J. M. SCHUTZ.

PRINTING MACHINE.

APPLICATION FILED JUNE 3, 1912.

1,132,623.

Patented Mar. 23, 1915

4 SHEETS—SHEET 1.

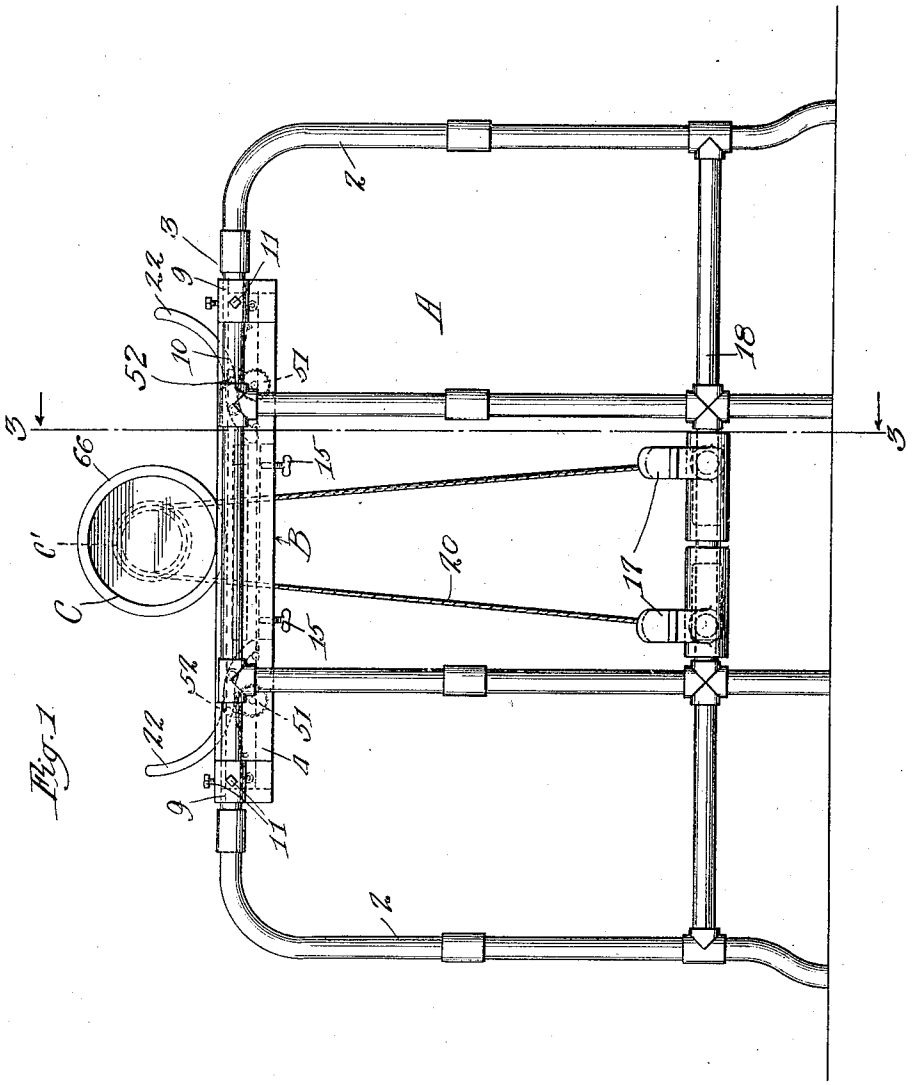


Fig. 1.

Witnesses:
Earl E. Howe.
Robert S. McCready.

Inventor:
Joseph M. Schutz:
by: Clarence Cullen Kearney
Atty:

NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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4 SHEETS—SHEET 2.

Fig. 2.

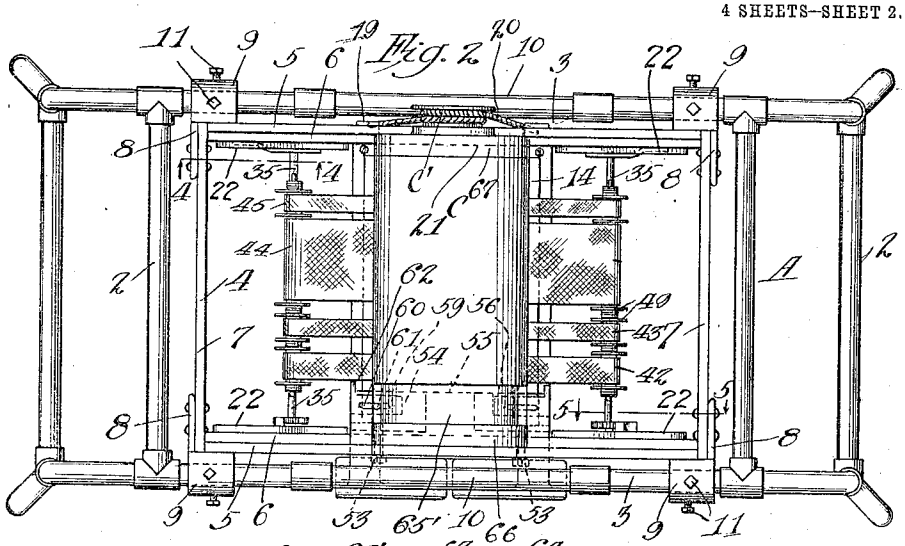
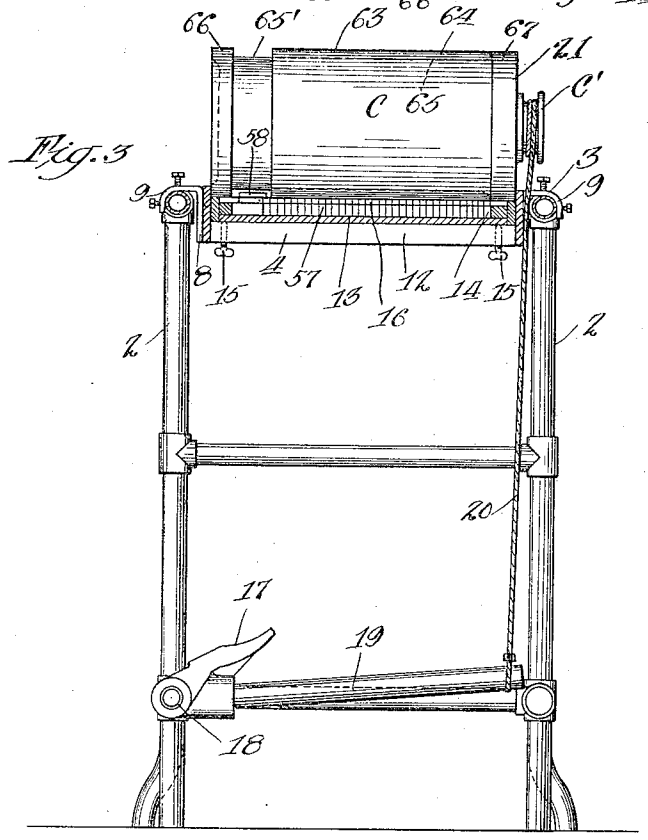


Fig. 3.



Witnesses:
Earl E. Howe.
Robert S. McCready.

Inventor:
Joseph M. Schutz.
by: Charles Allen Brown
Atty.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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4 SHEETS—SHEET 3.

Fig. 4

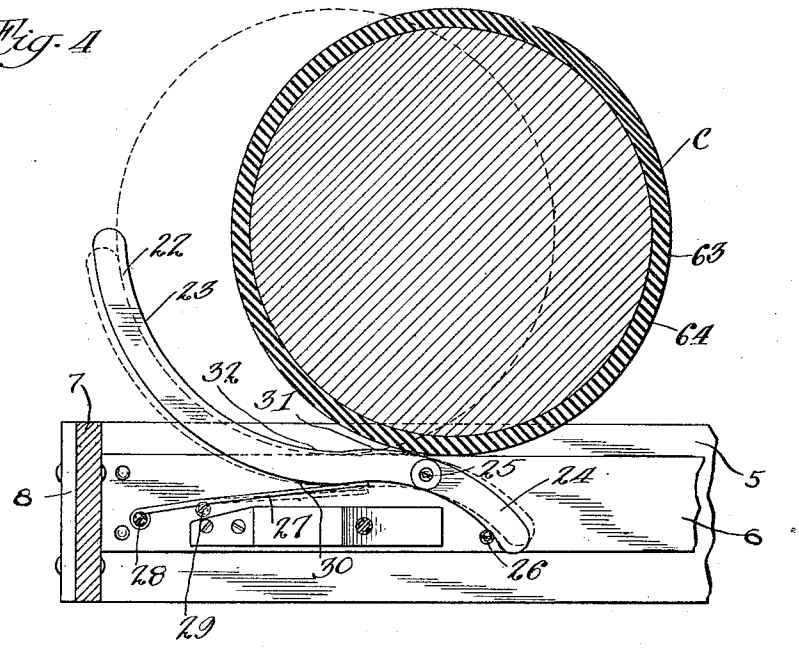
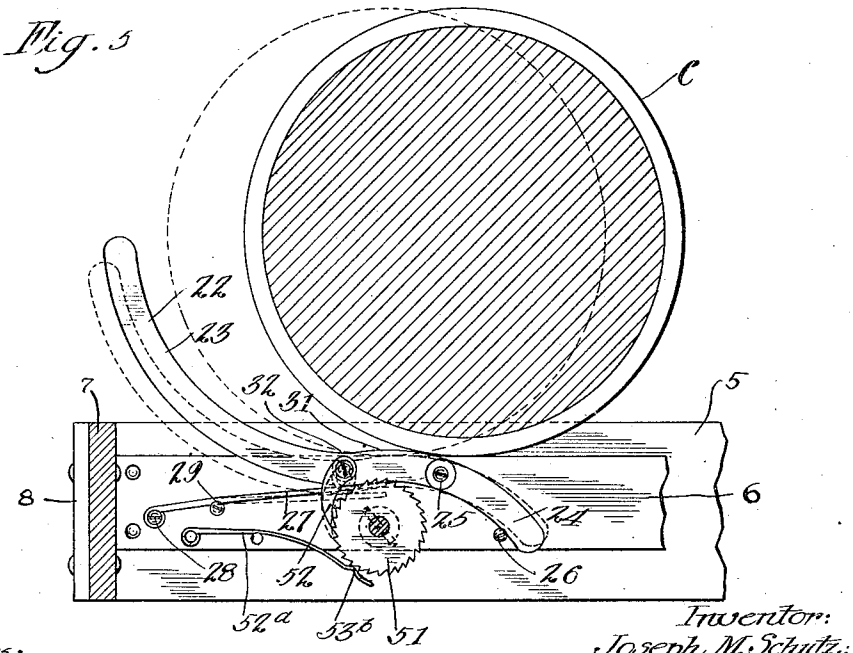


Fig. 5



Witnesses:

Earl E. Howe.

Robert S. McQuaid.

Inventor:

Joseph M. Schutz.

by: Edward Lowry Keasbey

Atty.

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4 SHEETS—SHEET 4.

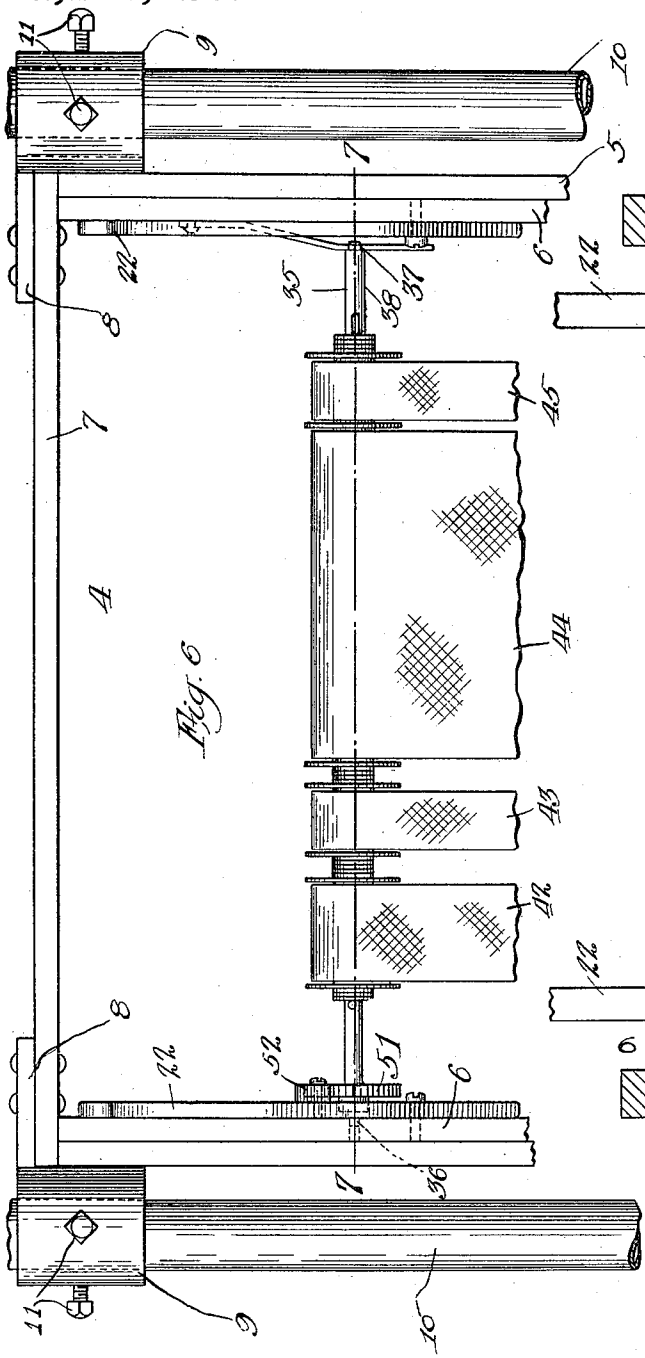


Fig. 6

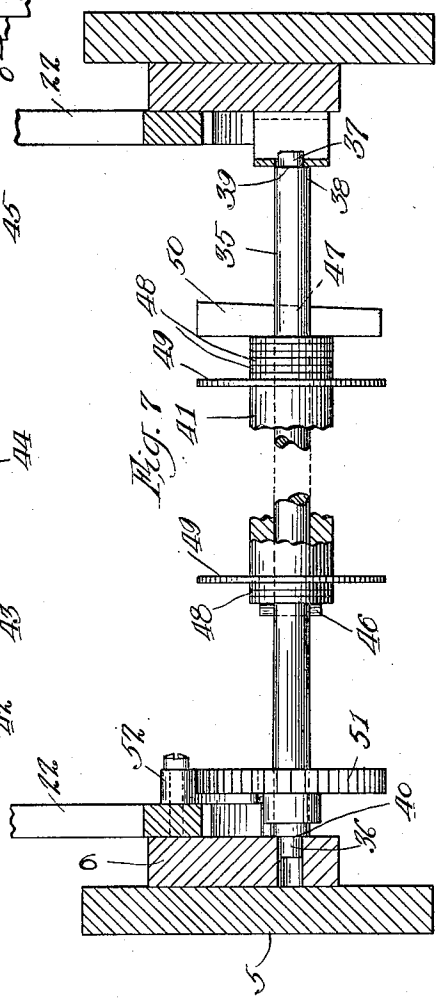


Fig. 7

Witnesses

Robert S. McGrady

Earl E. Howe

Inventor

Joseph M. Schutz.

by Glascock Downing & Seibold

Atty.

THE NORRIS-PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JOSEPH M. SCHUTZ, OF CHICAGO, ILLINOIS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO PED-O-GRAPH COMPANY, A CORPORATION OF ARIZONA.

PRINTING-MACHINE.

1,132,623. Specification of Letters Patent. Patented Mar. 23, 1915.

Application filed June 3, 1912. Serial No. 701,272.

To all whom it may concern:

Be it known that I, JOSEPH M. SCHUTZ, a citizen of the United States, and a resident of Chicago, county of Cook, and State of Illinois, have invented a certain new, useful, and Improved Printing-Machine, of which the following is a specification.

My invention relates to improvements in printing machines and has particular reference to a novel printing machine, which may be aptly described as a lettergraph, which is of a form and construction particularly adapted to be manually operated for the production of facsimile typewritten letters.

The object of my invention is to provide a printing machine of the above type which can be produced at a relatively low manufacturing cost; which can be manually operated with the expenditure of little effort; by means of which separate sheets can be impressed or printed upon in rapid succession; which shall be capable of being so arranged that a single letter sheet can be impressed with a plurality of colors; and, to provide a machine which shall be so constructed that rotative bearings and the necessity of oil or other lubricants will be practically eliminated.

A further object of my invention is to provide a multi-color printing machine adapted for the production of letters or similar printed sheets in more than one color and being so arranged that the ribbons, by means of which the various colors are produced, can be readily assembled in any desired order and proportion.

My invention consists in a printing machine provided with means for supporting type in a plane and provided with a heavy impression roller supported on rails and adapted to roll back and forth over the printing form. Between the roller and the type are arranged one or more typewriting ribbons through which the type are adapted to impress a sheet of paper, laid upon the ribbons and over the type, when the roller is rolled over and in contact with the form. The roller is arranged to be rolled back and forth through the medium of pedals or foot-levers, whereby both hands of the operator are left free to manipulate the paper sheets being printed.

My invention also consists in the various features of construction and in combination of parts whereby the above and other objects are attained and all as hereinafter described and particularly pointed out in the appended claims.

My invention will be more readily understood by reference to the accompanying drawings forming part of this specification and in which:

Figure 1 is a side elevation of a printing machine made in accordance with my invention; Fig. 2 is a top plan view of the machine, the impression roll being shown in mid-position; Fig. 3 is a vertical transverse section of the machine on the line 3—3 of Fig. 1; Fig. 4 is an enlarged vertical longitudinal section of the supporting frame on the line 4—4 of Fig. 2, the impression roll being shown in position adjacent to one limit of its movement; Fig. 5 is a similar view on the line 5—5 of Fig. 2; Fig. 6 is an enlarged fragmentary plan view of one end of the supporting frame, particularly illustrating the ribbon supporting and winding devices; and Fig. 7 is an enlarged vertical transverse section on the line 7—7 of Fig. 6.

While I have so far described the machine as being particularly adapted for the rapid production of facsimile typewritten letters, it should be understood that the machine is equally adapted to the production of circulars, the printing of envelops and such similar work and is particularly adapted for the production of relatively small printed sheets in one or more colors and which may or may not simulate the work done on an ordinary typewriting machine. To produce a good impression upon paper by the means of type, a certain amount of pressure or impact is necessary and in my novel machine, I provide a relatively heavy impression roll mounted on smooth tracks and adapted to be very easily rolled back and forth over the printing form and I make this roll of a weight sufficient to press upon the type with a pressure sufficient to produce the proper printed impression upon the paper.

In the form of my invention illustrated in the drawings, A indicates generally the frame of the machine, B the printing form and its supporting parts arranged in the upper portion of the frame A, and C indicates the impression roll. The frame A is

preferably rectangular in form and is preferably made up of a combination of tubes 2, coupled together by means of unions and pipe-fittings in such a manner that a rigid and relatively light frame is provided, the upper or top portion 3 thereof being of the ordinary work-table height

In and upon the upper part of the frame A I secure an open rectangular frame 4 in substantially horizontal position. This frame is made up of two longitudinal bars 5 and 6, respectively, at each side and a cross bar 7 at each end. The bars are united at the corners of the frame by means of angle or corner plates 8, and the rectangular frame 4 is supported upon the main frame A by means of supporting lugs 9 which are formed to embrace the upper side bars 10 of the main frame A. The lugs 9 are so formed that there is a clearance space between the inner surface of the lugs and the pipes upon which they rest and the rectangular frame 4 is leveled and adjusted to its proper lateral position by means of set-screws 11 arranged in said lugs and bearing upon the pipes 10. This rectangular frame 4 is provided with two cross bars 12 spaced apart in the middle portion of the frame and upon these bars I support a bed plate 13 adapted to receive and carry the type form 14. The plate 13 is adapted to be nicely adjusted to its proper horizontal position by means of set-screws 15 which are mounted in the cross bars 12, one at each end of each of the bars. The side bars 5 of the frame 4 are considerably deeper than the side bars 6 with which they are associated and the upper edges of the bars 6 are depressed below the upper edges of the bars 5. The bars 6 form the bearing rails upon which I mount the impression roll C, and the upper portions of the bars 5, which project above the bars 6, serve to guide the impression roll C as it rolls back and forth over the type form upon the bars or rails 6. The upper surfaces of the bars 6 are substantially coincident with the upper surface 16 of the type form, and the impression roll is substantially of uniform diameter from end to end and consequently when the type form is placed upon the bed plate 13 between the bars 6, and the impression roll is passed back and forth over the type form and resting upon the bars or tracks 6, the roll is in position to press upon the type form. The exact pressure which it is desired to use upon various parts of the form can be readily provided by adjusting the form up or down by means of the adjusting screws 15. In order to leave the operator with both hands free to manipulate the paper to be printed, I provide a mechanism by means of which he can easily operate the impression roll to make it roll back and forth over the type form by means of his feet. This mechanism consists of a pair of foot-levers 17 pivotally mounted upon one of the horizontal bars 18 of the frame A at the forward part thereof, and each of these levers has a rearward extension 19 which extends to the rear part of the machine and I provide a continuous cable or rope 20 which has one of its ends secured to the rear end of one of the levers 19 and its other end secured to the rear end of the other lever 19. This cable or rope is carried upward through the machine and is given a couple of turns around a central cylindrical projection or pulley C′ formed upon or secured to the rear end 21 of the impression roll C. In operating the device to roll the impression roll back and forth upon the machine, the cable 20 is maintained in a sufficiently taut or stretched condition so that the turns of the cable around the pulley C′ provide friction enough between the rope and the pulley to cause the impression roll to roll back and forth upon the tracks 6 when the foot-levers are alternately depressed. As it is necessary to provide considerable pressure in order to produce the desired effect of transferring the impression of the type to the paper through a printing medium, such as ribbons, I make the impression roll of such a weight that I am certain to have more than sufficient weight to produce the desired impression. It is obvious that having more weight than it is necessary to use to properly print, I can so adjust the height of the printing surface of the form that just exactly the proper or necessary weight will be carried or received thereby to produce the results desired.

When once the impression roll has been put into motion, starting from one end of the frame 4 and rolling toward the opposite end thereof upon the tracks, it requires considerable force to bring the roll to a state of rest at the opposite end of the frame, and in order to accomplish this without any unpleasant or disagreeable shock or jar to the machine I have provided the novel mechanism which I will now describe. In order to bring the impression roll to a state of rest at the end of its movement in each direction, I provide pivoted stop levers 22 which project above the track 6 and are curved to substantially the curvature of the roll and are adapted to stop the roll in its movement and prevent it from leaving the track upon which it runs. These levers are peculiarly formed and they are so associated with the rails 6, upon which the impression roll rides, that I am enabled thereby to bring the impression roll to a gradual stop without any impact or otherwise objectional shock at the end of its movement in either direction. Figs. 4 and 5 particularly illustrate the construction and action of these levers in relation to the roll. As

these levers 22 are substantially duplicates of each other, I will confine my description to one of them only. The upper end 23 of the lever 22 is curved to substantially the same curvature as the outer cylindrical surface of the impression roll C and the lower end 24 is curved in a reverse direction. This lever is pivotally mounted upon the inner surface of the rail 6 adjacent to its upper edge at the point 25 which is considerably closer to the lower end than to the upper end. In order to retain this lever in proper position, to perform its functions, I provide a stop 26 against which the lower end 24 is adapted to contact, and I hold the lever in such position by means of a flat spring 27 mounted upon the inner surface of the rail 6 by means of a screw 28 at its outer end, the inner end of the spring being arranged to press upwardly against the underside of the upper curved portion or end 23 of the lever. This spring is supported in position by means of a fulcrum pin or screw 29 arranged between its ends. The spring and lever are so formed and proportioned that when the lever is depressed the curved under portion 30 of the lever changes the point of contact between the lever and the spring to a position closer to the fulcrum pin 29 and thereby greatly increases the reactive effect of the spring upon the lever. At the fulcrum point 25 of the lever the upper edge of the lever is substantially coincident with the upper edge of the rail 6, and beyond and adjacent to this point, as shown at 31, it is slightly above the upper edge of the track 6. Beyond the portion 31 the lever again drops to a line substantially coincident with the upper edge of the rail 6, as shown at 32, and consequently when the impression roll first contacts with the lever the lever is depressed so that the portion 31 is coincident with the upper edge of the rail 6 and as the impression roll progresses further so that it rests substantially above the portion 32 the lever rises and the portion 31 forms a stop to prevent the return of the roll in the opposite direction. A further progress of the roll against the upper end 23 of the lever serves to depress the lever very rapidly and, as explained before, this depression of the lever rapidly increases the resisting force of the spring and the impression roll is thereby brought to a state of rest. The spring 27 then serves to raise the lever 22 and start the roll on its return movement, but this return movement is checked by the portion 31 of the lever which projects above the track and the roll is consequently yieldingly held or locked in its substantially extreme position. When it is desired to return the impression roll to the opposite end of the frame to produce another impression, the force applied to the roll by means of the operating cable rotates the roll upon the track and the weight of the roll easily depresses the levers and the roll is thereby free to be rolled along the track.

One important feature of my invention resides in the facility with which a plurality of different colored ribbons may be placed in operating position and condition over the type-form and beneath the impression roll. Adjacent to and in each end of the frame 4 I arrange a horizontal shaft 35 which extends transversely from one side to the opposite side of the frame. One end 36 of this shaft is rotatably mounted in a suitable hole provided in the adjacent bar or track 6. The opposite end of the roll is supported by a thumb latch or spring 37 which is secured to the inner face of the opposite bar or rail 6, and the shaft is adapted to be removed by forcing the spring or latch 37 toward the bar 6 upon which it is mounted sufficiently to permit the end 38 of the shaft 35 to be removed from the spring. This end 38 of the shaft is reduced in diameter whereby the shaft is provided with a shoulder 39 which contacts with the surface of the spring and the spring serves to hold the shaft longitudinally in position with the shoulder 40 at the opposite end of the shaft in contact with the inner surface of the bar 6 in which the end 36 of the shaft is mounted. This shaft provides a suitable mounting for a plurality of ribbon spools 41, and I arrange these spools in such a manner that ribbons, such as those indicated at 42, 43, 44 and 45 of various widths may be readily assembled in proper relative position to produce the colors desired upon the sheet to be printed in proper relation. For instance, the ribbon 42 which might be arranged to print the heading of a letter could be black, and the ribbon 43, which could be arranged to insert the date of a letter, could be red; the ribbon 44 which would serve to print the body of the letter could be black or blue, and the ribbon 45, which would probably be arranged to print the signature, could also be black.

To mount the spools upon which the ribbons are wound on the shaft I provide the shaft, adjacent to one end, with a stop pin 46 and adjacent to its other end I provide the shaft with a slot 47, and I assemble the spools in their proper order upon the shaft, spacing them by means of spacing washers 48 and arranging a relatively large washer 49 adjacent to each end of each spool, these large washers 49 serving to guide the ribbons upon the spools. The various spools and washers having been assembled upon the shaft with one end of the series arranged against the stop pin 46, I then insert a wedge 50 in the slot 47 and drive this wedge against the adjacent washers, forcing the series of spools and washers into

frictional contact so that when the shaft is rotated the various spools will be rotated therewith and the ribbons will be wound upon the spools. For the purpose of rotating the shafts automatically, I provide a ratchet wheel 51 on one end rigidly mounted thereon and I pivot a dog 52 upon the adjacent lever 22 above the ratchet wheel 51 so arranged that when the impression roll C depresses the lever 22 the ratchet wheel is turned one notch and the ribbons are thereby rolled up upon their spools. As shown in Figs. 1 and 2, I arrange one of these shafts with its ratchet wheel adjacent to each end of the frame, 4, and I so mount the dog that when I do not wish the dog to turn the shaft it can be reversed in position free from the ratchet wheel, but when it is desired that one of the dogs shall operate its wheel it is dropped into the position shown in full lines in Fig. 5. Usually the springs 37 frictionally bind the shafts sufficiently to prevent the tension of the ribbons from destroying the effect of the dog and ratchet in advancing the ribbon, but under some conditions I have found it advantageous to provide additional means of retaining the ratchet wheels and their shafts in the position determined by the action of the levers 22 and the dogs 52. I provide a spring lever 52^a mounted upon the bar 6 adjacent to the ratchet wheel and having a rounded tooth 53^b adapted to enter the notches of the ratchet wheel. This lever serves to retain the wheel against the tension of the ribbons and to hold any advance of the ribbons effected by the dog 52 and ratchet wheel 51, at the same time it does not prevent the rotation of the ribbon shaft when sufficient force is applied to move it.

To hold the type form 14 in proper position within the frame 4 and upon the bed plate 13 I provide two binding screws 53 which are mounted in the side bars of the frame 4 and project through the frame. They are adapted to be forced against blocks 54 which fill in the space between the side bar 6 of the frame 4 and the adjacent side bar 55 of the chase 56 in which the type 57 are held.

In order to retain the sheet of paper which is to be impressed by the type in proper position, I provide stops or clips 58 which I mount upon the blocks 54, one at each side of the type form. Each of these clips comprises a flat base portion 59 provided with a slot 60 through which a binding or holding screw 61 may pass. The clip is provided with a vertically arranged portion 62 which is adapted to be set transversely of the machine and form a suitable stop for the lateral edge of the sheet. The slot 60 permits the clips to be properly adjusted to the width of the sheet being printed. The impression roll has an impression surface 63 which occupies most of the length of the roll and this surface 63 is formed by means of a layer 64 of vulcanized rubber or other suitable material, the roll being reduced in diameter as indicated by the dotted lines 65 to accommodate this material which forms the impression surface of the roll. Adjacent one end of the roll it is provided with a shallow groove 65′ adapted to permit the roll to pass freely over the paper clips 58. While it is obvious that the roll could be lightened in weight by being made hollow, if it is so desired, I have preferred to show the roll as being substantially solid and consequently of maximum weight relatively to the material of which it is formed. It is to be noted that each end of the roll is of full diameter and the material of which the body of the roll is formed extends to the surface at these ends 66 and 67, thereby providing the roll with suitable bearing portions or ends upon which it can move back and forth upon the rails without perceptible wear.

In operating my machine, the type having been properly set in the chase and the chase properly adjusted in the machine, the ink ribbons are then arranged upon the shafts and the ribbon shafts are placed in position so that the ribbons lie above the type form, then one of the dogs 52 is placed in operative position, the other one being placed into inoperative position. The impression roll at this time is at one end of the frame 4. Then a sheet of paper, upon which it is desired to make an impression, is placed in position over the type form and lying upon the ribbons. The impression roll is then moved to the opposite end of the frame 4 and in rolling over the type form the pressure of the roll presses the paper against the ribbon and obviously against the type below the ribbon with sufficient pressure to cause the type to make the proper impression upon the paper; and when the roll has reached the opposite end of the frame 4 the printed sheet of paper is removed and another fresh sheet of paper is put in position and then the roll is returned to its former position, printing the second sheet of paper in like manner as the first. The impression roll is moved back and forth alternately by means of the foot levers as previously described and the operator can conveniently sit in position before the machine and both of his hands are free to manipulate the paper, one hand removing the printed sheet and the other hand placing the fresh sheet in position, consequently the machine can be operated at a relatively high speed and as many as two thousand or more impressions can be run off in one hour.

It will now be clear that my novel printing machine is extremely simple, both in construction and operation, the expense, danger, and inconvenience of oil or other

lubricant is practically eliminated; there are no expensive gears to make and maintain, and the machine as a whole and all of its parts can be produced at a minimum cost by the use of the usual manufacturing facilities.

As many modifications of my invention will readily suggest themselves to one skilled in the art, I do not limit or confine my invention to the specific structures herein shown and described.

I claim:

1. In a manually operated printing machine a substantially flat type form supported in a horizontal position, an ink ribbon over-laying the type form and means for holding the ribbon in such position, a relatively heavy impression roll adapted to be passed back and forth over the type form to cause the type to print upon a sheet of paper which may be interposed between the ribbon and the roll, rails arranged adjacent to the type form by which the roll is supported and guided in its movement back and forth over the form, means for moving the roll back and forth over the form, and spring-pressed levers carried by the rails adjacent to their ends in the path of the roll adapted to yieldingly stop the roll at each limit of its movement, and projecting portions on said levers serving to yieldingly retain the roll at either limit of its movement.

2. In a manually operated printing machine a substantially flat type form and a relatively heavy impression roll adapted to be moved back and forth over said type form to impress sheets of paper which may be interposed between the form and the roll, rails upon which the roll is supported and by which the roll is guided in its movement back and forth over the form, a reverse-curve lever pivotally mounted adjacent to one limit of the movement of the roll in the path of the roll adapted to stop the movement of the roll in one direction, a spring yieldingly retaining the lever in position to control the movement of the roll, the lever having a portion projecting into the path of the roll over which the roll is adapted to pass as it approaches the limit of its movement and which projection rises above the track on which the roll rests as the roll reaches the limit of its movement and serves to yieldingly prevent the return movement of the roll.

3. In a printing machine, the combination with a substantially horizontal type form of a relatively heavy impression roll adapted to be rolled back and forth over the type form to cause the type to print upon a sheet of paper which may be interposed between the type and the roll, rails arranged adjacent to the type form by which the roll is supported and guided in its movement back and forth, means for moving the roll back and forth, and means for yieldingly bringing the roll to a state of rest at each limit of its movement and there retaining the roll against accidental return.

4. In a printing machine, the combination with a substantially horizontal type form of a relatively heavy impression roll adapted to be rolled back and forth over the type form to cause the type to print upon a sheet of paper which may be interposed between the type and the roll, rails arranged adjacent to the type form by which the roll is supported and guided in its movement back and forth, means for moving the roll back and forth, and means for yieldingly bringing the roll to a state of rest at each limit of its movement, and for yieldingly retaining the roll in such position.

5. In a printing machine, the combination with a horizontally arranged type form of a relatively heavy roll adapted to be alternately rolled from end to end of the machine to produce the impression, and means for yieldingly stopping the roll at each limit of its movement, said means including a projection in the path of the roll adjacent to each limit of its movement for yieldingly retaining the roll against return.

In testimony whereof, I have hereunto set my hand, this 1st day of June, 1912, in the presence of two subscribing witnesses.

JOSEPH M. SCHUTZ.

Witnesses:

EDWARD F. WILSON,

JOHN L. LEFEVRE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."