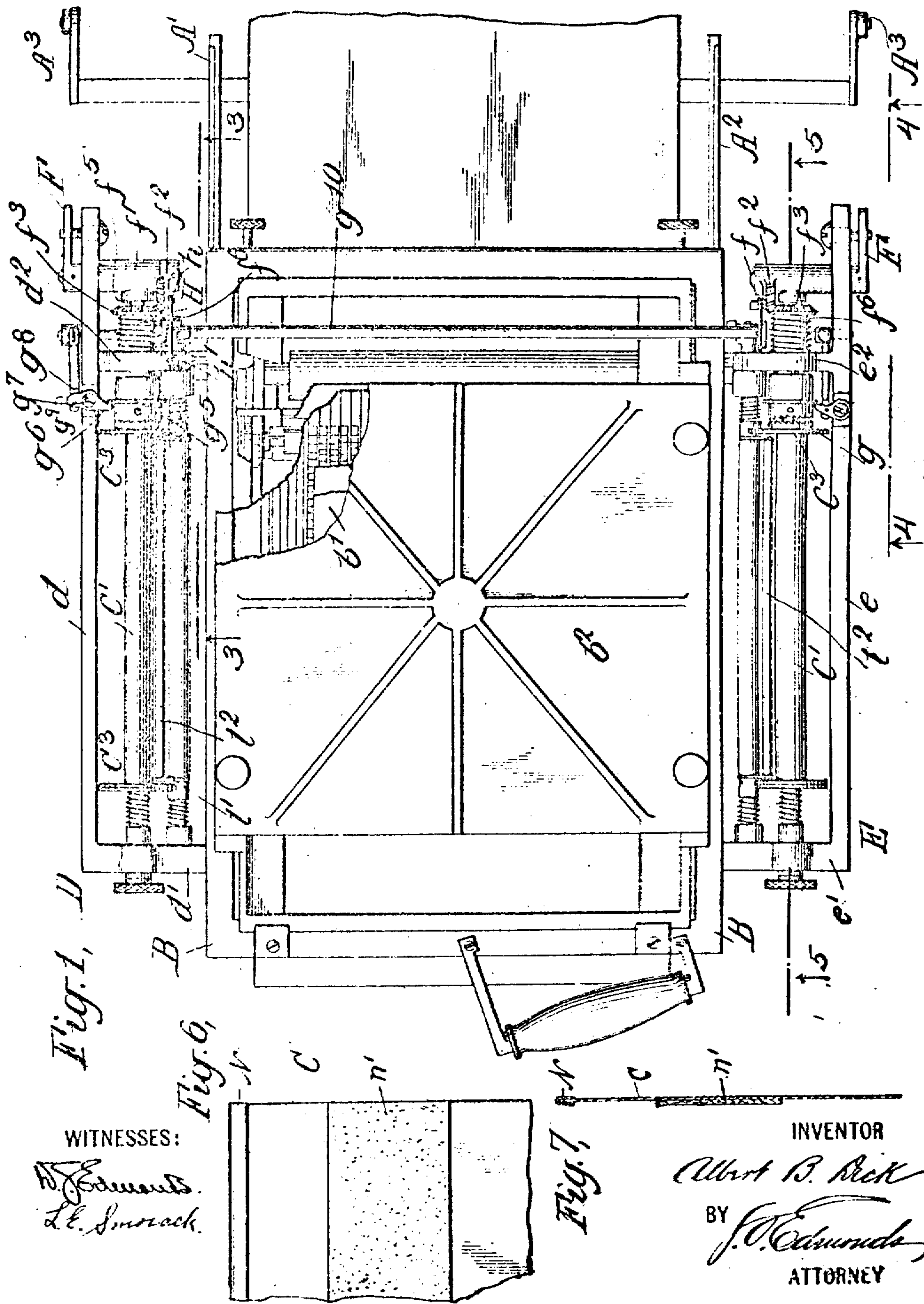


A. B. DICK.  
 RIBBON MECHANISM FOR TYPE PRINTING MACHINES.  
 APPLICATION FILED MAR. 1, 1907.

899,160.

Patented Sept. 22, 1908.

3 SHEETS—SHEET 1.



WITNESSES:

J. Edmunds.  
 L. L. Smorack.

INVENTOR

Albert B. Dick

BY

J. C. Edmunds

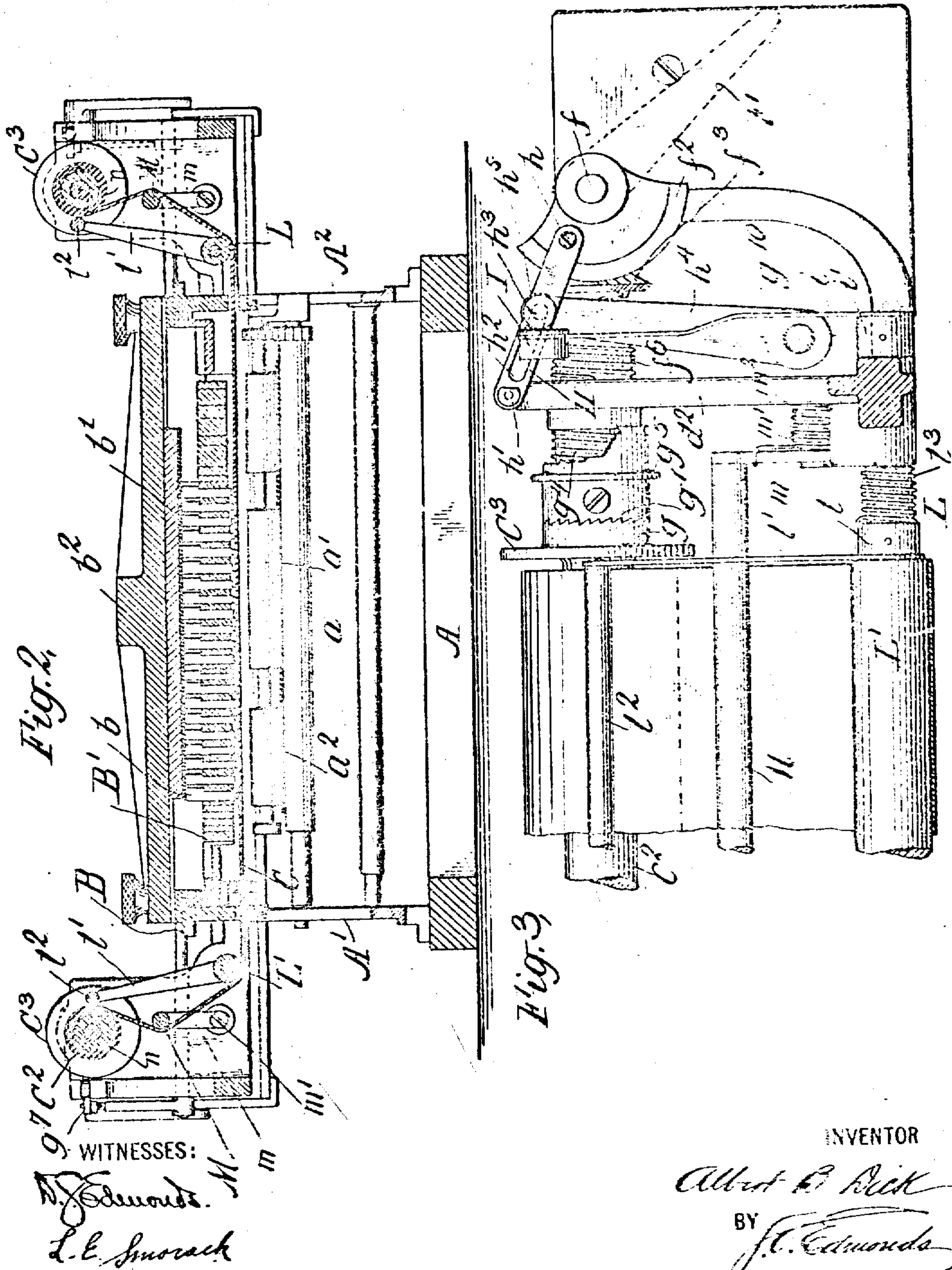
ATTORNEY

A. B. DICK.  
 RIBBON MECHANISM FOR TYPE PRINTING MACHINES.  
 APPLICATION FILED MAR. 1, 1907.

899,160.

Patented Sept. 22, 1908.

333333-SHEET 2.





A. B. DICK.  
 RIBBON MECHANISM FOR TYPE PRINTING MACHINES.  
 APPLICATION FILED MAR. 1, 1907.

899,160.

Patented Sept. 22, 1908.

3 SHEETS—SHEET 3.

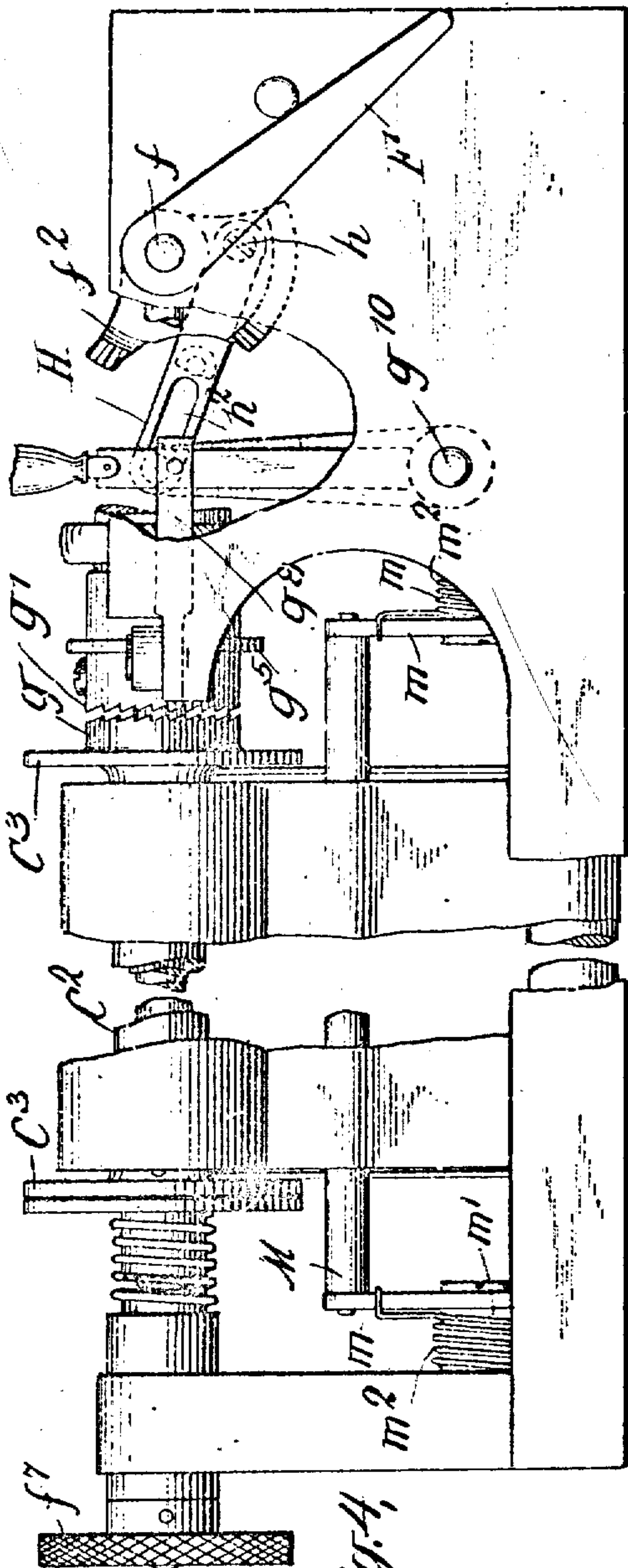


Fig. 4.

WITNESSES:

*J. Edwards*  
*L. E. Smorack*

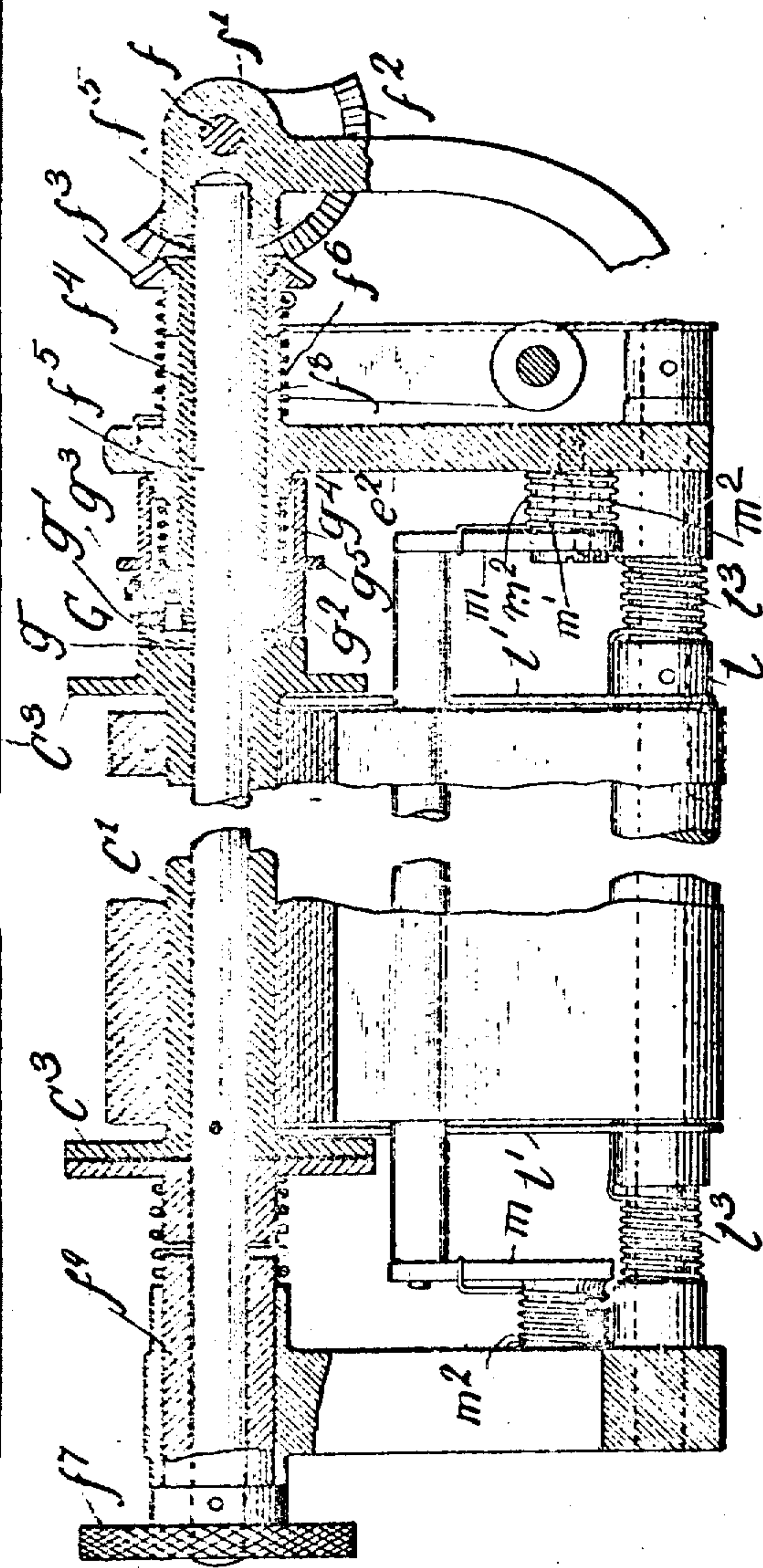


Fig. 5.

INVENTOR

*Albert B. Dick*

BY

*J. Edwards*

ATTORNEY



# UNITED STATES PATENT OFFICE.

ALBERT B. DICK, OF LAKE FOREST, ILLINOIS, ASSIGNOR TO A. B. DICK COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

## RIBBON MECHANISM FOR TYPE-PRINTING MACHINES.

No. 899,160.

Specification of Letters Patent.

Patented Sept. 22, 1908.

Application filed March 1, 1907. Serial No. 360,086.

*To all whom it may concern:*

Be it known that I, ALBERT B. DICK, a citizen of the United States, residing at Lake Forest, in the county of Lake and State of Illinois, have invented a certain new and useful Improvement in Ribbon Mechanism for Type-Printing Machines, of which the following is a specification.

The invention relates more particularly to that class of printing machines in which is employed an ink-ribbon traveling in proximity to the printing device, such, for example, as a form of type, etc., and which ribbon is automatically shifted at the end of its travel so that the feeding thereof relatively to the printing device, preferably recurring during each operation of such device, shall be uninterrupted, the ribbon being fed first in one direction and then in the opposite direction, the change being effected preferably by means of suitable connections between the ribbon-supporting means and a fixed member of the printing apparatus.

The invention although capable of use in other connections and for other purposes is particularly designed, and will herein be described in the form adapted, for use with a printing apparatus of the type disclosed in Letters Patent No. 831,042 granted to me September 18, 1906, and which includes a suitable frame having mounted to reciprocate therein a carriage supporting a type-form, the type being arranged therein with their printing faces downward. Mounted on a frame below the reciprocating carriage is a pressure-roller and between such pressure-roller and the type faces operates an ink-ribbon. The sheets to be imprinted upon are fed successively between the pressure-roller and the ink-ribbon extending over the type faces and are imprinted upon by said type faces and ink-ribbon when pressed into contact therewith by the pressure-roller.

In the present invention the type-form supporting carriage is provided with means for supporting ribbon spools on either side of the type-form and said ribbon and the feeding and reversing mechanism which coact therewith are so constructed and arranged that for each (operative) movement of the carriage (and therefore of the type-form) there will be a corresponding shift of the ink-ribbon, always in the same direction, until such ribbon has been fed almost its entire length, whereupon, automatically,

its direction of travel will be reversed, its movement thereafter being in the reverse direction, with the result that regardless of the length of the ribbon and of its direction of travel the same will be automatically shifted so as to present a fresh surface thereof for coaction with the type, each time the type-form assumes operative position to imprint upon a sheet.

The preferred form of the invention selected for the purpose of this disclosure is illustrated in the drawings in which

Figure 1 is a top plan view of a printing machine embodying my invention; Fig. 2 is a transverse section thereof; Fig. 3 is a section taken on the line 3—3 Fig. 1; Fig. 4 is a side elevation looking in the direction indicated by lines and arrows 4, 4, Fig. 1; Fig. 5 is a section taken on the line 5—5 Fig. 1; Figs. 6 and 7 are respectively a plan view and central longitudinal section of a portion of the ink-ribbon illustrated in the other figures.

Referring to these drawings, A designates a suitable base, upon which is mounted the supporting frame which includes the side members A' A'. This supporting frame as described in detail in the patent above mentioned has, suitably mounted therein, a pressure-roller, means for throwing the same to operative or inoperative positions and in addition, if desired, sheet-feeding mechanism such for example as the rolls *a*, *a'* between which the impression sheet *a''* is passed.

The apparatus, as thus far specifically referred to, forming no part of the present invention, but having as above indicated been previously disclosed, need not be described in detail.

Mounted to reciprocate over the supporting frame just described is the carriage, best shown in Figs. 1 and 2, which includes the frame B, having supported therein the type-form B' carrying type *b*, their printing faces downward, and over such type extends an elastic pad *b'* and a pressure plate *b''*. As will be seen (Fig. 1) the type are set up in lines extending in the direction in which the carriage is reciprocated and below the faces of such type operates (see Fig. 2) the ink-ribbon C, supported upon the carriage or an appurtenance thereof so that, in this embodiment of the invention, the whole of said ribbon will move with the carriage and therefore with the type-form.



Extending outwardly on either side of the carriage and either secured to or formed integral with the frame B thereof, are the brackets D, E, the former including the side member  $d$  and cross members  $d'$ ,  $d''$  and the latter including the side member  $e$  and the cross members  $e'$ ,  $e''$ .

The ribbon supporting, feeding and reversing mechanism at one side of the carriage is substantially the same as that of the other and therefore but one side need be described in detail, after which such differences as exist may be pointed out very briefly.

The ink-ribbon C is mounted upon suitable spools C', and in the operation of the device now to be described one of these spools is driven when the ribbon is fed in one direction, the other spool being driven when the direction of travel of the ribbon is reversed. To accomplish this there is a feeding and reversing device adjacent to one end of each of the spools and extending between these is a connecting shaft the purpose and operation of which will presently appear.

Each of the side members A', A'', of the supporting frame, over which the reciprocating carriage travels, is provided with a stop A<sup>3</sup> lying in the path of movement of a sector arm F, keyed to a stub-shaft  $f$  journaled in a bearing-block  $f'$  carried by the side member  $d$  of the bracket D. Keyed to the opposite end of said stub-shaft  $f$  is a sector gear  $f^2$  which meshes with a corresponding bevel-gear  $f^3$  keyed to a sleeve  $f^4$ , mounted upon a shaft  $f^5$  one end whereof is journaled in the bearing-block  $f'$ , the other end, provided with milled nut,  $f^7$ , being journaled in a sleeve  $f^6$  carried by the cross-member  $d'$  of bracket D. Said sleeve  $f^4$  operates within a bearing  $f^8$ , here shown as integral with cross-member  $d''$  of the frame and extending around the exterior of said bearing and around an annular extension of the gear  $f^3$ , and secured at its ends to each of these, is a coil-spring  $f^9$  exerting tension upon said gear  $f^3$  to restore the latter, and sector-gear  $f^2$ , after coaction of the arm F and stop A<sup>3</sup>.

G designates a clutch, one member  $g$  whereof is here shown as formed integral with one of the disks or heads C<sup>2</sup> of the spool C', the other member  $g'$  having tubular form and the coacting edges of both being provided with serrations. The inner end of the sleeve  $f^4$  is provided with a bushing  $g^2$  having an opening therein which coacts with the end of a screw  $g^3$ , passing through the tubular member  $g'$  of the clutch to limit the movement of that member longitudinally. As clearly shown in Fig. 5, said tubular member is of greater diameter than the bearing  $f^8$  and between these is arranged a coil-spring  $g^4$  exerting pressure upon the tubular member to keep the same in engagement with the disk member  $g$  of the clutch. Said tubular member is also provided with a circumferen-

tial flange  $g^5$  and with this coacts a lever  $g^6$  pivoted at  $g^7$  upon the side member  $d$  of the bracket D, its opposite end being connected by means of an arm  $g^8$  with a lever  $g^9$  secured eccentrically to the cross-connecting rock-shaft  $g^{10}$ .

As will be seen, the movement of the rock-shaft  $g^{10}$  causes a corresponding movement of the lever  $g^6$  which thereby controls the engagement between the members  $g$ ,  $g'$  of the clutch G. Ordinarily (by reason of spring  $g^4$ ) the said members are in engagement, so that the movement of the lever  $g^6$  is against the tension of said spring when throwing said clutch members out of engagement. On every forward movement of the carriage the sector-arm F is brought into contact with the stop A<sup>3</sup>, and the sector-gear  $f^2$  thereby operated to transmit movement to gear  $f^3$ , sleeve  $f^4$  and tubular member  $g'$  of the clutch G. Obviously whether this movement will cause a corresponding movement of the disk member  $g$  of the clutch and therefore of the ribbon-spool, depends upon the engagement or disengagement of the members  $g$ ,  $g'$  of the clutch and this is controlled in the following manner. The sector-gear  $f^2$  is provided with a crank-arm H pivoted to said sector-gear at  $h$ . This crank-arm is provided at its free end with a lug  $h'$  and intermediate of its ends with an elongated slot  $h^2$ . Operating within said slot is a pin  $h^3$  carried by the upper end of an arm  $h^4$  keyed or otherwise secured upon the rock-shaft  $g^{10}$ . The free end of the pin  $h^3$  is provided with an enlarged head  $h^5$ . The pin  $h^3$  and slot  $h^2$  are of such size that the former will work freely in the latter.

As will presently be seen, the throwing out of the clutch G is effected by means of the crank-arm H, through the movement of the rock-shaft  $g^{10}$  above referred to and this movement is controlled by the ink-ribbon, as presently described. For present purposes it is to be understood that the movement of said crank-arm is such that ordinarily the lug  $h'$  at the free end thereof is not brought into coaction with the head  $h^5$  and therefore no movement of the rock-shaft  $g^{10}$  results. When, however, the block I, at the end of upwardly extending arm  $i$ , (which block normally lies out of the path of movement of the lug  $h'$ ) is, through the travel of the ink-ribbon, permitted to interpose itself between said lug  $h'$  and the head  $h^5$ , the movement (to the right, Fig. 3) of the lug  $h'$  brings it into contact with said block I forcing said block I into contact with the lug  $h'$  and thereby, through the instrumentality of the arm  $h^4$ , rocking the shaft  $g^{10}$  and operating the clutch controlling lever  $g^6$ . The arm  $i$  is mounted upon a collar  $i'$  secured to the end of a shaft L, journaled in the cross-members  $d'$ ,  $d''$  of the bracket D. Said shaft L lies in a plane parallel with the axis of the



ribbon-spool C', and as shown in Fig. 3, below the same. Secured to shaft L is a bail comprising the collars l, keyed to said shaft, two arms l' secured to and upwardly extending from said collars, the upper ends of said arms being connected by a rod or bar l'' constituting a follower for the core of the ink-ribbon. A tension device, here shown in the form of coil-springs l'', exerts tension upon the said bail, forcing bar l'' into coaction with said core. The shaft L is provided with an idler-sleeve L' for coaction with the ribbon as hereinafter explained.

M designates an idler-roll mounted on the upper ends of the arms m, the lower ends of said arms being mounted upon stub-shafts m' around which are coiled springs m'', placing the idler-roll M under tension in the same direction as the follower just described. The ribbon from the spool shown at the left in Fig. 2 passes partially around the idler-roll M, thence partially around the sleeve L' on shaft L, thence under the type-form and to the corresponding instrumentalities at the other side of the carriage.

The ink-ribbon is shown in detail in Figs. 6 and 7. In its preferred form each end thereof is secured between the parallel faces of the metallic clamp X of such size as to snugly fit within a slot n in one of the spools C'. Secured to said ribbon at a suitable point adjacent to each end of said ribbon is a thickened portion n' which may be formed in any suitable manner, as, for example, by securing together a number of folds of the ribbon or by attaching thereto a portion of substantially thicker material, by means of stitching or an adhesive. The purposes of this thickened portion will now be explained.

The follower l'' is, as above stated, maintained through its tension device in close engagement with the ribbon upon each of the spools. When, therefore, a substantial quantity of the ribbon is wound upon one spool, the adjacent follower l'' is removed a substantial distance from the spool and as a result the block I is removed a corresponding distance from the path of movement of the lug k'. As the feeding of the ribbon continues and as the diameter of the combined spool and ribbon decreases, the follower is permitted to move closer to the spool and said block I, controlled thereby, is also permitted to move closer to the path of movement of the lug k'. Finally it is brought to a point almost within the path of movement of said lug. At this moment the thickened portion of the ribbon is fed from the spool, the follower being in contact therewith, and as said follower passes out of engagement with said thickened portion the shaft L, theretofore moved by almost imperceptible stages, is permitted to rock sufficiently to carry the block I, at one decisive step, into the path of movement of the lug k', this having the effect of increasing the

stroke of said lug which thereupon, through the arm h', rocks shaft q''. The result of the rocking of the shaft as above indicated, is to throw out the clutch at one side of the machine and to throw in the clutch at the other side of the machine, whereupon the direction of travel of the ribbon is reversed.

The slight differences heretofore alluded to between the ribbon supporting, feeding and reversing instrumentalities on either side of the carriage result merely from the fact that these naturally face in opposite directions instead of in the same direction. Due to this the link or lever H on one side of the machine is pivoted to the sector-gear f'' on that side near one edge of said gear (Fig. 3) and at the other side of the machine near the opposite edge (Fig. 4) of said gear. Also as will be seen, the connection between the rock-shaft q'' and clutch-operating lever g'' on one side of the machine is exactly reversed (so far as concerns the effect of the movement of said shaft) at the other, with the result that as the tubular clutch member g' on one side of the machine is thrown into engagement with its coacting clutch member the tubular clutch member at the other side of the machine is thrown out of engagement with its coacting clutch member. The feeding of the ribbon step by step in correspondence with the reciprocating movement of the carriage results from the movement of the sector-gear adjacent to the (operative) clutch and the movement of this is in turn controlled by the coaction of the adjacent sector-arm F and stop A'. The corresponding instrumentalities at the other side of the machine operate in the same manner, on the reciprocation of the carriage, save that the clutch members at that side of the machine being out of operative relation, no movement is transmitted to the spool. As a result the ribbon is drawn freely from the spool at that side and positively taken up by the spool at the opposite side where the members of the clutch are in engagement.

Having now described my invention, what I claim as new therein and desire to secure by Letters Patent is as follows:—

1. The combination of a movable carriage, a printing device supported thereby, spools mounted on said carriage and a ribbon carried thereby, feeding mechanism for said ribbon, reversing mechanism for the ribbon, a movable member held yieldingly in engagement with the ribbon on one of said spools, and means controlled by the position of said member for operating said reversing mechanism, substantially as set forth.

2. The combination of a movable carriage, a printing device supported thereby, spools mounted on said carriage and a ribbon carried thereby, said ribbon having a thickened portion thereon adjacent to one end, feeding mechanism for said ribbon, reversing mech-



anism for the ribbon, a movable member held yieldingly in engagement with the ribbon on one of said spools, and means controlled by the position of said member for operating said reversing mechanism, substantially as set forth.

3. The combination of a movable carriage, a printing device supported thereby, spools mounted on the carriage and a ribbon carried thereby, a clutch for each of said spools, a rock-shaft, connections between said shaft and said clutches to simultaneously throw one clutch to operative position and the other to inoperative position, a movable member held yieldingly in engagement with the ribbon on one of said spools, and means controlled by the position of said member for operating said rock-shaft, substantially as set forth.

4. The combination of a movable carriage, a printing device supported thereby, spools mounted on the carriage and a ribbon carried thereby, devices for feeding the ribbon in the direction of its length, a part movable in correspondence with the movement of the carriage, a member held yieldingly in engagement with the ribbon on one of said spools, and means controlled by the coaction of said part with said member for reversing the direction of feeding movement of said ribbon, substantially as set forth.

5. The combination of a movable carriage, a printing device supported thereby, spools mounted on the carriage and a ribbon carried thereby, ribbon-feeding mechanism, ribbon-reversing mechanism, a part movable in correspondence with the movement of the carriage, a member held yieldingly in engagement with the ribbon on one of said spools, and means dependent upon the position of said member for causing said part to actuate said ribbon-reversing mechanism, substantially as set forth.

6. The combination of a movable carriage, a printing device supported thereby, an ink-ribbon, spools on which the ends of the ribbon are wound, said ribbon having an operating device thereon adjacent to each end, ribbon-feeding mechanism, means actuated by the movement of the carriage for operating said ribbon-feeding mechanism, and means actuated by said operating devices upon the ribbon for reversing the direction of feed of the ribbon, substantially as set forth.

7. The combination of a movable carriage, a printing device supported thereby, spools mounted on the carriage, a ribbon carried by said spools and having a thickened portion therein adjacent to each end, ribbon feeding mechanism, means actuated by the movement of the carriage for operating said feeding mechanism, and means actuated by said thickened portions of the ribbon for reversing the direction of feed of the ribbon, substantially as set forth.

8. The combination of a movable carriage, a printing device supported thereby, an ink-ribbon, spools on which the ends of the ribbon are wound, said ribbon having an operating device thereon adjacent to each end, a ribbon-feeding device coacting with each of said spools, means actuated by the movement of the carriage for operating one or the other of said devices, a connection between said feeding devices, and means actuated by said operating devices upon the ribbon for automatically throwing one of said ribbon-feeding devices into operative relation to its spool and the other of said devices into inoperative relation to its spool, substantially as set forth.

9. The combination of a movable carriage, a printing device supported thereby, spools mounted on the carriage, a ribbon carried by said spools and having a thickened portion therein adjacent to each end, ribbon feeding mechanism, including a clutch for each of said spools and a connection between the clutches, means actuated by the movement of the carriage for operating said mechanism to feed one or the other of said spools, and means actuated by said thickened portions in the ribbon for simultaneously operating said clutches to connect said operating means for the spools to one of the spools and disconnect it from the other, substantially as set forth.

10. The combination of a movable carriage, a printing device supported thereby, an ink-ribbon, spools on which the ends of the ribbon are wound, said ribbon having a thickened portion therein adjacent to its end, ribbon-feeding mechanism actuated by the movement of the carriage, a member held yieldingly against the ribbon on one of said spools, and means controlled by said member for reversing the direction of feed of the ribbon, substantially as set forth.

11. The combination with a movable carriage and a printing device supported thereby, of an ink-ribbon mounted upon spools supported by said carriage, feeding mechanism for said spools, reversing mechanism for said ink-ribbon, and means for actuating said reversing mechanism, said means including a follower coacting with said ink-ribbon, substantially as set forth.

12. The combination with a movable carriage and a printing device supported thereby, of an ink-ribbon, spools for feeding and taking up said ink-ribbon, and feeding mechanism for said spools, said mechanism including clutches a connection between the same for simultaneously throwing one clutch to operative position and the other to inoperative position, and a device held yieldingly against said ribbon controlling the operation of said clutches, substantially as set forth.

13. The combination with a movable carriage and a printing device supported thereby, of an ink-ribbon and spools supported by



said carriage for feeding and taking up said ribbon, a clutch adjacent to each of said spools and determining its operation, a rock-shaft, and connections between the ends thereof and said clutches to simultaneously throw one of said clutches to operative position and the other to inoperative position, substantially as set forth.

14. The combination with a movable carriage and a printing device supported thereby, of an ink-ribbon and a spool coacting therewith, said ribbon having an operating device thereon adjacent to one end, a follower coacting with said ribbon as the same is wound from said spool, and means controlled by said follower for determining the operativeness of said spool, substantially as set forth.

15. The combination with a movable carriage and a printing device supported thereby, of an ink-ribbon, and reversing means therefor comprising clutches, a rock-shaft connected with said clutches to simultaneously throw one to operative position and the other to inoperative position, a reciprocating lug operated by the movement of said car-

riage, a follower coacting with said ink-ribbon, and means controlled by said follower for causing said lug to operate said rock-shaft, substantially as set forth.

16. The combination with a movable carriage and a printing device supported thereby, of an ink-ribbon, and reversing means therefor comprising clutches, a rock-shaft connected with said clutches to simultaneously throw one to operative position and the other to inoperative position, a reciprocating lug operated by the movement of said carriage, a follower coacting with said ink-ribbon, and a block controlled by said follower and movable, as said follower approaches the core of said spool, into the path of movement of said lug to effect the movement of said rock-shaft and thereby effect the reversal of the direction of travel of said ribbon, substantially as set forth.

This specification signed and witnessed this 13th day of February, 1907.

ALBERT B. DICK.

Witnesses:

S. O. EDMONDS,  
D. S. EDMONDS.