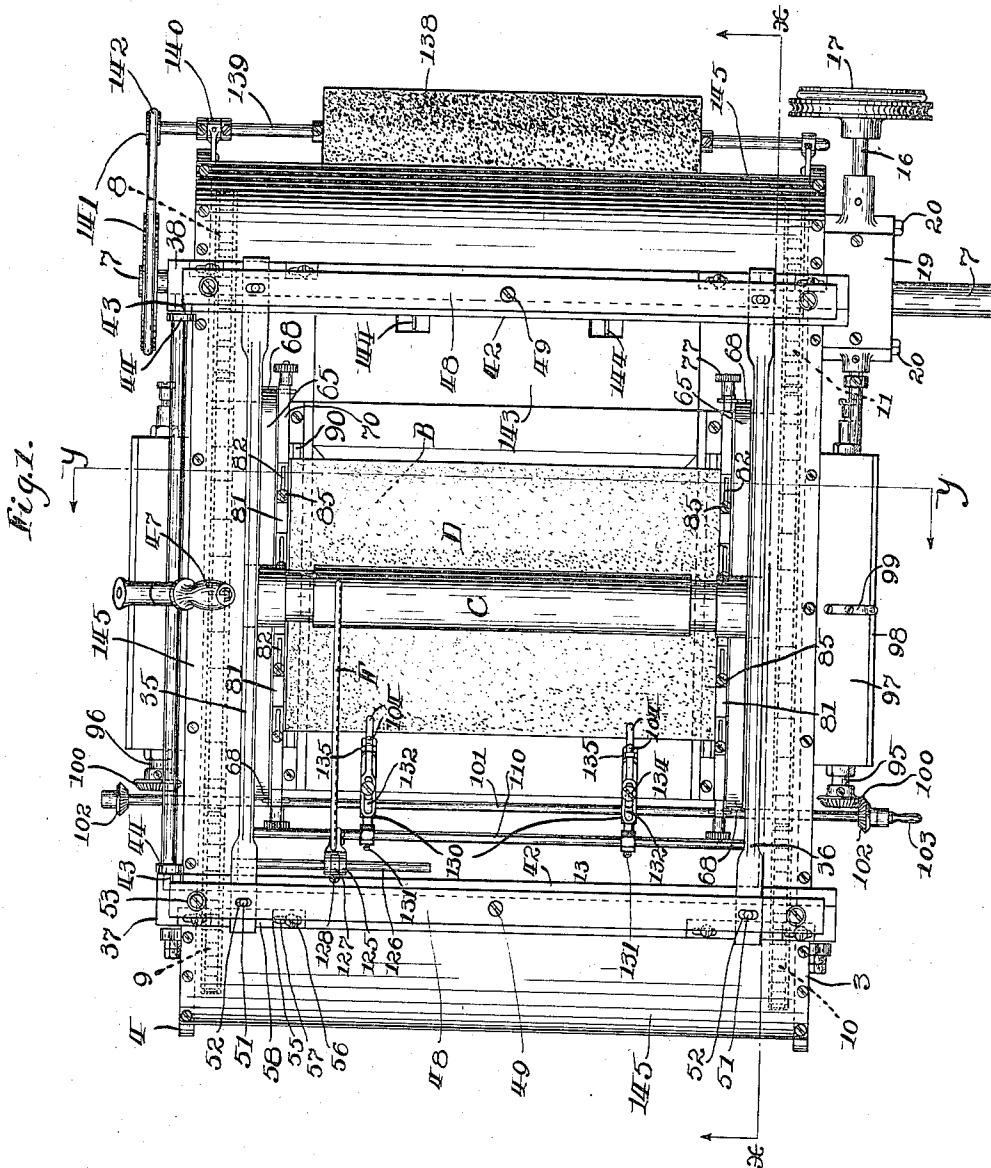


1,044,094.

W. A. SORG.
PRINTING PRESS.
APPLICATION FILED JUNE 8, 1908.

Patented Nov. 12, 1912.
5 SHEETS—SHEET 1.



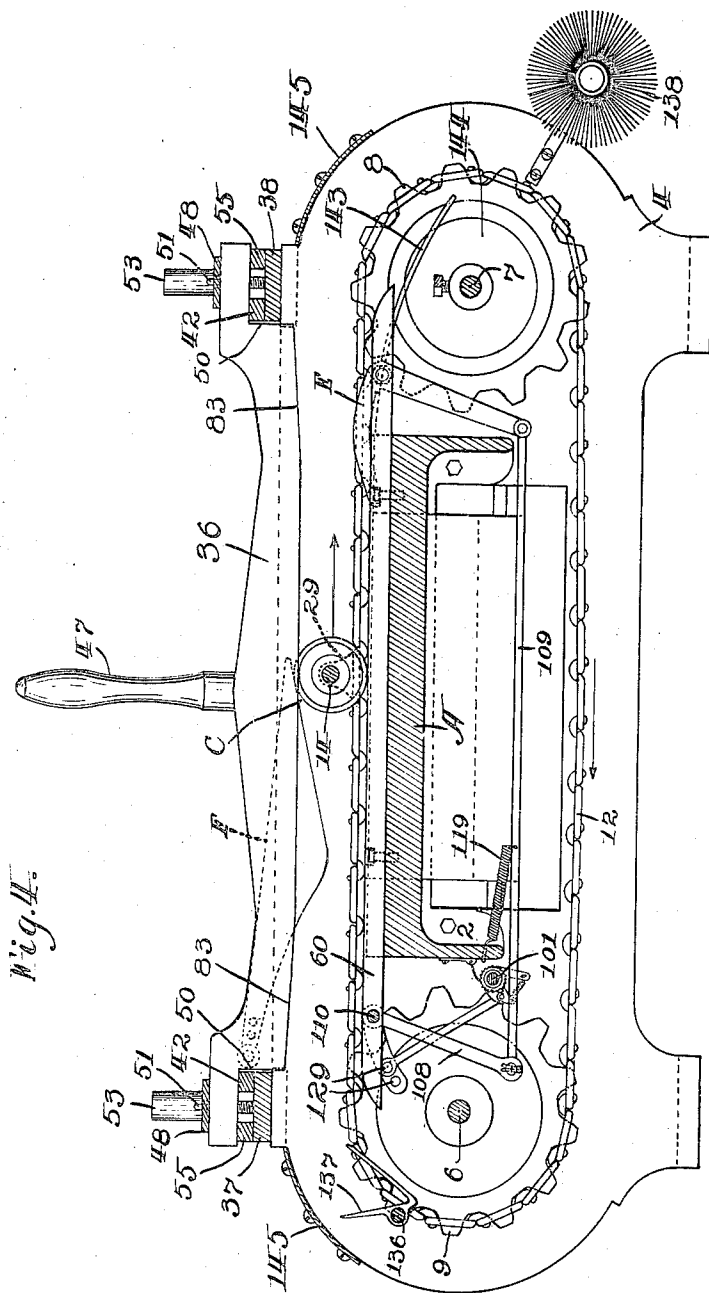
Witnesses:
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H. Fischer.

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5 SHEETS—SHEET 3.



Witnesses:
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H. Fischer

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5 SHEETS—SHEET 4.

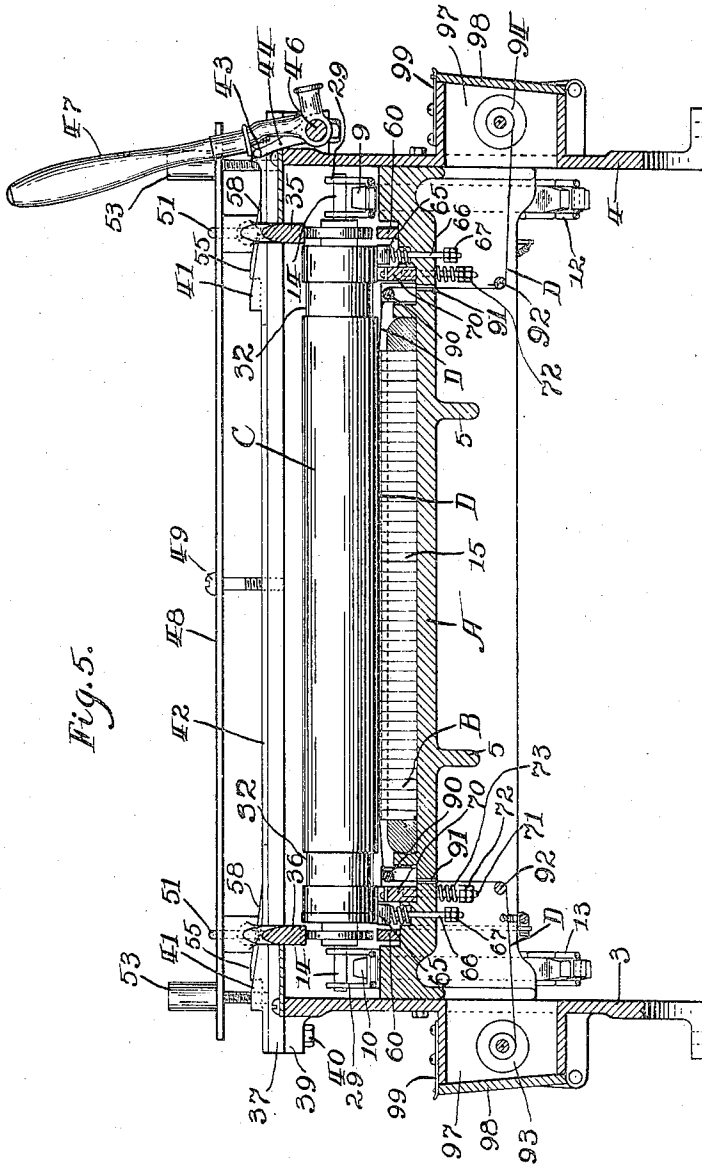


Fig. 5.

Witnesses:

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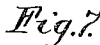
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PRINTING PRESS.
APPLICATION FILED JUNE 8, 1908.

5 SHEETS--SHEET 5.



Inventor:

William H. Sorg,
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UNITED STATES PATENT OFFICE.

WILLIAM A. SORG, OF MINNEAPOLIS, MINNESOTA.

PRINTING-PRESS.

1,044,094.

Specification of Letters Patent.

Patented Nov. 12, 1912.

Application filed June 8, 1908. Serial No. 437,302.

To all whom it may concern

Be it known that I, WILLIAM A. SORG, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented a new and useful Printing-Press, of which the following is a specification.

My invention relates to improvements in printing presses and more particularly to that class employing an ink transferring medium between the type and cooperating pressure element. A machine of this type is essentially useful for duplicating type written work and can be operated in business offices by inexperienced persons.

Among other advantages in my invention are simple and inexpensive construction, adjustability of the parts, uniformity of impression by the type, and greater speed with reduced power and effectiveness in operation than with machines of its class heretofore in use.

In the accompanying drawings forming part of this specification, Figure 1, is a plan view of my invention; Fig. 2, is a side view; Fig. 3, is another side view taken in the opposite direction from that in which Fig. 2 is taken; Fig. 4, is a longitudinal section taken on the line X—X of Fig. 1; Fig. 5, is a transverse section taken on the line Y—Y of Fig. 1; Fig. 6, is a detail side view illustrating the inking ribbon feed mechanism; Fig. 7, is a longitudinal section through the center of the impression roller; Fig. 8, is a longitudinal side view of the bed and the construction of what I have chosen to term the auxiliary guiding mechanism for the impression element; and Fig. 9, is a detail view partly in section of one of the adjustable springs which assists in depressing the pressure or guide bars.

In the drawings A represents a substantially horizontal, rigid bed which is secured by brackets 2, to longitudinal sides 3 and 4 which form a stand. The surface of the bed is finished in a true plane for the typeform B to rest upon and has a pair of longitudinal ribs 5 which serve to reinforce the strength of the bed. At the forward and delivery ends of the machine are two transverse shafts 6 and 7 upon which are secured at equal distances apart sprocket wheels 8, 9, 10 and 11. Upon these sprocket wheels a pair of parallel link belts 12 and 13 travel at the same surface speed. Between these belts

a transverse shaft 14 is secured upon which an impression roller C to be hereinafter described is freely journaled. The upper laps of the belts 12 and 13 travel over and the lower laps below, the bed, and the impression roller is thereby caused to impinge against the type 15 in the type form during each cycle of the belts. The shaft 7 as shown is driven by a transverse shaft 16 and a drive pulley 17 thereon. The transverse shaft 16 is operatively connected with the shaft 7 by means of intermediate worm gearing 18, said shaft and worm gearing being suitably journaled in the casing 19 which is secured on the side 3 of the stand by bolts 20. One end of the shaft 7 projects through the casing 19 so that a hand crank (not shown) may be attached to the machine for operating it when desired.

The impression roller C consists of a shell 25 having on its surface a thin jacket of resilient material such as vulcanized rubber and through which shell the shaft 14 extends longitudinally. The roller is freely journaled upon the shaft 14 by means of ball bearings 27 and 28 of ordinary construction which are located intermediate of the ends and within the casing of the roller, the bearing places being situated so that pressure upon the surface of the roller is equally distributed and a uniform impression always made. I have found in practice this construction of roller particularly effective, for should a slight bend occur in the shaft or a narrow form of type be used the bearings cause the shell to run true while with prior art devices a slight inequality in the turning of the roller under such circumstances has resulted in producing a poor quality of work or in the printing press becoming wholly inoperative. In all other machines the line of travel of the impression roller is determined by its journal bearings while on this machine the perimeter of the roller travels over the type conforming to any inequalities thereof. The ends of the shaft 14 are freely journaled in flanges 29 on a pair of the links of the belts. Immediately adjoining each end of the roller, guide wheels 30 are rigidly journaled upon the shaft 14. On one end of the shell 25 is a metal wear ring 31 and near each end of the jacket 26 is a circular space 32.

Above the roller (when on the upper lap of the belts) is pressure or guiding mechanism

nism which serves to press the impression roller downwardly toward the type in the form during each stroke of the impression roller. This pressure mechanism has a pair
 5 of longitudinal and parallel pressure or guide bars 35 and 36 below the lower edges of which the guide wheels 30 impinge and cause the roller to run over the surface of the type in the form on the bed of the machine. These pressure bars are carried by
 10 means of transverse supports 37 and 38 which are rigidly secured upon brackets 39 on the sides of the stand by means of the bolts 40. The ends of the pressure bars rest upon inclined upwardly extending draw
 15 shoulders 41 which are formed on the upper surfaces of shift bars 42 when the pressure bars are in superior position. The corresponding ends of the shift bars at one
 20 side of the machine are notched at 43 and a pair of crank arms 44 have their power ends 45 working in said notches and their work ends rigidly secured upon a longitudinal shaft 46 which is journaled in two
 25 of the brackets 39. A handle 47 is secured to the shaft 46 and by swinging it backward and forward said shaft is turned and the shift bars 42 moved. When the
 30 handle 47 is operated the shoulders 41 either raise the pressure bars into superior position or allow them to recede. Above the shift bars 42 are a pair of spring bars 48 the ends of which rest across the ends of the pressure bars. These spring bars are
 35 secured to the transverse supports 37 and 38 by vertical screws 49 passing through said spring bars substantially midway between their ends. The ends of the pressure bars are held in place by their shoulders
 40 50, and pins 51 passing freely through slots 52 in the ends of the spring bars 48. The ends of the spring bars 48 are held down under spring pressure below deep seated cups
 45 53 in which are held helical expansion springs 54 through which vertical bolts extend and pass through the ends of spring bars 48 into the transverse supports 37 and
 50 38. The downward pressure exerted against the ends of the spring bars 48 and in consequence upon the ends of the pressure bars can be varied by adjusting the vertical bolts
 55 22 or 49. Below the end of each pressure bar is a stop 55 which is secured to the transverse supports 37 and 38 by means of screws 56 passing through slots 57. These
 60 stops have inclined shoulders 58 which limit the downward movement of the pressure bars by their ends resting thereon. By loosening the screws 56, moving the stops and setting said screws, the inclined shoulders 58 can be changed in position to limit the downward movement of the pressure bars. All of the inclined shoulders on the
 65 stops 55 and shift bars 42 taper in the same general direction. As the belts travel

around the bed, the wheels 30 impinge and run upon the lower edges of the pressure bars and cause the roller to press down toward the type in the form. The wheels 30 thus act as anti-friction devices and leave
 70 the impression roller to revolve upon its shaft freely. The wheels 30 on the roller do not come into contact with the longitudinal support bars 60 in the operation of the machine.

The auxiliary guiding mechanism, which is primarily for preventing the impression roller from coming into contact with the form on the bed and the inking ribbon during the entire movement of the impression
 80 roller when the pressure bars are in superior position and for revolving the roller forwardly at the same surface speed as that of the belts when the pressure bars are down, is provided with a pair of longitudinal track or guide bars 65 which are located
 85 below each end of the impression roller casing. Each of these track bars 65 is mounted upon a pair of vertical stud bolts 66 to the lower ends of which are secured lock nuts
 90 67 which permit but limit vertical movement of said track bars. Helical springs around said vertical bolts are interposed between the track bars and the bed, having sufficient expansive strength to cause the
 95 roller to ride upon said track bars when the pressure bars are in superior position but are depressed when said pressure bars are down. The ends of the track bars are rounded off at 68 so that the roller is adapted
 100 to run freely on and off of the same. It is thus evident that the roller shell is revolved at equal surface speed as the advance movement of the belt and is adapted thereby to make an even impression in coöperation
 105 with the type and other parts when printing and does not disturb the transfer inking medium or the material being printed upon.

Adjoining the auxiliary guiding mechanism are devices which are adapted to raise the roller in exact alinement to work in a horizontal plane upon the type without disturbing the latter when the pressure bars are
 110 down. These devices have a pair of longitudinal and parallel bars 70 from which stud bolts 71 depend through the bed. Helical expansion springs 73 surround the stud bolts 71 and impinge against the lower surface of the bed and lock nuts 72 on the lower
 115 ends of said bolts thus tending to draw the bars 70 toward the bed. For the purpose of raising and lowering each bar 70 a pair of wedge blocks 74 is provided each block being placed with its inwardly tapering end
 120 sliding over the bed and impinging against one of the ridges 75, which are near the ends of the bars 70. The wedge blocks 74 are driven below the bar 70 and withdrawn by an adjusting screw in the form of a stud bolt
 125 130

76 projecting from the bed and provided with a threaded collar 77 running in a groove 78 in the lower surface of the block. Upon the upper edge of each bar 70 is a pair of skids 80 which are adapted to rest in the path of the roller when the pressure bars are down. These skids are in the form of blocks having inclined shoulders 81 up and down which the impression roller is adapted to run and longitudinal slots 82 through which set screws 85 pass into the bar 70 and hold the skids longitudinally adjusted thereon. The springs 73 on the stud bolts 71 referred to permit the skid bar 70 to be raised by the wedges 74. The skids raise the impression roller upon the type and cause the impression roller to run off of the type upon the guide without in any way jarring the type in the form, said skids having their faces adjusted exactly in the same horizontal plane as the faces of the type rest in the form. By loosening the screws the skids may be moved longitudinally in alinement with the transverse edges of the form of type. The pressure bars 35 and 36 serve as guides for causing the impression roller or element to cooperate with the type in the form; and the resiliently supported guide bars 65 serve to revolve the impression roller when said bars 35 and 36 are down and to guide the impression element out of cooperation with the type holding element when the pressure bars are in superior position. It will be noted that the lower edges of the pressure bars incline slightly down toward the inner portion of the machine at 83 so that the impression roller will be gradually guided with its surface in cooperative alinement with the type in the form.

Running transversely across the bed and above the type form is a ribbon D of suitable transfer material. In practice I have used a ribbon or web of material similar to that employed in typewriting machines and a ribbon of thin paper or parchment coated with ink the latter producing better results for some classes of work than that which is possible for a transfer web to produce. This machine being capable of minute adjustment of the parts and smooth cooperation between the impression and the type holding elements causes little wear upon the ribbon and permits the use of thin inked parchment while with machines of the class of this invention heretofore used it is necessary to employ a strong web. This machine being adapted to run the lines of type longitudinally with the travel of the impression element also permits the use of a transfer material made of paper or equivalent material.

The ribbon D passes horizontally across and around longitudinal anti-friction rollers 90 above the bed, thence down through slots 91 in the bed, around anti-friction rollers 92 below the surface of the bed, to maga-

zine spools 93 and 94 upon which the ribbon is adapted to be wound. The anti-friction rollers 90 and 92 are journaled in the bed.

The spools 93 and 94 are mounted upon longitudinal shafts 95 and 96 which are journaled on magazine frames 97. These frames are formed on the sides 3 and 4 of the stand and are closed by hinged doors 98 which are locked by spring snaps 99. The shafts 95 and 96 are of the usual construction for supporting magazine spools of the character described and each is provided on one end with a beveled gear 100. Adjoining the ends of the shafts 95 and 96 upon which said beveled gears are mounted is a transverse shaft 101 journaled and free to slide in the sides of the stand and upon which are mounted beveled pinions 102. By moving the shaft forward or backward first one or the other of said beveled pinions is adapted to be thrown into mesh with one of the beveled gears 100 thus causing one of the spools to wind the ribbon and the other to pay it out or vice versa. By running the ribbon across the lines of type instead of with the lines as in other machines the edges of the ribbon do not curl. A handle 103 on the end of the shaft 101 is for the purpose of operating the spools by hand to move the ribbon across the type holding element. The shaft 101 is turned a step forward each time the impression roller passes over the bed of the machine by said roller impinging against a dog E as illustrated in Fig. 6 of the drawings. The dog E consists of a bell crank lever pivoted at its angle by means of a pin 105 upon one of the track bars 60 near its overhanging end and having one arm 106 curved upwardly in the path of the wear ring 31 on the impression roller. The other arm 107 of the bell crank lever is connected to a rocker arm 108 by means of a rod 109, said rocker arm being rigidly secured to a rock shaft 110 which is pivoted in the forward end of the track bars 60. The rock shaft 110 carries a lever 111 which is operatively connected to a ratchet dog carrier 112 by means of a reach rod 113. The ratchet dog carrier is freely mounted upon the shaft 101 adjoining a ratchet wheel 114 which is rigidly secured upon said shaft. A dog 115 is pivoted at 116 upon the carrier 112 and is adapted to engage the teeth of the ratchet wheel when the carrier is moved in one direction and to sweep over said teeth when the carrier is reversed. A spring connected by one end to an arm on the dog and by its other end to an arm on the carrier tends to hold the dog in engagement with the teeth of the ratchet wheel. A dog 118 secured to the bed engages the teeth of the ratchet wheel and prevents the shaft 101 reversing when the carrier moves its dog 115 back. It is thus evident that each time the impression roller moves over the bed and

immediately after it has coöperated with the type holding element it impinges against the lever arm 106 and depresses it as shown in Fig. 6 and thereby turns the shaft 101 forward and moves the transfer ribbon a step across the type holding element thus presenting a fresh transfer surface to the type. A spring 119 secured to the bed and to the arm 109 returns the parts of the ribbon feeding mechanism described into normal position as shown in Fig. 4. By changing the lever to one of the pivot openings 129 the feed may be varied to a greater or less extent as desired.

A system of paper guides is employed to receive the paper to be printed upon and by its use it is possible to register the paper both quickly and accurately. Coöperating with this system of paper guides is provided, means for automatically removing the paper, after it has been printed upon, from the machine. The paper guides consist of a longitudinal and vertical plate F which rests normally upon the ribbon above the type form on the bed and is secured to a bifurcated support 125 through which a transverse rod 126 supported on the side of one of the pressure bars 35 passes freely. A collar 127 through which the rod 126 also passes is secured between the bifurcations of the support 125 by means of the set screw 128. By loosening this set screw the longitudinal guide can be set in any desired position transversely. Supported upon the rock shaft 110 are a pair of transverse guides 130 for the paper. These guides 130 can also be set in any desired position transversely by means of the set screws 131. The transverse guides 130 consist each of a pair of upper and lower jaws 104 which are secured through longitudinal slots 132 to a longitudinal arm 133 by means of a screw 134. By loosening the screws in the transverse paper guides the jaws of said guides can be extended to adjust said guides longitudinally. The lower jaw of each transverse guide carries a stop 135 against which a transverse edge of the paper impinges. Each time the impression roller coöperates with the type holding element it impinges against the arm 106 of the ribbon feed mechanism and tilts the rock shaft 110, lifting the transverse paper guides into the position indicated in Fig. 6 and the rearward edge of the sheet of paper which has been previously printed upon. At this point the mechanism for removing the paper from the machine coöperates with the guides by engaging the rearward edge of the sheet of paper which has been lifted by the guides and sliding the sheet of paper off the bed. Secured between the link belts by rigid connections with two of their links is a transverse shaft 136 and upon which are rigidly secured a pair of jaws 137. At

the delivery end of the machine is a carrier brush 138 which is mounted upon a transverse shaft 139. This shaft is journaled in bearings 140 upon the sides of the stand and is operatively connected with the shaft 7 by means of pulleys 141 and a belt 142. The surface speed of the brush 138 is greater than the surface speed of the belts and the impression roller. A carrier plate 143 secured to the bed and a pair of carrier wheels 144 secured upon the shaft 7 operate with the carrier brush to assist in removing each sheet of paper from the machine after it has been printed upon. The carrier brush operating at an accelerated speed causes the carrier mechanism to work efficiently and effectively to the end desired. Suitable guard plates 145 secured to the sides of the stand protect the mechanism from dust and the operator from danger by coming into contact with the working parts. As the belts travel the guide F sweeps over the impression roller and the carrier shaft 136. The grooves 32 in the impression roller permit the roller to operate out of contact with the ribbon guide rollers 90.

In operation the sheets of paper to be printed upon are placed by hand one at a time against the guides upon the form with their forward edges projecting between the jaws 104 of the transverse guides. As the belts are driven forward the impression roller and carrier upon the belts pass freely above the type holding element and out of contact with the paper to be printed upon. When the handle 47 is thrown forward and the pressure or guide bars 35 and 36 lowered the impression roller coöperates with the type holding element and causes the type to print upon the sheet of paper in the machine. As the impression roller advances from and after it has left the type holding element it depresses the dog E and causes the ribbon feed mechanism to move the transfer material a step forward across the type holding element; this same action lifts the transverse guides into the position shown in Fig. 6 thus raising the rearward edge of the sheet of paper above the face of the type form. The jaws 137 following the impression roller on the belts thereupon engage the forward edge of the sheet of paper and push said sheet over the carrier plate 143 and onto the carrier brush 138, the latter ejecting the paper quickly from the machine. The carriers carry the paper (substantially) without contact with the ribbon.

In accordance with the patent statutes I have described the principle of operation of my invention together with the apparatus which I now consider to represent the best embodiment thereof; but I desire to have it understood that the construction shown is only illustrative and that the in-

vention can be carried out by other means and applied to uses other than those above set forth within the scope of the following claims.

5 Having described my invention what I claim as new and desire to protect by Letters Patent is:—

1. In a printing machine, two cooperating elements, one a traveling carrier and the
10 other a flat form carrying member, a transfer ribbon between said members between which ribbon and one of said members a sheet of paper is adapted to be printed, means for raising a portion of said sheet
15 after the printing operation and means for engaging said raised sheet and removing it from the form.

2. A machine of the class described, comprising, in combination, a type holding element, a pair of endless belts around said
20 element, an impression roller carried between said belts, means for driving said belts continuously at equal surface speed, an inking transfer medium between said type
25 holding element and roller, means for feeding said transfer medium across said type holding element and a carrier following said roller on said belts to remove the material being printed upon.

3. A machine of the class set forth, comprising, in combination, a type holding element, having a bed with openings and a
30 form, an impression element traveling continuously and longitudinally forward above said holding element, a guide causing said
35 elements to cooperate, and a transverse transfer ribbon passing through said bed and across said form, means for feeding said ribbon and means for changing the speed of
40 the feed of said ribbon.

4. A machine of the class set forth, comprising, in combination, a type holding element, an impression element, a guide causing
45 said elements to cooperate, a second guide holding said elements out of cooperation, means for throwing said guides into and out of operation, and transfer material between said elements.

5. A machine of the class set forth, comprising, in combination, a bed, a type form
50 upon said bed, an impression element traveling continuously around said form, a guide causing said elements to cooperate, a skid operating to raise said impression element
55 upon the type in said form and lower it from the same, and transfer material between said form and impression element.

6. A machine of the class set forth, comprising, in combination, a type holding element, an impression element traveling adjacent
60 to said holding element, a guide causing said elements to cooperate, a resilient track raising said impression element out of cooperation, means for raising said guide

to permit said impression element to ride
65 upon said track, and transfer material between said cooperating elements.

7. A machine of the class described, comprising, in combination, a type holding element, an impression element traveling continuously
70 around said holding element, a resilient guide causing said elements to cooperate, means for raising said guide to permit said impression element to travel out of cooperation with said type holding element,
75 transfer material between said elements, and means for moving said transfer material across said holding element.

8. A machine of the class described, comprising, in combination, a type holding element, an impression element traveling continuously
80 around said holding element and cooperating with said holding element, a skid for raising said impression element upon said type holding element, and transfer
85 material across the face of said holding element.

9. A machine of the class described, comprising, in combination, a type holding element, an impression element traveling continuously
90 around said holding element and cooperating with said holding element, a skid for raising said impression element upon said type holding element, transfer material across said holding element, and
95 means for moving said material.

10. A machine of the class described, comprising, in combination, a type holding element, an impression element traveling continuously
100 around said holding element, and cooperating therewith, a skid gradually raising said impression element upon said holding element and lowering it therefrom, and transfer material passing over said holding
105 element.

11. A machine of the class set forth, comprising, in combination, a type holding element, an impression element, associated with
110 said holding element for the paper to be printed upon, means for causing said elements to cooperate, paper guides associated with said holding element, a carrier traveling forward continuously and cooperating
115 with said guides to remove said paper from said holding element, and transfer material passing between said elements, for the purposes specified.

12. A machine of the class set forth, comprising, in combination, a type holding element, an impression element traveling continuously
120 forward above said holding element, guides associated with said holding element for the material to be printed upon, means for causing said elements to cooperate, transfer material between said elements,
125 and means for removing the printed material from said holding element.

13. A machine of the class set forth, com-

prising, in combination, a bed, a type form upon said bed, an impression element traveling longitudinally and continuously across said bed, means for causing said elements to cooperate, means for removing printed material from the machine, a transfer ribbon passing through said bed and across said form and means for moving said transfer material.

10 14. A machine of the class set forth, comprising, in combination, a type holding element, an impression element, means for causing said elements to cooperate, guides associated with said elements for the material to be printed upon, means adapted to travel around the type holding element for removing the printed material from said holding element, a carrier for the printed material adjacent to said holding element, and transfer material between said holding and impression elements.

15 15. A machine of the class set forth, comprising, in combination, a stationary type holding element, a belt passing continuously around said holding element, a transverse impression roller carried by said belt, means for causing said roller and holding element to cooperate, means for holding said roller out of cooperation with said holding element, means for driving said belt continuously, a transfer ribbon passing across the face of said holding element and means for automatically moving said transfer ribbon.

20 16. A machine of the class set forth, comprising, in combination, a rigid bed, a type form upon said bed, a belt passing over said bed, means for driving said belt continuously forward, an impression roller carried by said belt, means for causing said impression roller to cooperate with said type form, means for holding said roller out of cooperation with said type form, a transfer ribbon passing over the face of said type form, means for moving said ribbon and means carried by said belt for removing the printed material from said type form.

25 17. A machine of the class set forth, comprising, in combination, a rigid bed, a type holding element upon said bed, a belt, means for driving said belt forward continuously, an impression roller carried by said belt, means for causing said roller to cooperate with said form, means for holding said roller out of cooperation with said form, transfer material, between the face of said form and roller, means carried by said belt for removing the printed material from said form, and a carrier associated with said parts for the printed material.

30 18. In a machine of the class set forth, a pair of cooperating type holding and platen elements, one of said elements being mounted to travel orbitally with relation to the opposite element, a paper guide movably

mounted above said type holding element 65 and adapted to move upwardly following the cooperation of said platen and type holding elements.

19. A machine of the class set forth, comprising, in combination, a bed, a form upon said bed, a belt, means for driving said belt forward continuously, a support carried by said belt, a guide wheel mounted upon said support, an impression roller journaled upon said support, means co-acting with said guide wheel for causing said roller to cooperate with said form, means also carried by said belt for removing printed material from said form, transfer material between said roller and form and means co-operating with said parts for moving said material.

20. A machine of the class set forth, comprising, in combination, a bed, a type form on said bed, a belt, means for driving said belt forward continuously, a support carried by said belt, a guide cooperating with said support, a roller freely journaled upon said support and cooperating with said form, means independent of the type in said form for revolving said roller at equal surface speed with the advance of said belt, and transfer material between the face of said type form and roller.

21. A machine of the class set forth, comprising, in combination, a bed, a type form on said bed, a pair of parallel belts, means for driving said belts forward continuously at equal surface speed, a transverse support between said belts, guides carried by said support, a roller journaled intermediate of its ends upon said support, means cooperating with said guides for causing said roller to co-act with said type form, means cooperating with said roller for holding the latter out of co-active position with said form and transfer material passing between said type form and roller for the purposes specified.

22. A machine of the class set forth, comprising, in combination, a type holding element, a pair of parallel belts, means for driving said belts forward continuously, an impression roller carried between said belts, means for causing said roller to cooperate with said holding element, a transfer ribbon between said holding element and roller, feed mechanism for automatically moving said ribbon each time the roller passes over said holding element, guides for the material to be printed upon associated with said holding element and a carrier upon said belts for removing the printed material from said holding element.

23. A machine of the class set forth, comprising, in combination, a rigid base, a type form upon said base, a pair of endless belts traveling around said base, sprocket wheels

for said belts, a transverse shaft freely journaled between said belts, an impression roller journaled freely intermediate of its ends upon said shaft, guide wheels at the ends of said roller upon said shaft, a pair of pressure bars, springs impinging against said bars and causing them to co-act with said guide wheels and press said roller down upon said form, means for raising said pressure bars, a pair of resilient track bars for raising said roller out of coöperation with said form, a pair of skids for raising said roller upon and lowering it gradually from the type in said form, guides adjacent to said bed for the material to be printed upon, means for raising part of said guides and lifting the rearward edge of the material printed upon, and carriers following said roller upon said belts adapted to engage the rearward raised edge of said material and remove the printed material from said form.

24. A machine of the class set forth, comprising, in combination, a type holding element, a belt, means for driving said belt forward, an impression roller carried by said belt, means for causing said impression roller to coöperate with said holding element, a transfer ribbon between said holding element and roller, mechanism for advancing said ribbon, guides for the material being printed upon adjoining said holding element, means connected with said advancing mechanism for lifting said guides with the rearward edge of the material being printed upon after said impression roller has moved over said holding element, a carrier following said roller upon said belts for removing said material printed upon from said holding element, a carrier brush associated with said parts and means for revolving said brush at surface speed greater than that of said belts and delivering the printed material from the machine.

25. In a machine of the class set forth, a pair of coöperating type holding and platen elements, one of said elements being mounted to travel orbitally with relation to the opposite element, a paper guide movably mounted and selectively positioned above said type holding element and adapted to move upwardly following the coöperation of said platen and type holding elements.

26. A machine of the class set forth, comprising, in combination, a bed, a type-form upon said bed, an impression element traveling continuously around said form, a guide causing said elements to coöperate, a skid operating to raise said impression element upon the type in said form and lower it from the same, means for raising and lowering said skid, and transfer material between said form and impression element.

27. A machine of the class set forth, comprising, in combination, a bed, a type form

upon said bed, an impression element traveling continuously around said form, a guide causing said elements to coöperate, a skid operating to raise said impression element upon the type in said form, and means for raising and lowering said skid.

28. A machine of the class set forth, comprising, in combination, a bed, a type form upon said bed, an impression element traveling forward above said form, a guide causing said elements to coöperate, a skid operating to raise said impression element upon the type in said form, means for raising and lowering said skid and transfer material between said form and impression element.

29. In a machine of the class set forth, a pair of coöperating type holding and platen elements, said platen element being mounted to travel orbitally with relation to the type holding element, a guide for positioning sheets of printing material upon the type holding element laterally and a transverse support above the path of the platen element and upon which said guide is movably mounted to sweep over the platen element as the latter coöperates with the type holding element and selectively positioned to regulate the positioning of the sheets of printing material upon said type holding element.

30. In a machine of the class set forth, a type form holding element, a platen mounted to travel orbitally relative to said type holding element, means for pressing said platen down toward the type on said holding element, means for varying the downward pressure of said platen at a plurality of points, whereby a substantially even impression by the platen upon the form of type is adapted to be produced and means for lifting said platen out of coöperative position regarding said type holding element.

31. The combination of a type-bearing member, an impression member coöperating therewith, a ribbon passing over said type-bearing member and adapted to receive a sheet of paper to be printed, a traveling support adapted to move orbitally about said type bearing member and on which said impression member is rotatably mounted, a paper delivery device movable with said support and out of contact with the paper during the time of printing and adapted to engage the paper after printing and deliver the same.

32. Two coöperating members, one an impression cylinder mounted in a carrier and the other a flat form-carrying member about which said carrier is adapted to travel orbitally, a transfer ribbon between said members between which ribbon and one of said members a sheet of paper is to be printed combined with an arm mounted on the car-

rier for the impression member and out of contact with the paper during the printing operation but movable to engage one edge of the paper after being printed and deliver the same.

33. In a printing machine, the combination of a bed, a form of type thereon, an ink-ribbon adapted to coact with the printing faces of the type, a pressure-roller, flexible carriers on which the roller is mounted, means for actuating said carriers to move the roller in one direction on one side of the type and in coaction with the printing faces thereof to effect the printing and in the opposite direction on the other side of the type to return to initial position, and a delivery device mounted on said carriers and adapted to engage a sheet after the roller has passed over the same to remove the sheet from printing position.

34. In a printing machine, the combination of a bed, a form of type thereon, an ink-ribbon adapted to coact with the printing faces of the type, a pressure-roller, flexible carriers on which the roller is mounted, means for actuating said carriers to move the roller in one direction on one side of the type and in coaction with the printing faces thereof and in the opposite direction on the other side of the type and a delivery device adapted to engage the edge of a sheet to remove the sheet from printing position, said device being mounted on said carriers a distance in rear of said roller greater than the length of said form of type.

35. A printing machine having a support for a form of type, an ink-ribbon supported in coöperative relation to the printing faces thereof, shafts at opposite ends of said support, sprockets on said shafts, chains running on corresponding sprockets on the two shafts, a roller mounted for rotation on said chains and adapted to be carried thereby into co-action with said type, and sheet-strippers mounted on said chains in rear of said roller.

36. In a machine of the class set forth, a type holding element, a platen mounted to travel orbitally with relation to said type holding element and movable into and out of coöperative position regarding said type holding element, a pair of pressure bars co-acting with said platen to force the latter toward said holding element, means for variably pressing the ends of said pressure bars to cause an even printing impression to be produced by said platen upon the type on said type holding element, and means for shifting said platen into and out of co-operative position regarding the type on said holding element.

37. In a machine of the class set forth, a type holding element, a platen mounted to travel orbitally with relation to said type holding element, a pair of pressure bars

co-acting with said platen to force the latter toward said holding element, resilient means co-acting with the ends of said pressure bars to press said pressure bars toward said holding element, means for removing the force exerted by said resilient means and means for lifting said platen out of co-operation with the type on said holding element.

38. In apparatus of the class set forth, a pair of coöperating type holding and platen members, a support on which said platen member is mounted to travel orbitally with relation to said holding element, means for raising the edge of the sheet of material after it has been printed upon by said co-operating members and a stripper mounted to move and engage the raised edge of said sheet and remove the sheet from printing position.

39. In apparatus of the class set forth, the combination of a bed, a form of type thereon, an inking ribbon overlying the printing faces of the type, a roller, means for moving the roller to produce printing, paper guide mechanism adapted to co-act with the side and end edges of the sheet a portion of which serving to raise an edge of the sheet after said roller has performed its function, means for holding a portion of said guiding mechanism in raised position and a stripper adapted to engage the raised edge of the sheet of material and remove said sheet from the type form.

40. In an apparatus of the class set forth, coöperating type holding and platen elements said platen element having orbital movement with relation to said holding element and a stripper movably mounted to follow the platen element and remove the printed material from said holding element.

41. In a ribbon-press, a movable platen carrier; fingers carried by the platen carrier for delivering the paper; and mechanism for holding the corners of the paper up in position to be caught by the fingers.

42. In a ribbon-press, a movable platen carrier, a finger carried by the platen carrier and adapted to assist in delivering the paper, and a device for lifting an edge of the paper up in position to be caught by said finger.

43. In a printing machine, two coöperating elements one a traveling carrier and the other a flat form carrying member, a transfer ribbon between said members between which ribbon and one of said members a sheet of paper is to be printed, means for raising said sheet after the printing operation and means for engaging said raised sheet and removing it from the form.

44. In a printing machine, two coöperating elements one a traveling carrier and the other a flat form carrying member around

which said carrier has orbital movement, a transfer ribbon between said members between which ribbon and one of said members a sheet of paper is to be printed, means for
5 raising said sheet after the printing operation and means for engaging said raised sheet and removing it from the form.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

WILLIAM A. SORG.

Witnesses:

LOIS HOYT BRADBURY,
F. G. BRADBURY.
