, like the spring 28 of Fig. 1. It also carries a plate 33^b corresponding to the plate 33 of said figure.

The trigger 39 in this instance, while mounted on a screw 32^b on a vertically re-

ciprocating rod 20, as in Fig. 1, operates to pull lever 26^b and its plate 33^b upward instead of pushing it downward, the trigger having a hook 40, instead of a toe, as before.

A wing 34^b rests on the under side of the roll of ribbon and operates, either by a mere decrease in diameter of the said roll or by dropping into a notch 41 in the spindle 42 upon which the ribbon 3^b is wound, when the unwinding of the said ribbon (as contrasted with the winding up thereof) uncovers the said notch. Movement of the trigger 39^b is, as before, limited by engagement of a pin 37^b on the rod 20^b with a hole in the trigger, and a spring 35^b that is secured to the wing and bears upon said pin, tends to force the trigger into engagement with the ribbon.

Having particularly described my invention, what I claim and desire to secure by Letters Patent is:

1. In a printing machine, the combination of printing means, ribbon-feeding means comprising spools for the ends of the ribbon, means for actuating said spools, mechanism for permitting and restraining the operation of one of said actuating means comprising a part necessarily having a reciprocation to an operative point when a single printing operation is effected, and means influenced by the ribbon for putting said part into and out of operative relation with another part of said mechanism.

2. In a printing machine, the combination of printing means, ribbon-feeding means comprising spools for the ends of the ribbon, means for actuating each of said spools, mechanism alternately permitting and restraining the operation of said actuating means, one after the other, comprising a part necessarily having a reciprocation to an operative point when a single printing operation is effected, and means influenced by the ribbon for putting said part into and out of operative relation with another part of said mechanism.

3. In a printing machine, the combination of printing means, ribbon-feeding means comprising spools for the ends of the ribbon, means for actuating each of said spools, controlling means for alternately permitting and restraining the operation of said actuating means one after the other, a part adapted to operate said controlling means, and means influenced by the unthickened ribbon for setting said part into and out of position to operate said controlling means.

4. In a printing machine, the combination of printing means, ribbon-feeding means comprising spools for the ends of the ribbon, means for actuating each of said spools, controlling means for alternately permitting and restraining the operation of said actuating means one after the other, a part adapted to engage said controlling means

and necessarily having a movement each time that printing is effected that is sufficient to completely operate said controlling means, and means influenced by the ribbon for setting said part into and out of position to engage said controlling means.

5. In a printing machine, the combination of printing means, ribbon-feeding means comprising spools for the ends of the ribbon, means for actuating each of said spools, controlling means for alternately permitting and restraining the operation of said actuating means one after the other, a part adapted to engage and operate said controlling means, said part being connected to a device that is necessarily reciprocated uniformly each time that printing occurs to an operative point, and means influenced by the ribbon for setting said part into and out of position to engage said controlling means.

6. In a printing machine, the combination of printing means, ribbon-feeding means comprising spools for the ends of the ribbon, means for actuating each of said spools, controlling means for alternately permitting and restraining the operation of said actuating means one after the other, a part adapted to engage and operate said controlling means, said part being connected with a device necessarily reciprocated to an operative point with respect to said controlling means each time that a printing operation is completely effected, and means influenced by the ribbons for setting said part into and out of position to engage said controlling means.

7. In a printing machine, the combination of printing means, ribbon-feeding means comprising spools for the ends of the ribbon, means for actuating each of said spools, controlling means for alternately permitting and restraining the operation of said actuating means one after the other, a part adapted to engage and operate said controlling means, said part being connected with a device that is so connected with the printing mechanism as always to have sufficient movement fully to operate said controlling means, and means influenced by the ribbon for setting said part into and out of position to engage said controlling means.

8. In a printing machine, the combination of printing means, ribbon-feeding means comprising spools for the ends of the ribbon, means for actuating each of said spools, controlling means for alternately permitting and restraining the operation of said actuating means one after the other, a part adapted to engage and operate said controlling means, said part being connected with a device that is so connected with the printing mechanism as always to have sufficient movement during a single printing operation fully to operate said con-

trolling means, and means influenced by the ribbon for setting said part into and out of position to engage said controlling means.

9. In a printing machine, the combination of printing means, ribbon-feeding means comprising spools for the ends of the ribbon, means for actuating each of said spools, controlling means for alternately permitting and restraining the operation of said actuating one after the other, a trigger, means for giving said trigger a complete reciprocation during a single printing operation, and means influenced by the ribbon for setting said trigger into and out of position to engage said controlling means.

10. In a printing machine, the combination of printing means, ribbon-feeding means comprising spools for the ends of the ribbon, means for actuating each of said spools, controlling means for alternately permitting and restraining the operation of said actuating means one after the other, a part adapted to operate said controlling means, and bendable means influenced by the ribbon for setting said part into and out of position to operate said controlling means.

11. In a time printing machine the combination of two printing dies, an operatable device for actuating each of said dies, ribbon-feeding means comprising spools for the ends of the ribbon, means moved by each of said operatable parts for actuating one of said spools, controlling means for alternately permitting and restraining the operation of said actuating means one after the other, a part connected with each of said devices and adapted to engage and operate said controlling means, and means influenced by the ribbon for setting said parts into and out of position to engage said controlling means.

12. In a time printing machine, the combination of two printing dies, a manually operatable device for actuating each of said dies, ribbon-feeding means comprising spools for the ends of the ribbon, means moved by each of said manually operatable parts for actuating one of said spools, controlling means for alternately permitting and restraining the operation of said actuating means one after the other, a part connected with each of said devices and adapted to engage and operate said controlling means influenced by the ribbon for setting said parts into and out of position to engage said controlling means.

13. In a time printing machine, the combination of two printing dies, a manually operatable device for actuating each of said dies, ribbon-feeding means comprising spools for the ends of the ribbon, means moved by each of said manually operatable parts for actuating one of said spools, controlling means for alternately permitting and restraining the operation of said actuat-

ing means one after the other, a part connected with each of said devices and adapted to engage and operate said controlling means, and means influenced by the ribbon on each spool for setting the corresponding said part into and out of position to engage said controlling means.

14. In a printing machine, the combination of printing means, ribbon-feeding means comprising spools for the ends of the ribbon, means for actuating each of said spools, controlling means for alternately permitting and restraining the operation of said actuating means one after the other, a trigger, means for giving said trigger a reciprocation sufficient to operate said controlling means during a single printing operation, and means influenced by the ribbon for setting said trigger into and out of position to engage said controlling means.

15. In a printing machine, the combination of printing means, ribbon-feeding means comprising spools for the ends of the ribbon, means for actuating each of said spools, controlling means for alternately permitting and restraining the operation of said actuating means one after the other, a part adapted to engage and operate said controlling means, means influenced by the ribbon for setting said part into and out of position to engage said controlling means, and means for limiting the approach of said setting means toward its spool.

16. In a printing machine, the combination of printing means, ribbon-feeding means comprising spools for the ends of the ribbon, means for actuating said spools, mechanism for permitting and restraining the operation of one of said actuating means comprising a part having a complete reciprocation during a single printing operation, and means influenced by the ribbon for putting said part into and out of operative relation with another part of said mechanism, said second-mentioned part comprising a shoulder and said first-mentioned part having a toe that is beveled with reference to said shoulder.

17. In a printing machine, the combination of printing means, ribbon-feeding means comprising spools for the ends of the ribbon, means for actuating said spools, mechanism for permitting and restraining the operation of one of said actuating means comprising a pivoted part having a complete reciprocation during a single printing operation, and means influenced by the ribbon for putting said pivoted part into and out of operative relation with a shoulder on said mechanism that is approximately perpendicular to the direction of said reciprocation.

18. In a printing machine, the combination of printing means, ribbon-feeding means comprising spools for the ends of the

ribbon, means for actuating said spools, mechanism for permitting and restraining the operation of one of said actuating means, comprising a pivoted part having a complete reciprocation during a single printing operation, and means influenced by the ribbon for putting said pivoted part into and out of operative relation with a shoulder on said mechanism that is approximately perpendicular to the direction of said reciprocation, said pivoted part having a toe that is inclined to said shoulder.

19. In a printing machine, the combination of printing means, ribbon-feeding means comprising spools for the ends of the ribbon, means for actuating said spools, mechanism for permitting and restraining the operation of one of said actuating means comprising a pivoted part having a complete reciprocation during a single printing operation, and means influenced by the ribbon for putting said pivoted part into and out of operative relation with a shoulder on said mechanism that is approximately perpendicular to the direction of said reciprocation, said pivoted part having a toe that is inclined to said shoulder, said toe being offset from said pivot relative to the direction of said reciprocation.

20. In a printing machine, the combination of printing means, ribbon-feeding means comprising spools for the ends of the ribbon, means for actuating said spools, mechanism for permitting and restraining the operation of one of said actuating means comprising a pivoted part having a complete reciprocation during a single printing operation, and means influenced by the ribbon for putting said pivoted part into and out of operative relation with a shoulder on said mechanism that is approximately perpendicular to the direction of said reciprocation, said pivoted part having a toe that is inclined to said shoulder, and means for holding said toe out of line with said shoulders.

21. In a printing machine, the combination of printing means, ribbon-feeding means comprising spools for the ends of the ribbon, means for actuating said spools, mechanism for permitting and restraining the operation of one of said actuating means comprising a pivoted part having a complete reciprocation during a single printing operation, and means influenced by the ribbon for putting said pivoted part into and out of operative relation with a shoulder on said mechanism that is approximately perpendicular to the direction of said reciprocation, said pivoted part having a toe that is inclined to said shoulder, and means for yieldingly holding said toe out of line with said shoulder.

22. In a printing machine, the combination of printing means, ribbon-feeding

means comprising spools for the ends of the ribbon, means for actuating said spools, mechanism for permitting and restraining the operation of one of said actuating means comprising a pivoted part having a complete reciprocation during a single printing operation, and means influenced by the ribbon for putting said pivoted part into and out of operative relation with a shoulder on said mechanism that is approximately perpendicular to the direction of said reciprocation, said pivoted part having a toe that is inclined to said shoulder, said toe being offset from said pivot relative to the direction of said reciprocation, and means for holding said toe out of line with said shoulder.

23. In a printing machine, the combination of printing means, ribbon-feeding means comprising spools for the ends of the ribbon, means for actuating said spools, mechanism for permitting and restraining the operation of one of said actuating means comprising a pivoted part having a complete reciprocation during a single printing operation, and means influenced by the ribbon for putting said pivoted part into and out of operative relation with a shoulder on said mechanism that is approximately perpendicular to the direction of said reciprocation, said pivoted part having a toe that is inclined to said shoulder, said toe being offset from said pivot relative to the direction of said reciprocation, and means for yieldingly holding said toe out of line with said shoulder.

24. In a printing machine, the combination of printing means, ribbon-feeding means, comprising spools for the ends of the ribbon, means for actuating said spools, mechanism for permitting and restraining the operation of one of said actuating means comprising a pivoted part having a complete reciprocation during a single printing operation, and a wing carried by said pivoted part and in the path of the coil of ribbon wound upon a spool, said wing serving to put said pivoted part into and out of operative relation with a shoulder on said mechanism.

25. In a printing machine, the combination of printing means, ribbon-feeding means, comprising spools for the ends of the ribbon, means for actuating said spools, mechanism for permitting and restraining the operation of one of said actuating means comprising a pivoted part having a complete reciprocation during a single printing operation, and a wing carried by said pivoted part and in the path of the coil of ribbon wound upon a spool, said wing serving to put said pivoted part into and out of operative relation with a shoulder on said mechanism, said wing being made of bendable material.

26. In a printing machine, the combination of printing means, ribbon-feeding means, comprising spools for the ends of the ribbon, means for actuating said spools, mechanism for permitting and restraining the operation of one of said actuating means comprising a pivoted part having a complete reciprocation during a single printing operation, a wing carried by said pivoted part and in the path of the coil of ribbon wound upon a spool, said wing serving to put said pivoted part into and out of operative relation with a shoulder on said mechanism, and means of limiting the approach of said wing toward its spool.

27. In a printing machine, the combination of printing means, ribbon-feeding means, comprising spools for the ends of the ribbon, means for actuating said spools, mechanism for permitting and restraining the operation of one of said actuating means comprising a pivoted part having a complete reciprocation during a single printing operation, a wing carried by said pivoted part and in the path of the coil of ribbon wound upon a spool, said wing serving to put said pivoted part into and out of operative relation with a shoulder on said mechanism, said swing being made of bendable material, and means for limiting the approach of said wing toward its spool.

28. In a printing machine, the combination of printing means, ribbon-feeding means, comprising spools for the ends of the ribbon, means for actuating said spools, mechanism for permitting and restraining the operation of one of said actuating means comprising a rod having a complete reciprocation during a single printing operation, a combined trigger and wing pivoted on said rod, said trigger having a toe adapted to engage a shoulder on said mechanism, said trigger and wing being formed by bending a piece of sheet metal, said rod carrying a pin extending through a hole in said trigger, said trigger carrying a spring that is adapted to hold the trigger out of operative relation with said shoulder and to yieldingly press said wing toward said spool.

29. In a printing machine, the combination of printing means, ribbon feeding means comprising spools for the ends of the ribbon, means for actuating said spools, mechanism for permitting and restraining the operation of one of said actuating means comprising a part having a reciprocation during each printing operation, a second part that is adapted to be moved by the reciprocation of said first mentioned part, and means influenced by the ribbon for putting said second mentioned part into and out of operative relation with a shoulder on said mechanism, one of the contacting surfaces between said second mentioned part and said

shoulder being so inclined that said second mentioned part shall tend to move into a position of more secure engagement.

30. In a printing machine, the combination of printing means, ribbon feeding means, comprising spools for the ends of the ribbon, means for actuating each of said spools, controlling means that are adapted to be placed in two different positions respectively for permitting and restraining the operation of said actuating means one after the other, a part necessarily having a reciprocation to an operative point each time that a printing

operation is effected, said part being adapted to fully throw said controlling means from one of said operative positions to the other, means influenced by the ribbon for setting said part into a position to engage said controlling means, and means for holding said controlling means in each of its said operative positions. 15 20

In testimony that I claim the foregoing, I have hereunto set my hand this 13 day of June, 1922.

HENRY ABBOTT.