N. MEYERS.

PRINTING MACHINE.

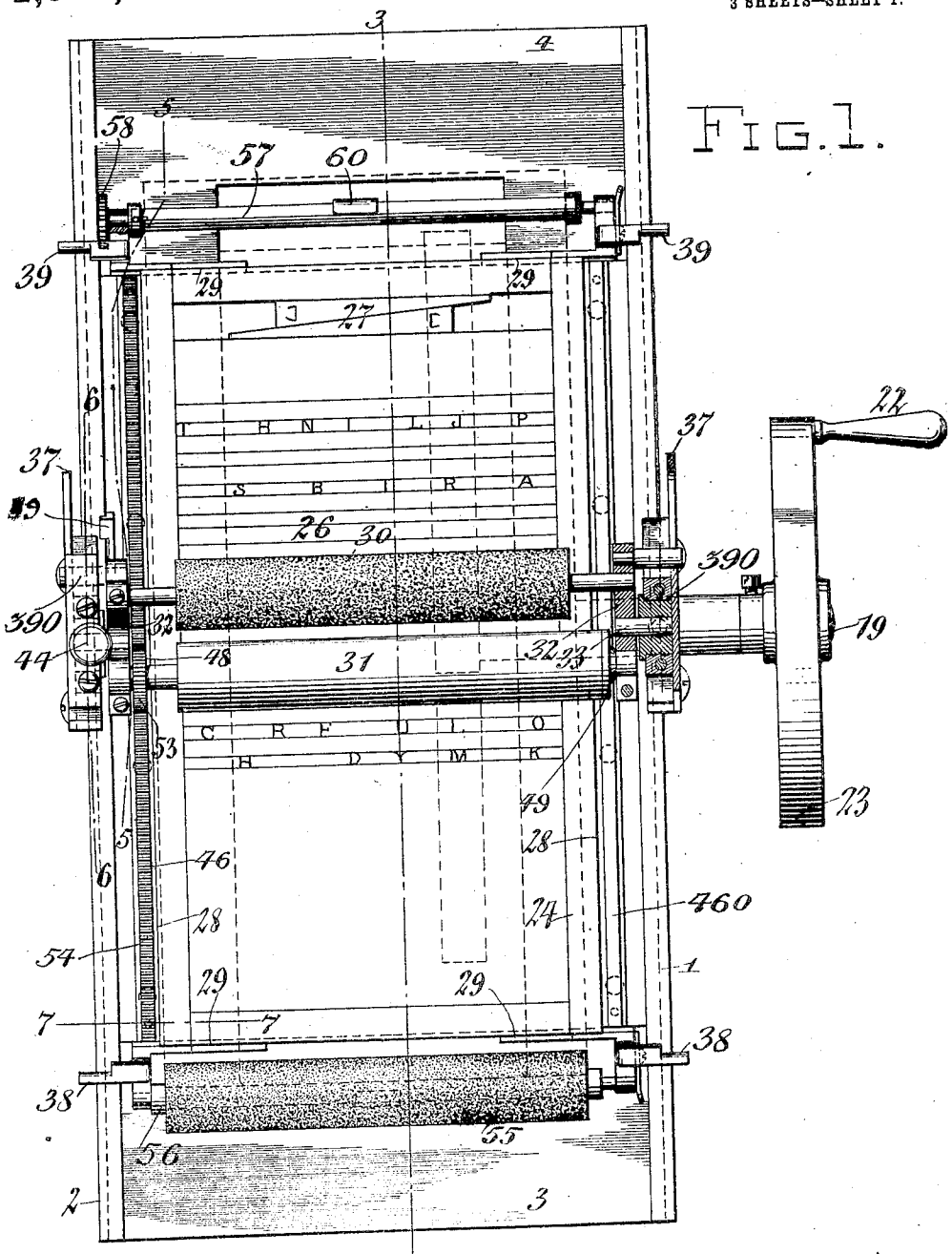
APPLICATION FILED AUG. 4, 1909. RENEWED JUNE 3, 1913.

1,086,387.

Patented Feb. 10, 1914.

3 SHEETS—SHEET 1.

FIG. 1.



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3 SHEETS—SHEET 2.

FIG. 2.

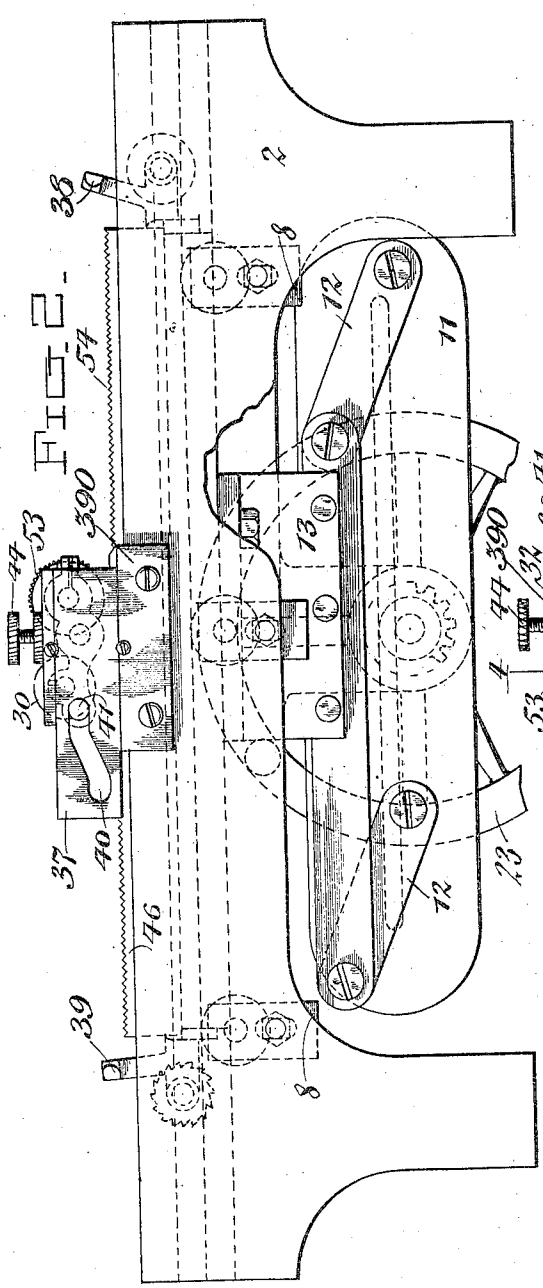
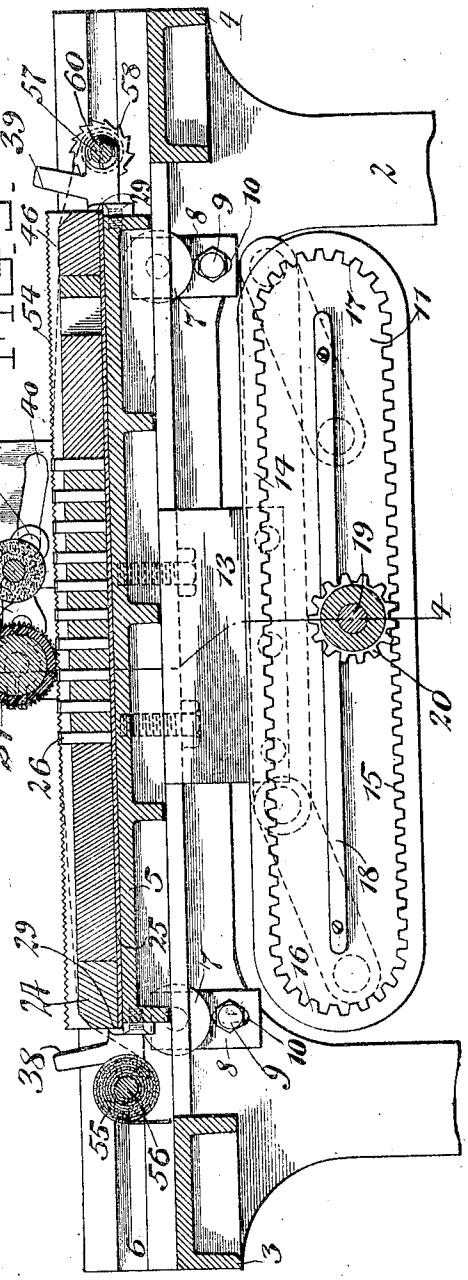


FIG. 3.



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3 SHEETS—SHEET 3.

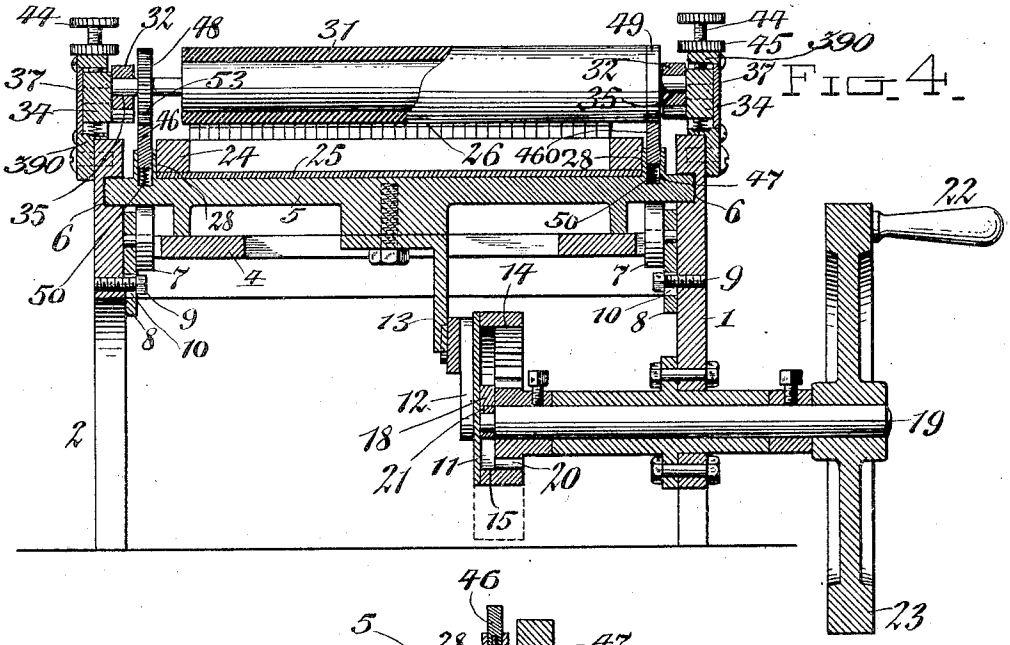


FIG. 4.

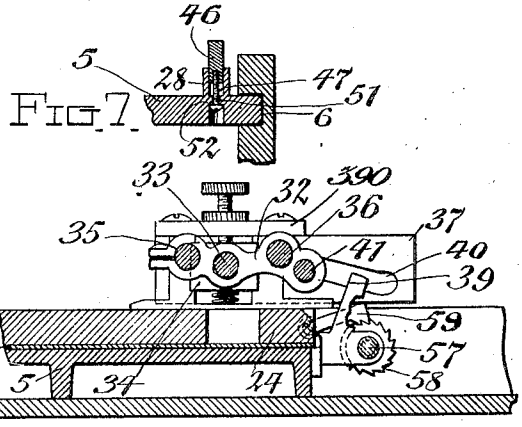


FIG. 5.

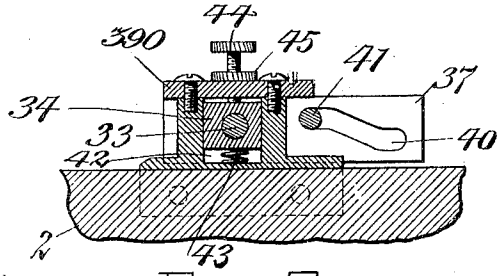


FIG. 6.

FIG. 7.

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UNITED STATES PATENT OFFICE.

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PRINTING-MACHINE.

1,086,387. Specification of Letters Patent. Patented Feb. 10, 1914.

Application filed August 4, 1909, Serial No. 511,086. Renewed June 3, 1913. Serial No. 771,529.

To all whom it may concern:

Be it known that I, NICHOLAS MEYERS, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented a new and useful Improvement in Printing-Machines, of which the following is a specification.

This invention relates to a printing press which is more particularly designed for printing circular letters which are sent out from time to time by business houses but which may also be used for general printing.

It is the object of this invention to produce a machine of this character which is simple and compact in construction, which can be operated with comparatively little skill and still produce a high grade of work, which is not liable to get out of order by ordinary use, and which permits of quickly changing the type matter when desired and to readily adjust the parts relatively to each other for taking up wear and producing a uniform impression upon the sheets which are being printed.

In the accompanying drawings consisting of 3 sheets: Figure 1 is a top plan view, partly in section, of my improved printing machine. Fig. 2 is a rear side elevation of the machine with part of the frame broken away. Fig. 3 is a vertical longitudinal section, taken in line 3—3, Fig. 1, and showing the parts in the position which they occupy when the reciprocating bed and the type chase supported thereby has reached about the middle of its forward movement. Fig. 4 is a vertical transverse section in line 4—4, Fig. 3. Fig. 5 is a fragmentary vertical longitudinal section, taken in line 5—5, Fig. 1, with the type supporting bed assumed to be at the end of its forward stroke. Fig. 6 is a vertical longitudinal section in line 6—6, Fig. 1. Fig. 7 is a fragmentary vertical transverse section in line 7—7, Fig. 1.

Similar characters of reference indicate corresponding parts throughout the several views.

The main frame of this printing machine may be variously constructed to support the different working parts of the machine, but as shown in the drawings the same preferably comprises two upright longitudinal side pieces 1, 2, and two horizontal cross pieces 3, 4 which connect the front and rear ends respectively of the side pieces.

Reciprocating horizontally and lengthwise between the upper parts of the frame side pieces is a horizontal printing bed or table 5 which engages loosely with its opposite longitudinal edges in longitudinal grooves or guideways 6 formed on the inner sides of the adjacent upper parts of the side pieces. For the purpose of reducing the friction and wear, this printing bed or table is supported by means of rolling members which preferably consist of rollers 7 engaging with the underside of the printing bed adjacent to the side pieces of the frame and carried by the latter. As shown in the drawings, three of such rollers are arranged on each side of the printing bed but, if desired, this number may be varied. Each of these rollers is preferably pivoted on a bracket 8 which is adjustably secured to the adjacent part of the main frame side piece by means of a bolt 9 passing through a vertical slot 10 in the bracket and entering a threaded opening in said side piece. By this means, the several rollers may be adjusted vertically for causing them to bear uniformly against the underside of the printing bed, and also permit the printing bed to be adjusted vertically for bringing the same into proper relation to the impression and inking devices and also permit of taking up any wear on the rollers, the printing bed and the parts coöperating therewith.

Any suitable means may be employed for effecting a vibrating or reciprocating movement of the printing bed lengthwise of the frame. The means for this purpose which are shown in the drawings are preferred on account of their simplicity, reliability and ease of operation, and are constructed as follows: 11 represents a gear support which is preferably constructed in the form of a vertical plate and which is connected with the printing bed so as to be capable of bodily vertical movement relatively to said bed but be compelled to move back and forth therewith. The preferred means for thus connecting the supporting plate with the printing bed comprises two vertically swinging links 12, 12 which are arranged parallel and pivotally connected at their lower ends to opposite ends of the gear plate on the rear side thereof while their upper ends are pivoted to a hanger 13 depending from the underside of the printing bed. On its front side the gear plate is provided with a mangle gear rack comprising an upper longitu-

dinal row of teeth 14, a lower longitudinal row of teeth 15, a curved row of front teeth 16 connecting the front ends of the upper and lower rows, and a curved row of rear teeth 17 connecting the rear ends of the upper and lower rows of teeth, as shown in Fig. 3. Centrally between the upper and lower rows of teeth and stopping short of the curved rows of teeth of the mangle rack is arranged a horizontal guide bar 18 which is secured to the front side of the gear plate and forms with these gear teeth an endless channel or passageway. 19 represents a horizontal driving shaft journaled transversely in a bearing on the lower part of the front side piece of the frame and provided at its rear or inner end with a gear pinion 20 which is adapted to mesh with the mangle gear rack and also provided beyond the inner side of the gear pinion with the guide roller 21 which engages with the horizontal face of the guide bar 18. The driving shaft is rotated continuously in the same direction, which movement may be imparted to the same either by a hand crank 22, by means of a driving belt passing around a pulley 23 on the front or outer end of the driving shaft, or by any other suitable means. As the pinion rotates in engagement with one of the longitudinal rows of teeth of the mangle gear rack, the latter is moved lengthwise in one direction together with the printing bed, and as this reaches the curved row of teeth at one end of said horizontal row, the mangle gear rack is moved bodily vertically and the pinion is caused to engage with the longitudinal row of gear teeth on the opposite side of the rack, thereby causing the movement of the gear rack and the printing bed connected therewith to be reversed lengthwise of the machine. As the pinion again reaches the end of the last-mentioned longitudinal row of teeth of the mangle gear rack and engages with the curved row of teeth at the opposite end of this rack, the latter is moved bodily vertically in the opposite direction. This operation is repeated continuously while the machine is running, causing the bed to be reciprocated continuously. During the shifting of the gear pinion from the upper to the lower teeth of the mangle gear rack, the links 12 swing vertically, so as to permit the mangle gear rack to adapt itself to the gear pinion without, however, disturbing the driving connection between the pinion and the printing bed. As the gear pinion travels around the mangle gear rack, the retaining or guide roller 21 of the driving shaft remains constantly in engagement with one horizontal side or the other of the guide bar 18, thereby retaining the gear pinion positively in engagement with the mangle gear rack in all positions of the same.

Upon the upper side of the printing bed the same is adapted to receive the chase which contains the type of the matter which is to be printed. This chase may be variously constructed but in its preferred form comprises a rectangular frame or rim 24 of wood or other suitable material and a bottom 25 of sheet metal, preferably zinc, secured to the underside of the frame so that the same has substantially the form of a tray or disk. Within this chase is arranged the impression or type surface 26 from which the letters are to be printed, which surface may be in the form of individual type, electrotypes or otherwise, and may be locked in the chase by means of quoins 27 and other printers' furniture in common use. The chase containing the type matter while resting with its bottom upon the upper side or surface of the printing bed engages with its opposite longitudinal sides against longitudinal walls or shoulders 28 formed on the upper side of the printing bed near opposite longitudinal edges thereof and the ends of the chase engage on their outer sides with transverse shoulders 29 arranged on the upper side of the printing bed at opposite ends thereof, thereby reliably holding the chase against longitudinal and transverse displacement of the printing bed and preventing blurring of the printing.

The inking of the type face may be effected in various ways, two means being shown for this purpose in the drawings either of which may be used to suit the quality of the work desired or the convenience of the operator. One of these means consists of a horizontal inking roller 30 of felt or similar material which is arranged transversely above the path of the printing type and movable vertically toward and from the same. This inking roller is coated with ink and is lowered upon the face of the type during the backward movement of the same, whereby the surface of the type is inked and at the end of this backward movement the inking roller is lifted so that it is out of engagement with the type face during the subsequent forward movement of the type.

When the printing bed reaches the end of its backward movement and the type face has been inked, the sheet to be printed is deposited upon the type face either by hand or by automatic means and during the subsequent forward movement of the type with the sheet resting thereon, the latter is pressed downwardly upon the type face by means of an impression roller or platen 31 which preferably has an elastic face of rubber or similar material and which is preferably arranged horizontally and transversely in front of the inking roller 30. This impression roller is movable vertically and is depressed during the forward movement of

the type, so as to produce an impression of the same on the sheet resting thereon but is raised during the last part of the forward movement of the type and during the subsequent backward movement thereof. When the type and sheet reach the end of their forward movement, the rear end of the sheet clears the impression roller and may now be removed from the type either by hand or by automatic means, so as to permit the type face to be inked by the inking roller during the next following backward movement of the type in the manner before described. It will thus be noted that the inking roller and impression roller are raised and lowered alternately, the inking roller being depressed into engagement with the type face and the impression roller raised therefrom during the backward movement of the type, while during the forward movement of the type the inking roller is raised from the type and the impression roller is depressed into operative relation thereto. This alternate raising and lowering of the inking roller and impression roller is preferably effected automatically and the means for this purpose which are shown in the drawings are constructed as follows: 32 represents two vertically swinging rock levers arranged lengthwise above the central parts of the side pieces of the main frame and each pivoted between its front and rear arms by means of a pin 33 upon a supporting block or bearing 34 arranged on the outer side of the respective lever. The front arms of the rock levers are provided with bearings 35 in which opposite ends of the shaft of the impression roller are journaled. The rear arms of the rock levers are provided with corresponding bearings 36 in which opposite ends of the shaft of the inking roller are journaled. It follows from this construction that upon turning the rock levers 32 simultaneously in one direction, the impression roller will be lowered and the inking roller raised, while upon turning the rock levers in the opposite direction, the movement of the impression and inking rollers is reversed. This rocking movement of the rock levers is effected during the last part of the forward and backward movements of the type, but during the intermediate parts of the backward and forward stroke of the printing bed and the type thereon the rock levers remain at rest in either one position or the other, so as to hold either the impression roller or the inking roller, as the case may be, in its operative position relatively to the type face. As shown in the drawings, this rocking movement of the levers is effected by two horizontally and longitudinally movable cams or cam plates 37 which are operatively connected with the rock levers, and two pairs of tappets 38, 39 which move with the type and engage alternately with the front and rear ends of the cam plates. As shown in the drawings, these cam plates are guided in horizontal longitudinal ways, on the outer sides of brackets 390 rising from the side pieces of the frame and each plate is provided with a cam slot 40 which receives a laterally projecting pin 41 on the rear arm of the adjacent rock lever. The front and rear tappets of each pair are arranged on the front and rear ends of the printing bed and project laterally therefrom across opposite ends of the cam plate on the corresponding side of the machine. While the type and printing bed are moving forwardly, the cam plates are in their rearmost position and the cam slots thereof are so constructed that at this time the rock levers are turned so as to depress the impression roller and elevate the inking roller. During the last portion of the forward movement of the printing bed the rear tappets of both pairs engage with the rear ends of the cam plates and push the same forwardly, thereby causing the cam slots to turn the rock levers so as to elevate the impression roller and depress the inking roller. The cam plates and the impression and inking rollers now remain in this position until the type and printing bed have nearly completed the following backward movement and during the last portion of this movement the front tappets of both pairs engage with the front ends of the cam plates and push the latter backwardly, thereby causing the cam slots to turn the rock levers in the opposite direction, so as to lower the impression roller on the type and raise the inking roller therefrom.

For the purpose of permitting the impression and inking rollers to be accurately adjusted relatively to the type face, the bearing blocks 34 which support the pivots of the rock levers 32 are capable of independent vertical adjustment on the main frame, this being preferably effected by arranging each bearing block in a vertical way 42 which is formed in the bracket 390 on the adjacent part of the main frame, a spring 43 interposed between the underside of each bearing block and the lower end of the guide way 42 and tending constantly to raise the bearing block, and an adjusting screw 44 arranged at the upper end of the guideway and bearing against the upper side of the bearing block 34. Upon lowering the screw 44, the bearing block and the impression and inking rollers supported thereon through the medium of the adjacent rock lever are lowered and the spring 43 is compressed, while upon raising this screw the resilience of the spring 43 raises the bearing block in the same measure as well as the impression and inking rollers carried thereby. After adjustment the screws 44 are held in position by means of jam nuts

45. By this means it is possible to cause the impression and inking rollers to be accurately alined with the face of the type and produce uniform inking and printing.

In order to take up any looseness in the bearings of the impression roller shaft and cause the same to engage the face of the type uniformly for producing an even impression, a constant upper pressure is exerted against this roller at opposite ends thereof, this being preferably effected by means of two longitudinal presser bars or rails 46, 460 arranged in longitudinal grooves or guideways 47 in the upper side of the printing bed on opposite sides of the type face and bearing with their upper sides against presser wheels 48, 49 mounted on the shaft of the impression roller adjacent to the bearings thereof. These presser bars are constantly pressed upwardly by means of springs 50 each of which engages with its upper end against the underside of the respective presser bar and with its lower end against the bottom of the groove or guideway in which the same is arranged. Upward movement of the presser bars or rails in their guideways is preferably limited so as to prevent the same from following the impression roller to the end of its upward movement when the latter is raised from the type, this being preferably effected by means of vertical stop screws 51 connected at their upper ends with the underside of the presser bars and adapted to engage the heads at their lower ends with downwardly facing shoulders 52 on the underside of the printing bed, as shown in Fig. 7.

For the purpose of positively rotating the impression rollers while the same is depressed and thus preventing displacement of the paper or sheet and insuring a perfect impression thereon, one of the presser wheels, for instance the wheel 48, as shown, is provided on its periphery with an annular row of teeth 53, so that the same practically forms the gear wheel or pinion and the upper side of the corresponding presser bar or rail 46 is provided on its upper side with a longitudinal row of gear teeth 54 which are adapted to be engaged by the teeth of the wheel 48. Upon depressing the impression rollers, the teeth of its gear wheel 48 are engaged with the teeth 54 of the respective presser bar in the manner of a gear rack, thereby causing the impression roller to be positively turned during the forward movement of the type with the printing bed. The pitch line of the teeth on the gear pinion or wheel 48 is of the same diameter as the periphery of the impression roller, so as to cause the surface of the latter to move at the same rate as the forward movement of the type, whereby dragging of the sheet of paper and blurring of the printing is avoided which otherwise would occur if a differential existed in the movement between the periphery of the impression roller and the face of the type. The teeth of the gear wheel 48 and the presser bar coöperating therewith are preferably V-shaped so that they are not liable to meet edge to edge and interfere with free engagement of the same upon lowering the impression roller.

Although the inking roller is preferable for some kinds of work on account of economy, it has been found in practice that the type are liable to fill up with ink and therefore require more frequent cleaning in order to produce perfect impressions of the same. The use of an inking roller also does not permit of producing perfect imitation of typewriting. If therefore it is desired to produce printing which avoids the necessity of frequently cleaning the type and which is a more perfect imitation of typewritten matter, a ribbon inking device is provided which may be used in place of the inking roller and which is constructed as follows: 55 represents an inking ribbon which is as wide as the face of the type which is to be inked and extends with its intermediate portion over the face of the type, as shown by dotted lines in Figs. 1 and 3, and is wound with its opposite ends upon front and rear drums or shafts 56, 57 which are journaled transversely in bearings at the front and rear ends of the printing bed. As the printing of successive letters or sheets is effected, the ribbon is moved lengthwise of the type face step by step so that new ink bearing portions of the ribbon are successively presented to the face of the type. For this purpose, the ribbon is preferably unwound from the front shaft or drum 56 and gradually wound up on the rear drum or shaft 57 by means of a ratchet wheel 58 secured to one end of the rear ribbon shaft 57, and a pawl or dog 59 pivoted on the inner side of one of the side pieces of the main frame in the path of the upper part of the ratchet wheel. During the main part of the forward movement of the printing bed, the ink ribbon remains at rest relatively to the type, so that a clear impression of the same is produced on the sheet which at this time is being pressed against the same by the impression roller. During the last portion of the forward movement of the type and after the impression roller has been raised, the upper teeth of the ratchet wheel engage with the relatively stationary shifting dog 59, as shown in Fig. 5, thereby causing the rear ribbon shaft to be turned sufficiently to present another part of the inking ribbon to the type. When the inking ribbon has been entirely unwound from the front roller 56, the same is again rewound upon the same preparatory to again being fed step by step over the face of the type.

The ink ribbon roller may be held against winding backward by any suitable means, for instance, by mounting said roller sufficiently tight in its bearings that it is held frictionally in whatever position the same may be turned. The ends of the ink ribbon may be secured to their respective shafts by any suitable means, but preferably by means of crescent-shaped spring clasps 60, as shown in Figs. 1 and 3. It is of course understood that when the inking roller is in use, the inking ribbon is removed from the face of the type and is out of commission, at which time the inking ribbon may be wound wholly upon the front roller or shaft, as shown in Fig. 3, or may be wholly removed from the machine if desired.

My improved printing machine contains comparatively few parts, it can be quickly prepared for printing and permits of producing high grade of printing expeditiously and at very low cost.

I claim as my invention:

1. A printing machine comprising a frame, a printing bed reciprocating horizontally in said frame and adapted to support a printing face, an impression roller movable toward and from the printing face, rock levers mounted on relatively stationary pivots and supporting opposite ends of the impression roller and having projections, horizontally sliding cam plates guided in stationary ways and having cam slots which receive said projections, and tappets arranged on said bed and adapted to engage alternately with opposite ends of the cam plates for shifting the latter and causing said levers to raise and lower the impression roller.

2. A printing machine comprising a frame, a printing bed reciprocating in said frame and adapted to support a printing face, an impression roller movable toward and from the printing face, rock levers supporting opposite ends of the impression roller, vertically movable blocks on which said levers are pivoted, brackets arranged on said frame and provided with ways in which said blocks are guided, and means for raising and lowering said blocks in said ways.

3. A printing machine comprising a frame, a printing bed reciprocating in said frame and adapted to support a printing face, an impression roller movable toward and from the printing face, rock levers supporting opposite ends of the impression roller, vertically movable blocks on which said levers are pivoted, brackets arranged on said frame and provided with ways in which said blocks are guided, and means for raising and lowering said blocks in said ways comprising springs for moving said blocks in one direction and adjusting screws for moving said blocks in the opposite direction.

Witness my hand this 2nd day of August, 1909.

NICHOLAS MEYERS.

Witnesses:
THEO. L. POPP,
E. M. GRAHAM.