No. 662,790.

Patented Nov. 27, 1900.

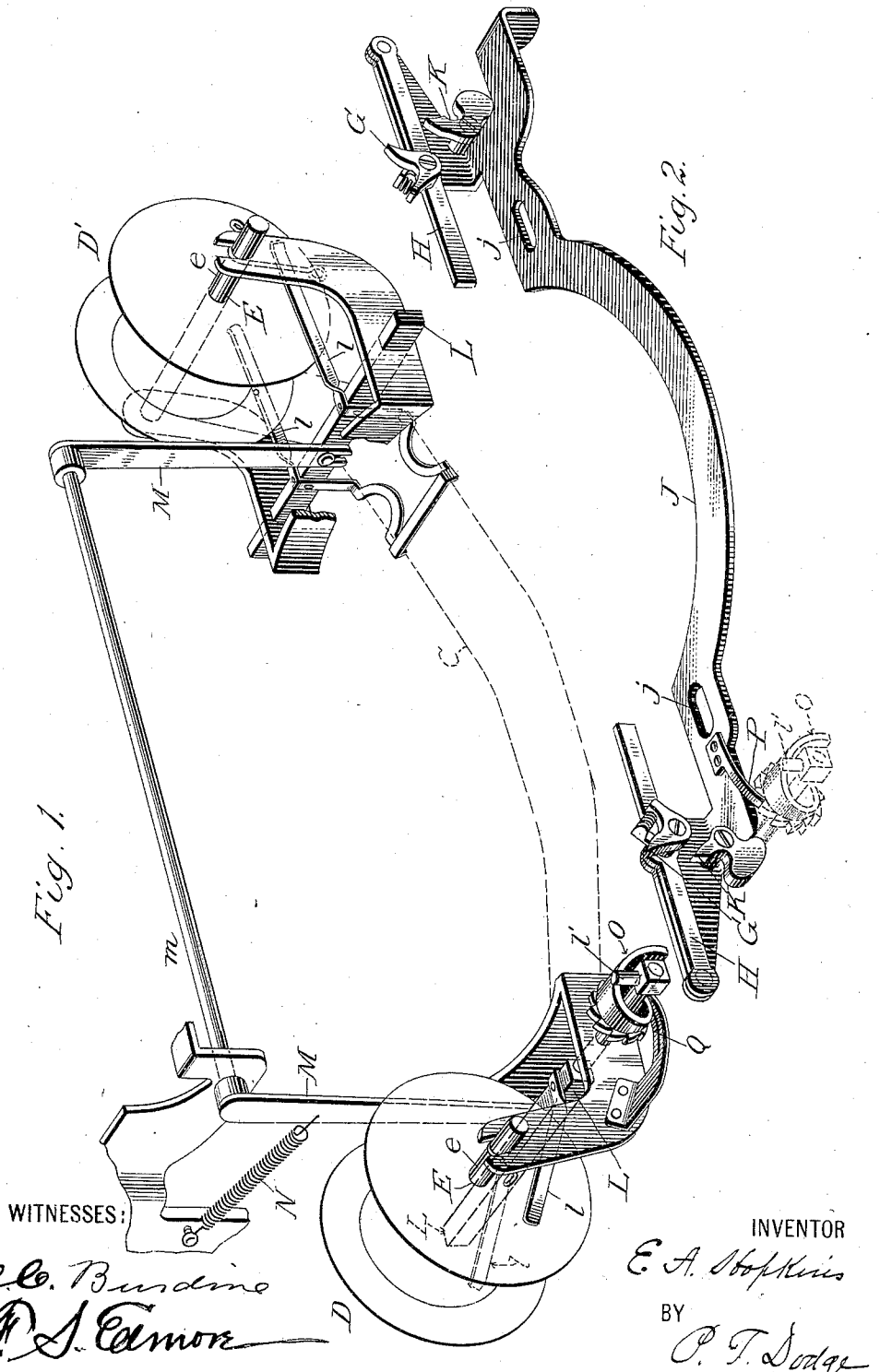
E. A. HOPKINS.

TYPE WRITING MACHINE.

(No Model.)

(Application filed June 30, 1900.

3 Sheets—Sheet 1




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## TYPE WRITING MACHINE.

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(No Model.) 3 Sheets—Sheet 2.

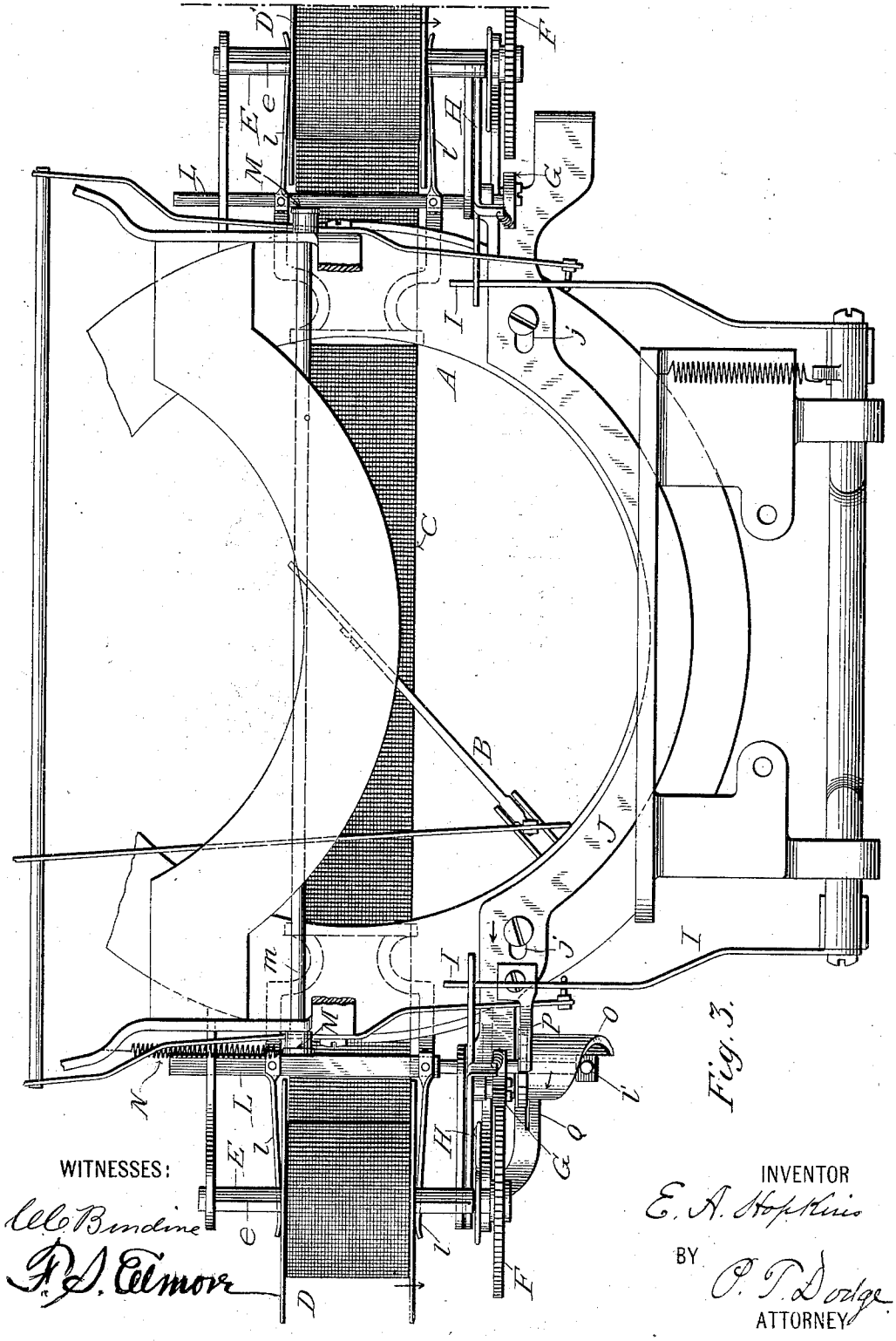



Fig. 3.

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## TYPE WRITING MACHINE.

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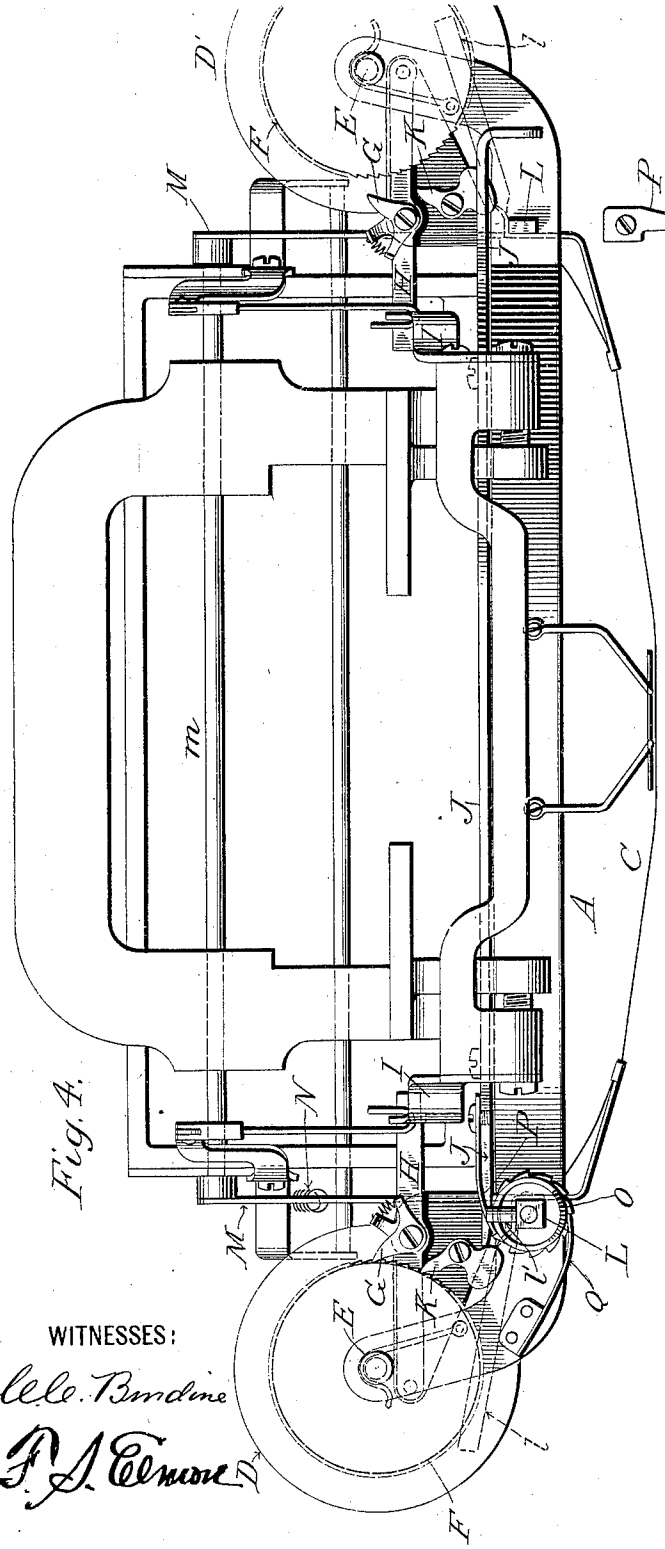


Fig. 4.

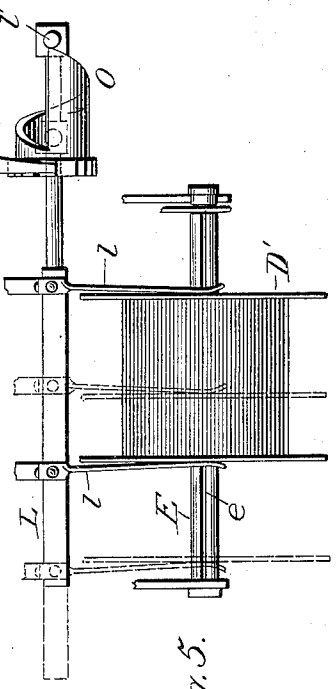


Fig. 5.

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# UNITED STATES PATENT OFFICE.

EDWARD A. HOPKINS, OF NEW YORK, N. Y., ASSIGNOR TO THE ELLIOTT & HATCH BOOK TYPEWRITER COMPANY, OF NEW YORK.

## TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 662,790, dated November 27, 1900.

Application filed June 30, 1900. Serial No. 22,196. (No model.)

*To all whom it may concern:*

Be it known that I, EDWARD A. HOPKINS, of New York, (Brooklyn,) county of Kings, and State of New York, have invented a new and useful Improvement in Type-Writing Machines, of which the following is a specification.

In type-writing machines it is customary to employ an ink-ribbon stretched between two spools, the rotary motion of which is reversed from time to time in order that the ribbon may be slowly wound first upon one spool and then upon the other in order to carry its entire length over the printing-point between the paper and the type. The ribbon is much wider than the type, and therefore it is desirable to shift the spool endwise in order that the type may in the course of time act on all portions of the ribbon in order to fully utilize the same. Heretofore the spools have been mounted so that they could be moved endwise by hand and in some cases combined with mechanism for constantly and gradually moving them to and fro while the ribbon was being fed longitudinally, so that the type would act successively in lines extending diagonally or transversely of the ribbon. My invention contemplates the action of the type in straight lines lengthwise of the ribbon and the movement of the ribbon laterally after it has been acted upon throughout its length, so that during its reverse movement it will be acted upon in a second straight line parallel with the first, and so on repeatedly. To this end I combine with the spools and their reversible feed mechanism devices by which the spools are moved axially a slight distance each time that the feed devices are reversed to change the direction of travel of the ribbon.

My improvement, although applicable to type-writers in general, is designed more particularly for use on book type-writers, in which the type-arms strike in a downward direction, and I have therefore shown it applied to a commercial machine of the Elliott & Hatch type, essentially such as represented in Letters Patent of the United States No. 615,017. In its general organization the machine may be of ordinary construction.

Figure 1 is a perspective view representing in outline my mechanism. Fig. 2 is a perspective view of detached parts. Fig. 3 is a top plan view showing in outline portions of the type-writing machine with my improvements applied thereto. Fig. 4 is an outline elevation of the writing-machine with my improvements incorporated therein. Fig. 5 is a side view of one of the spools and the adjacent adjusting-cam forming part of my invention.

In the drawings, A represents the angular main frame, carrying a series of type-arms B, actuated by finger-keys and arranged to strike downward at a central printing-point upon the ink-ribbon C, which is stretched horizontally beneath the frame between the two spools D and D′, the paper to be printed upon lying horizontally beneath the ribbon on a platen or other support, as usual. The ribbon-spools are sustained each on a shaft E, mounted at their ends in arms on the frame. Each shaft is provided with a longitudinal spline or feather *e*, compelling the rotation of the spool therewith and permitting it to slide endwise. Each spool-shaft is provided at one end with a ratchet-wheel F, rotated intermittingly by a pawl G on a vertically-vibrating lever H, the inner end of which is acted upon by a vertically-vibrating arm I, forming part of the feed mechanism of the usual type-writer, so that each time the feed mechanism is operated the lever will be raised and the ratchet-wheel and spool make a slight rotation. The two pawls G are arranged to feed the ribbon in opposite directions, and only one dog or pawl is in operation at a time. In order to permit them to be thrown into and out of action to effect the reversal of the course of the ribbon, the pawl-carrying levers H are pivoted to the ends of a supplemental bar or frame J, which is extended across the frame of the writing-machine, provided with longitudinal slots *j*, and secured by screws, so that it may be pushed endwise to the right or left in order to bring one or the other of the dogs

G into operative relation to the adjacent wheel F. The retrograding of the spool being turned is prevented by a weighted pawl K, also pivoted to the supplemental sliding frame, one at each end thereon.

It will be observed that the foregoing mechanism serves to turn the spools and to feed the ribbon first in one direction and then in the other over the printing-point. So long as the spools have a rotary motion only and no motion in the direction of their axes the type will act along a single narrow line on the ribbon parallel with its edges. To change this line of travel, as already referred to, I mount in the frame adjacent to each spool a transversely-sliding bar L, having two arms *l* fitting against opposite ends of the spool, so that as the bar is shifted the arms will move the spool axially, or, in other words, in a direction transverse to the length of the ribbon.

In order to effect the simultaneous movement of the two spools, I connect the two shifting bars L to the lower ends of the arms M, fixed to opposite ends of a horizontal rock-shaft *m*, mounted in the machine-frame.

In order to cause the axial movement of the spools, I connect to either or both of the arms M a spring N, extended to the frame and serving through the arms to urge both spools in one direction along their shafts. To move them in the opposite direction, I mount on one of the spool-supporting arms of the main frame a cam O, encircling the end of one of the shift-bars L and having a spirally-curved and stepped edge to act against the pin *l'* on said bar, so that as the cam is turned it will draw the bar and the spool in one direction until the highest point of the cam-surface is reached, when the pin *l'* will be released and the bar permitted to snap back to its original position, the pin or stud *l'* falling to the lowest part of the cam-surface and the spool assuming the first position. This cam is turned step by step by means of ratchet-teeth formed on its outer surface and acted upon by a spring-pawl P on the sliding or secondary frame J, as specially indicated in Figs. 2, 3, and 4. Its retrograde motion is prevented by spring-pawl Q.

By reason of the foregoing arrangement it follows that when the frame J is shifted to the left to change the course of the ribbon it will at the same time by turning the cam O cause the movement of both ribbon-spools in an axial direction, so that during the operation of the machine the type will act on the ribbon along a new path or line parallel with the first. By repetition of the action described the type are caused to act on the ribbon in a series of parallel longitudinal lines following each other from one edge of the ribbon to the other, after which the ribbon assumes its first position and the type again begin their action thereon near one edge.

It is to be observed that the shifting of the ribbon laterally and its feed longitudinally do not occur simultaneously in my machine. In other words, the movement of the ribbon laterally to a new position and its gradual feed longitudinally take place alternately, one having no relationship to the other. It is also to be observed that the mechanism for turning the spools has no operative connection with the mechanism for shifting the spools axially. The rotation of the spool is effected through the ratchet mechanism from the finger-keys, while the axial movement is effected by the manually-operated device which reverses the ratchet mechanism. My ribbon cannot move longitudinally while it is being moved laterally, nor can it move laterally while it is being moved longitudinally.

What I claim as my invention is—

1. In a type-writing machine, the combination of an ink-ribbon, two winding-spools attached to opposite ends thereof, alternately-acting mechanisms, serving respectively to shift the spools in an axial direction and to turn the spools, whereby the ribbon is fed longitudinally in an unchanging path and then shifted laterally preparatory to its travel in a new path.

2. In a type-writing machine, the combination of an ink-ribbon, of mechanism actuated from the finger-keys for feeding the ribbon step by step longitudinally, and means acting independently of the above-named mechanism for shifting the same laterally at intervals, whereby the longitudinal and lateral movements of the ribbon are effected wholly independent of each other.

3. In a type-writer, an ink-ribbon, two spools between which the ribbon is wound to and fro, mechanism for turning the respective spools alternately and in opposite directions, shifting mechanism for throwing the feed devices of the respective spools alternately into and out of action, and means for moving the spools endwise, actuated by said shifting mechanism.

4. In a type-writer, the combination of an ink-ribbon, the two spools and their ratchet-wheels, the pawls and their operating devices, the shifting frame to which they are attached, means for feeding the spools endwise in unison, and means connected with the shifting frame for effecting said movement of the spools in the act of reversing the direction of the ribbon-feed.

5. In a type-writer, the spools, their feed mechanism, the sliding frame for reversing the action of said feed mechanism, a cam and connections for shifting the spools endwise, and a device connected with the sliding frame for rotating the cam step by step in the act of reversing the feed mechanism.

6. In a type-writer, two ribbon-carrying spools, movable in an axial direction, connections to insure equal movement of the two spools, a spring tending to move the spools in one direction and a stepped cam to move them in the opposite direction.

7. In a type-writer, two ribbon-carrying spools movable in an axial direction, connecting devices to secure their equal movement, a spring connection tending to move them axially in one direction, a cam controlling their to-and-fro motion, means for reversing the rotation of the spools and at the same time actuating the cam.

In testimony whereof I hereunto set my hand, this 27th day of June, 1900, in the presence of two attesting witnesses.

EDWARD A. HOPKINS.

Witnesses:
JOHN F. GEORGE,
M. A. DRIFFILL.