

E. R. LERNER & H. L. BEAN.

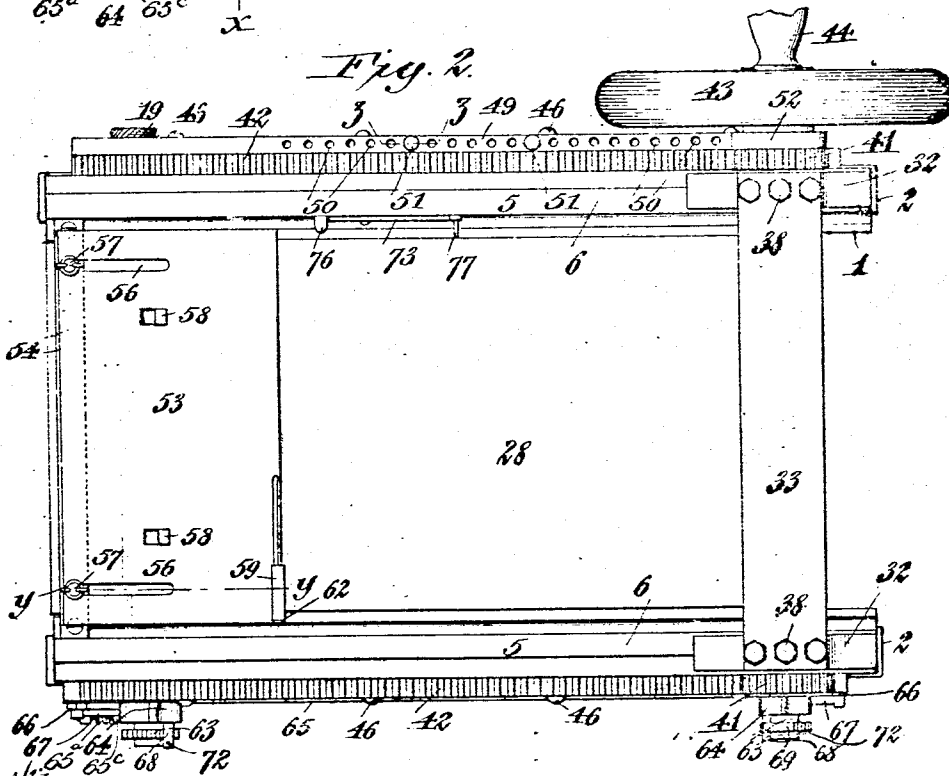
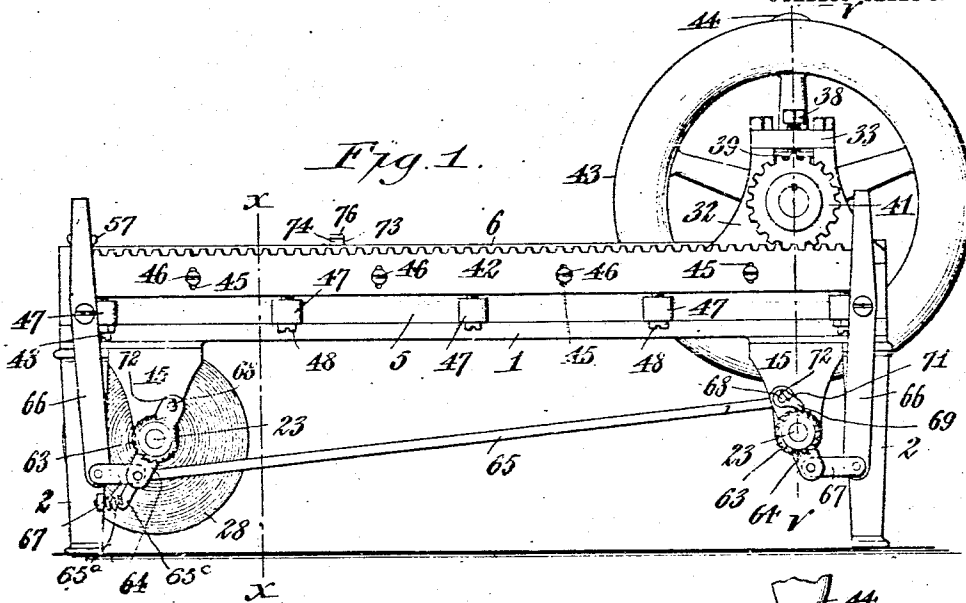
DUPLICATING MACHINE.

APPLICATION FILED FEB. 27, 1907.

Patented Feb. 15, 1910.

949,486.

3 SHEETS-SHEET 1.



Witnesses:

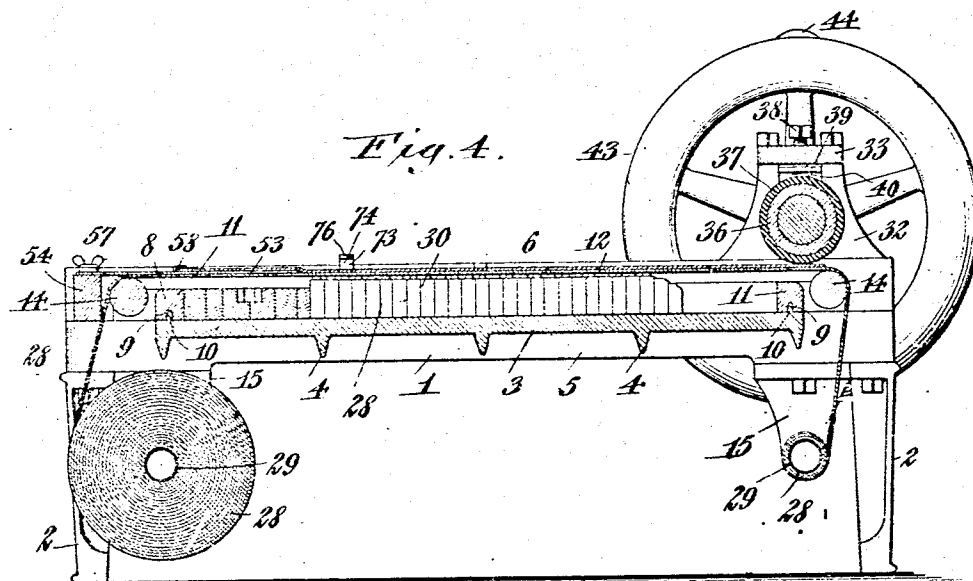
Christ Feinle.

Harry D. Rapp.

Ernest R. Lerner, }
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By Emil Neuhart Attorney.

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4 SHEETS—SHEET 2.



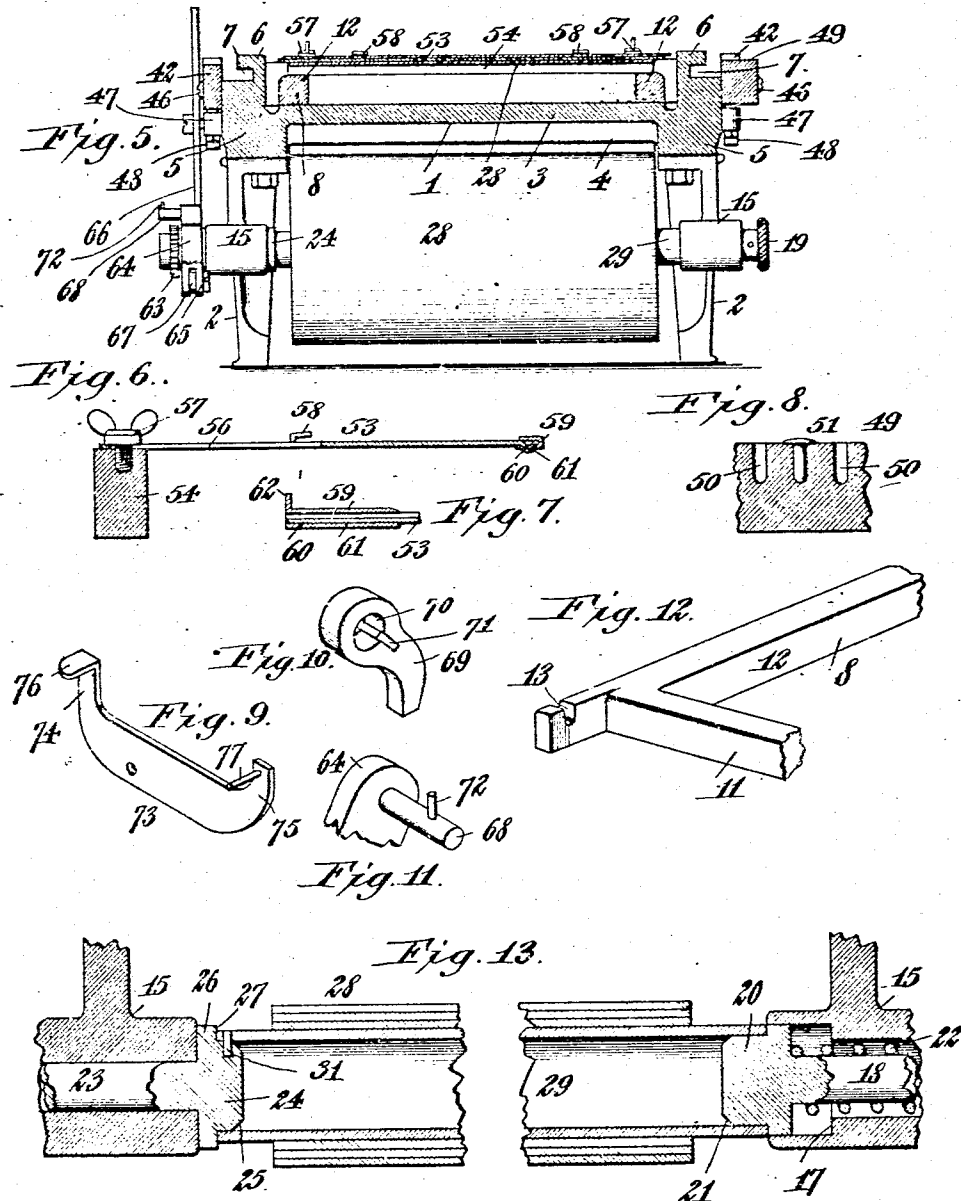
Ernest R. Lerner, } Inventors.
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By Emil Neuhart,
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 Harry D. Rapp.

Ernest R. Lerner,
 Harry L. Bean, } Inventors.
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 Attorney.

UNITED STATES PATENT OFFICE.

ERNEST R. LERNER AND HARRY L. BEAN, OF BUFFALO, NEW YORK, ASSIGNORS TO
THE TYPEWRITER PRINTING MACHINE COMPANY, OF BUFFALO, NEW YORK, A
CORPORATION OF NEW YORK.

DUPLICATING-MACHINE.

949,486.

Specification of Letters Patent.

Patented Feb. 15, 1910.

Application filed February 27, 1907. Serial No. 359,639.

To all whom it may concern:

Be it known that we, ERNEST R. LERNER and HARRY L. BEAN, citizens of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Duplicating-Machines, of which the following is a specification.

Our invention relates to duplicating machines such as are used to reproduce circular or imitation typewritten-letters in large quantities.

The objects of our invention are the production of a simple, inexpensive, and durable printing or duplicating machine with which perfect imitation typewritten-letters can be produced and in which stock type may be employed which can be purchased at any type foundries; to provide means for regulating the impression and for slightly relieving the pressure of the impression-roller as it passes over a short line of type; to provide simple and effective means for reversing the inking-ribbon; and to otherwise improve on machines of this character now in use.

To these ends, the invention consists in the construction, arrangement and combination of parts to be hereinafter described and particularly pointed out in the appended claims.

Referring to the accompanying drawings forming part of this specification, similar numerals of reference refer to similar parts throughout the several figures.

Figure 1 is a side elevation of our improved duplicating machine. Fig. 2 is a plan view of the same. Fig. 3 is a transverse section on line *v-v*, Fig. 1 looking toward the left. Fig. 4 is a central longitudinal section taken on line *w-w*, Fig. 3. Fig. 5 is a transverse section taken on line *x-x*, Fig. 1, looking toward the left. Fig. 6 is an enlarged longitudinal section taken on line *y-y*, Fig. 2. Fig. 7 is an enlarged longitudinal section through the side paper gage and its supporting gage-plate. Fig. 8 is an enlarged section taken on line *z-z*, Fig. 2, showing the pressure relieving-device. Fig. 9 is an enlarged detached perspective view of the paper releasing-device. Fig. 10 is an enlarged detached perspective view of the ribbon-feeding pawl. Fig. 11 is an enlarged perspective view of the upper

portion of one of the ratchet-levers on which the ribbon-feeding pawl is detachably applied. Fig. 12 is an enlarged perspective view of the type chase showing one of the bearing extensions to receive a ribbon guide-roller. Fig. 13 is an enlarged longitudinal section through one of the ribbon feed-rollers.

The reference numeral 1 designates the bed of the machine having legs 2 at its four corners for supporting the bed at the proper elevation so that part of the operating-mechanism may be placed beneath the same. The bed is preferably of a size to receive a sheet of paper of letter size, but as this machine is intended for office use, it may be of any suitable length and width.

The bed has a flat and comparatively thin center-portion 3 provided with transverse strengthening ribs 4 on its underside, and thickened sides 5 provided with upstanding angular flanges 6 forming outwardly opening grooves 7. The flat center portion of the bed, which for convenience of description we term the "type-form support," is somewhat shorter than the thickened sides of the bed, which we term the "impression-roller guides;" and applied to the type-form support is a chase 8 having on its underside sockets 9 to receive pins 10 extending upward from the said support and entering said sockets, whereby the chase is held in place. The chase comprises end-bars 11 and side-bars 12 extending beyond the end bars and having notches 13 at their ends in which the journals of transversely disposed guide-rollers 14 are mounted.

Brackets 15, are secured to the underside of the bed, and are arranged in pairs at each end thereof. One bracket of each pair has a stepped bore of successively larger diameters providing interior shoulders and 17. Within each of said brackets is a stud 18 having secured to its outer end a knurled finger-grip 19; said stud having a cylindrical enlargement or head 20 at its inner end beveled at its inner edge, as at 21, for a purpose to presently appear. Between said head and the shoulder 16 of the bracket is a spiral spring 22 which surrounds stud 18 and exerts its force against head 20 to maintain said stud in its innermost position. Upon gripping the finger-grip 19 and pulling the stud upward

against the action of said spring, shoulder 17 limits the extent of outward movement of said stud. The other bracket of each pair is provided with a plain cylindrical bore having revoluble therein a shaft 23 provided with a head or enlargement 24 at its inner end bearing against the inner end of said bracket. Said head or enlargement has its inner edge beveled, as at 25, and has a circumferential flange 26 at its outer end to form a shoulder 27.

28 designates an inking-ribbon having its ends secured to feed-rollers 29 supported at their ends on studs 18 and shafts 23; said ribbon passing upward from one feed-roller, over one of the guide-rollers 14, the type-form 30 within the chase, over the other guide-roller, and finally down onto the other feed-roller. The feed-rollers are in the form of cylindrical tubes whose ends fit onto the heads of the studs 18 and shafts 23, respectively; one end of each roller being free to revolve on its supporting stud 18 and the other end thereof being secured to its shaft 23 by a pin 31 passed through the roller and entering the enlarged head of the shaft. That end of each feed-roller which is secured to its actuating shaft, bears against the shoulder 27, thus providing a secure and rigid connection between said shaft and its feed-roller. By reason of the inner enlarged ends of the studs 18 and shafts 23 being beveled the feed-roller can be quickly and conveniently secured thereto, or removed therefrom.

32 designates a pair of vertically slotted uprights connected by a transverse top-bar 33; each having an angular flange 34 complementary to the angular flanges 7 which they engage, to provide a steady support for the uprights. In the vertical slots of the uprights are journal-boxes 35 in which the journals of an impression-roller 36 are journaled, said roller having a rubber covering 37 similar to that used on a platen of a typewriter so that the same effect is obtained. Regulating-screws 38 are provided which bear against followers 39, between which and the journal-boxes, tension-springs 40 are interposed; whereby the pressure of the roller against the paper is regulated.

Secured to the spindle of the impression-roller are gear-wheels 41 which mesh with gear-racks 42 adjustably secured to the sides of the bed 1, and to one end of said spindle is affixed a wheel 43 of considerable weight, such as a fly-wheel, to render the machine more easily operative; said wheel having a handle 44 for conveniently revolving the wheel and the impression-roller to which said wheel is affixed. Manifestly, the wheel 43 may be dispensed with, if desired, and a crank affixed directly to the spindle of said roller.

The gear-racks 42 are provided with vertical slots 45 through which are passed fastening-screws 46 that take into the sides of the bed. The latter has formed on each side thereof, a series of lugs 47 having vertical threaded openings through which set-screws 48 are passed; said screws projecting from said lugs and bearing against the underside of the gear-racks, so that the latter may be adjusted when worn and held against downward movement under pressure of the gear-wheels 41.

At one side of the machine, herein shown as integral with one of the gear-racks, is a track 49 having numerous sockets 50 spaced to conform to the regulation lines of type-writer-type, and in any of said sockets, a thin-headed pin 51 may be inserted, as shown in Fig. 8, to provide a slight elevation on the track. Riding on said track is a disk 52, herein shown as integral with one of the gear-wheels. When said disk rides over the slight elevation on the track thus formed, the impression-roller is raised a trifle to slightly relieve the pressure of the same against the paper. This is particularly desirable where short lines of type are used, as the same amount of pressure thereagainst as used on a full line of type, will make a much heavier impression on the paper. These pressure-relieving pins are therefore used where the type are set in short lines; resulting in an even impression throughout the paper.

A paper-gage 53 is adjustably secured to a cross bar 54 having its ends secured to the bed 1. Said gage comprises a plate of sheet metal having parallel longitudinal slots 56 through which are passed thumb screws 57 that take into threaded sockets in said cross-bar; said plate having end paper-gages 58 formed by stamping an upwardly and forwardly directed lip from the plate. By loosening the thumb-screws 57, the plate 53 may be moved lengthwise of the bed in either direction so as to bring the paper-gages 58 to the desired point for gaging the paper, after which the set screws may be tightened to secure the plate.

A side paper-gage 59 is adjustable on plate 53 which has a transverse rib 60 near its inner edge. Gage 59 is formed of a strip of metal bent upon itself to straddle the end of plate 53, and it has a groove 61 to receive the rib of said plate, thus permitting the gage to be moved transversely on said plate. At one end of said side-gage, a lip 62 is bent upward, against which the side edge of a sheet of paper is placed. From the foregoing it is apparent that adjustment of the gages can be quickly and positively effected to cause the impression to be made on any portion of the paper desired.

The impression-roller is moved back and forth over the ribbon-covered type-form and

prints during each forward and backward movement.

Secured to each of the feed-roller shafts is a ratchet-wheel 63, the teeth of said 5 ratchet-wheels being oppositely arranged, for a purpose to appear hereinafter. Mounted loosely on said shafts between said 10 ratchet-wheels and the brackets 15 are ratchet-arms 64 extending above and below said shafts. A connecting-rod 65 has one 15 end attached to the upper end of one of said ratchet-arms and its opposite end connected to the lower end of the other ratchet-arm. A retractile spring 65^a is provided to main- 20 tain the ratchet-arms in normal position, it having one end secured to one of the legs of the machine, as at 65^b, and its other end secured to an extension on the ratchet-arm whose lower end is connected with said con- 25 necting-rod, as at 65^c. An actuating-lever 66 is pivoted between its ends to the side of the bed of the machine at each end thereof: both levers having their upper ends in the path of the impression-roller or more par- 30 ticularly the hub of the gear-wheel 41 at one end of said roller; so that when said roller approaches the end of its movement in either direction, it actuates one of said levers. Links 67 connect the lower ends of said le- 35 vers with the lower ends of the ratchet-arms. Each of the latter has a laterally extending stud 68 at its upper end adapted to receive the pawl 69 which has an aperture 70 and a slot 71 opening into said aperture. 40 Each of the studs 68 has a pin 72 arranged radially thereon which permits pawl 69 to be slipped onto either of the studs 63 when the slot therein is in line with the pin on the stud to which the pawl is to be ap- 45 plied; and after the latter has been moved onto the stud beyond said pin, the free end thereof is allowed to swing against the ratchet-wheel, during which action the slot in said pawl is moved out of line with said pin, thus preventing the accidental discon- 50 nection of the pawl from its stud.

As shown in Fig. 1, the ribbon is being moved from the feed-roller at the left of the machine to the roller at the right thereof, 50 and the pawl is used at the right-hand end of the machine. When the operating-lever 66 at the right-hand end of the machine is actuated by the impression-roller, said pawl causes the ratchet wheel engaged thereby to 55 rotate, thereby causing the ribbon to be moved from left to right. When the impression-roller is moved from right to left, the operating-lever 66 at the left hand end of the machine is actuated, which, through 60 the intervention of the link 67 at the left hand end of the machine and the connecting rod 65 also causes the pawl to rotate the ratchet-wheel engaged thereby and move the ribbon from left to right. When, during 65 the operation of the machine the compres-

sion roller is moved away from the oper- 60 ating-levers, the spring 65^a acts to move the pawl 69 idly over its cooperating ratchet-wheel so that it will be prepared to partially rotate said wheel when either operating- 70 lever is actuated by the impression roller. As there is only one feeding-pawl used, the inking-ribbon is free to unwind from the left hand feed-roller, and owing to the ratchet-arms being connected, the actuation 75 of either operating-lever will cause both ratchet-arms to be moved. In order to reverse the movement of the feed-ribbon it is only necessary to remove the feeding-pawl from the ratchet-arm to which it is applied 80 and attach it to the other ratchet-arm.

To aid in removing the paper from the type-form after having received an impres- 85 sion, we provide a paper-release comprising a lever 73 pivotally attached at one side of its center to one of the thickened sides 5 of the bed, said lever having its ends curved upward, as at 74 and 75, the end 74 having an inwardly bent lip 76 which is held nor- 90 mally in a plane above the paper receiving the imprint of the type-form, while the end 75 has an inwardly extending pin 77 which is normally below the plane of the paper and covered thereby. In order to release 95 the paper, the end 74 is depressed by hand, which causes the end 75 of the lever to be elevated and raises the paper from the type-form.

From the foregoing it is apparent that exact facsimiles of typewritten-letters may 100 be produced in any quantities, and that an entire page is imprinted at one operation, and owing to the type being of metal and the inking-medium a ribbon similar to those used on typewriters, a perfect imitation of 105 a typewritten-letter is obtained; the impression-roller acting to press the paper against the ribbon-covered type.

Having thus described our invention, what we claim is,—

1. The combination of a supporting-bed 110 having lugs at opposite sides thereof and a type form thereon, a transfer material in contact with said type-form, longitudinally disposed gear-racks having vertical slots, 115 screws passing through said slots and taking into the sides of said supporting-bed, adjusting-screws passing through the lugs on said bed and bearing against the underside of said gear-racks, and an impression-roller 120 having gear-wheels in mesh with said gear-racks.

2. The combination of a supporting-bed having type thereon, a transfer medium on 125 said type, an impression-member to cause a sheet of paper laid upon said transfer medium to receive the imprint of said type, and a horizontally disposed releasing-lever pivoted between its ends to the bed and hav- 130 ing one end terminating above the sheet of

paper on the type and its other end provided with a laterally directed pin lying beneath said sheet of paper.

3. The combination of a supporting-bed 5 having type thereon, a transfer medium on said type, an impression-member to cause a sheet of paper laid upon said transfer medium to receive the imprint of said type, and 10 a horizontally disposed releasing-lever pivoted between its ends to the bed and having upwardly curved ends, one end terminating in a laterally bent lip lying in a plane above the sheet of paper on the type and the other 15 end having a laterally directed pin lying beneath said sheet of paper.

4. The combination of a supporting-bed having type held thereon and brackets depending therefrom at the ends of said bed, 20 an inking-ribbon in contact with said type, feed-rollers supported by said brackets and having the ends of said inking-ribbon attached thereto, a ratchet-wheel secured to the shaft of one of said rollers, a ratchet- 25 arm loosely mounted, a pawl on said ratchet-arm engaging said ratchet-wheel, a vertical operating-lever pivoted between its ends to the bed and having its upper end terminating above the top of the latter, a link connecting the lower end of the operating-lever 30 with said ratchet-arm, and an impression-roller movable lengthwise of the bed and adapted to actuate said operating-lever.

5. The combination of a supporting-bed having type held thereon, an inking-ribbon 35 in contact with said type, an impression-roller movable lengthwise of the machine, a feed-roller at each end of the bed to which opposite ends of said inking-ribbon are secured, a ratchet-wheel secured to the shaft 40 of each feed-roller, a ratchet-arm loosely mounted on each shaft and extending above and below the same, a rod connecting the lower end of one ratchet-arm with the upper end of the other ratchet-arm, vertical oper- 45 ating-levers pivoted between their ends to the supporting-bed and having their upper ends in the path of the impression-roller, links connecting the lower ends of said operating-levers with the lower ends of said 50 ratchet-arms, and a pawl detachably affixed to either ratchet-arm to actuate the adjacent ratchet-wheel, said ratchet-wheels having their teeth oppositely arranged.

6. The combination of a type-bearing 55 member, an impression-member, an inking-ribbon movable between said members, feed-rollers to which the ends of said inking-ribbon are attached, a ratchet-wheel secured to the shaft of each feed-roller, a ratchet- 60 arm loosely mounted on each of said shafts, a stud on each ratchet-arm having a later-

ally directed pin, a pawl adapted to be attached to either ratchet-arm and having an aperture adapted to fit either of said studs and a notch opening into said aperture and 65 adapted to permit the pawl to be passed over the pin of either stud, and means to actuate said ratchet-arms.

7. The combination of a type-bearing member, an impression-member, an inking- 70 ribbon movable between said members, feed-rollers to which the ends of said inking-ribbon are attached, brackets arranged in pairs and serving as a means to support said feed-rollers, a shaft in one of each pair of 75 brackets having an enlarged inner end provided with a peripheral flange to form a shoulder and having its inner edge beveled, said enlarged end fitting into the adjacent end of the corresponding feed-roller with 80 the edge of the latter against said shoulder, and pins securing said feed-rollers to said enlarged ends.

8. The combination of a type-bearing member, an impression-member, an inking- 85 ribbon movable between said members, feed-rollers to which the ends of said inking-ribbon are attached, brackets arranged in pairs and serving as a means to support said feed-rollers, one of each pair of brackets 90 having a bore provided with two shoulders, a stud in each of said shouldered bores having an enlarged inner end fitting into the adjacent end of the corresponding feed-roller and limited in movement by said enlarged 95 end striking one of said shoulders, a spiral spring surrounding each stud and bearing with opposite ends against the enlarged end thereof and against the other shoulder in said bore, and finger-grips secured to said 100 studs and bearing against the outer sides of said brackets.

9. The combination of a supporting-bed having a plurality of rows of assembled type 105 thereon, said rows being of unequal lengths, transfer material in contact with said type, an impression-roller movable over said type in contact with said transfer-material, and means to slightly relieve the impression- 110 roller of pressure when passing over short rows of type so as to assure an even impression at all points of the paper to be printed upon.

In testimony whereof, we have affixed our signatures in the presence of two subscrib- 115 ing witnesses.

ERNEST R. LERNER.
HARRY L. BEAN.

Witnesses:

CHRIST FEINLE,
EMIL NEUHART.