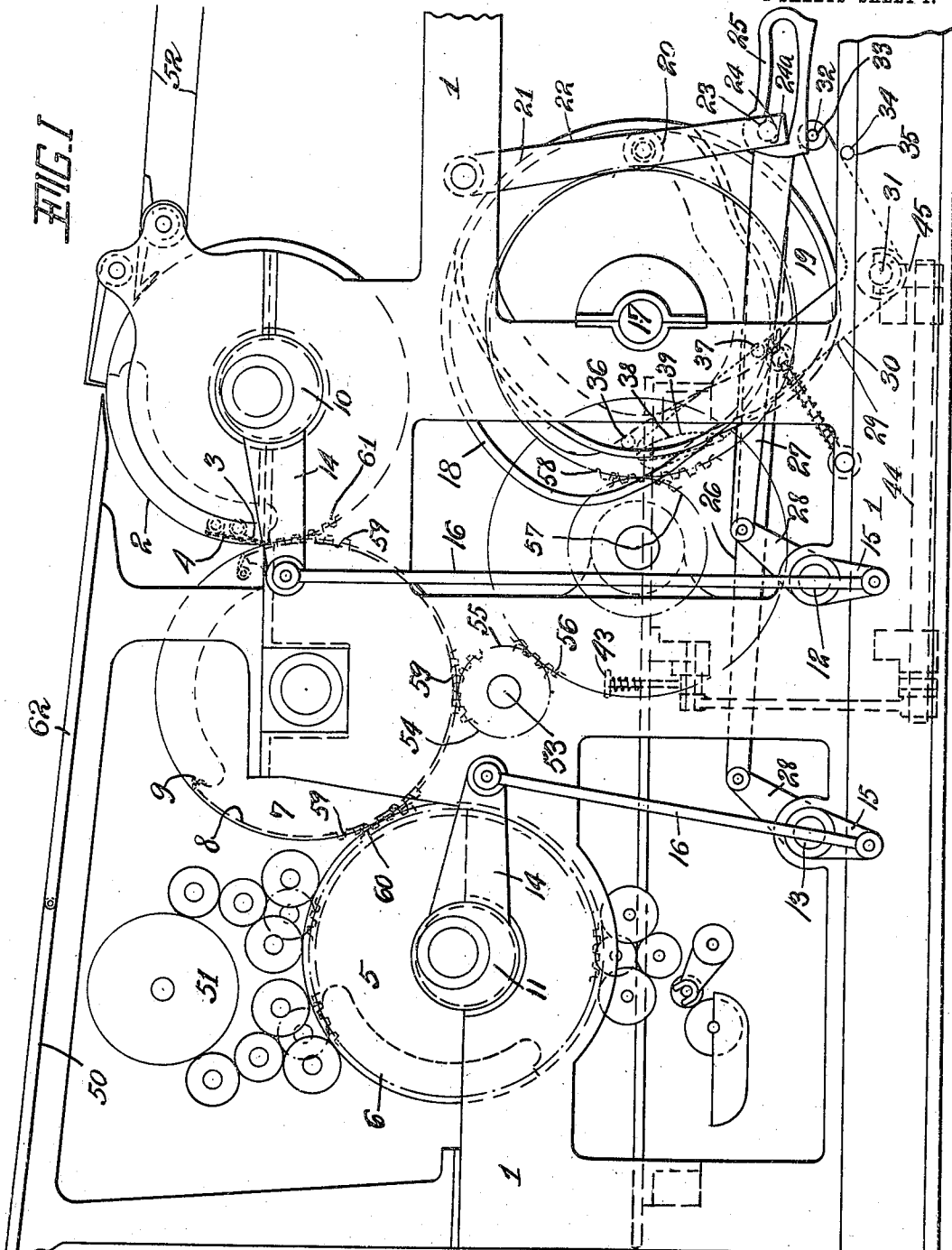


W. SCOTT, DEC'D.
I. & D. J. SCOTT, EXECUTORS.
MULTIREVOLUTION PRINTING MACHINE.
APPLICATION FILED APR. 24, 1906.

1,022,604.

Patented Apr. 9, 1912.

2 SHEETS—SHEET 1.



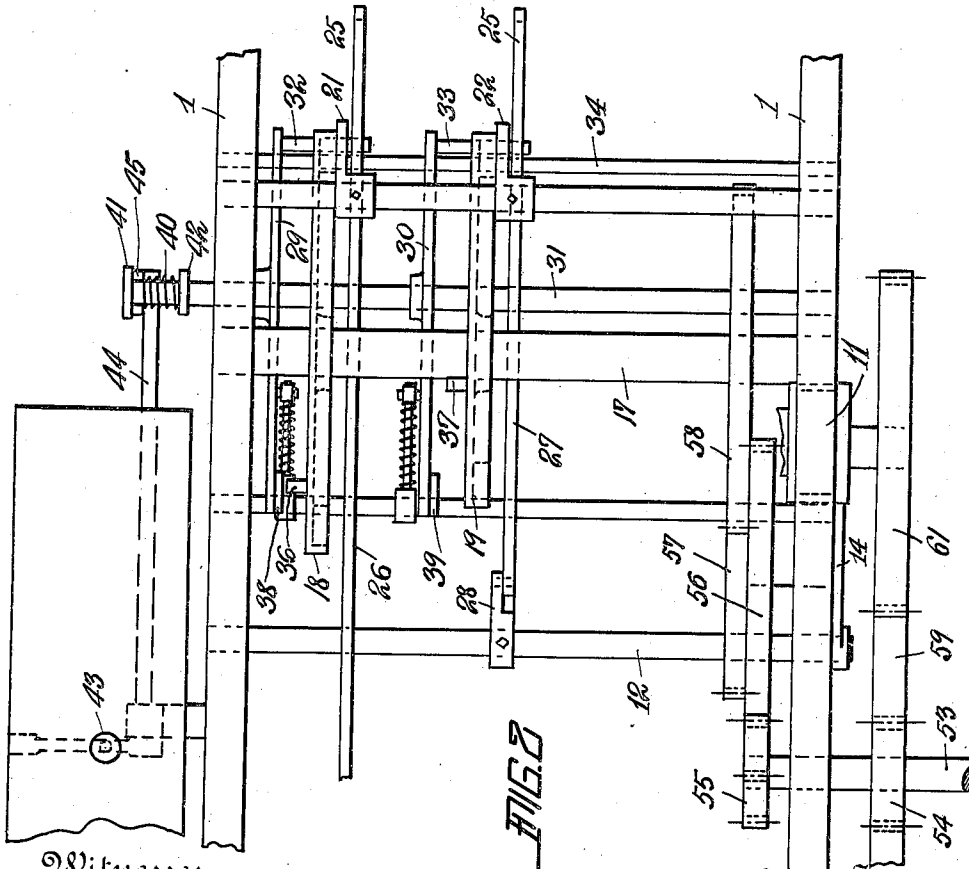
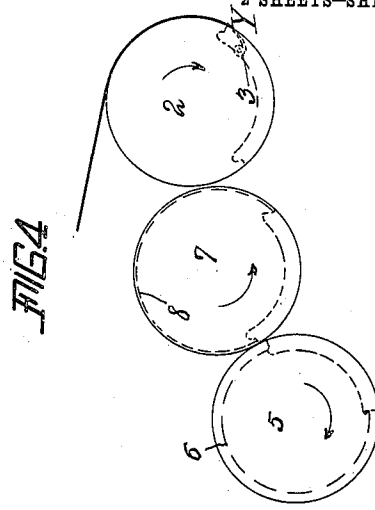
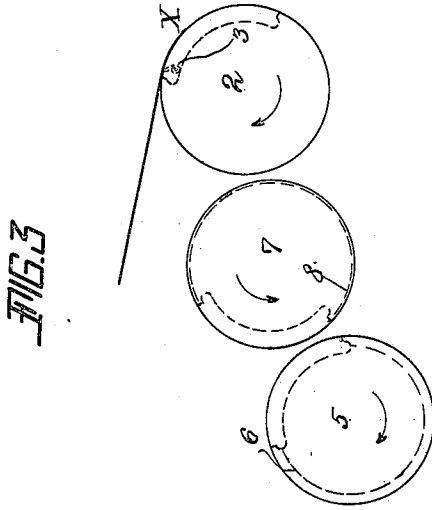
Witnesses
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Witnesses

Frank Konigsberg
John K. Higgins

Walter Scott
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Inventor

UNITED STATES PATENT OFFICE.

WALTER SCOTT, OF PLAINFIELD, NEW JERSEY; ISABELLA SCOTT AND DAVID JOHN SCOTT EXECUTORS OF SAID WALTER SCOTT, DECEASED.

MULTIREVOLUTION PRINTING-MACHINE.

1,022,604.

Specification of Letters Patent.

Patented Apr. 9, 1912.

Application filed April 24, 1906. Serial No. 313,384.

To all whom it may concern:

Be it known that I, WALTER SCOTT, a citizen of the United States of America, and a resident of Plainfield, Union county, New Jersey, have invented certain new and useful Improvements in Multirevolution Printing-Machines, of which the following is a specification.

The present invention relates generally to printing machines, and has more particularly reference to planographic printing machines.

In the prior art a type of planographic machine has been developed in which the printing mechanism consists of an impression member, a form carrying member, and a printing member interposed between the two. This printing member, which is in the form of a cylinder covered with a rubber or other suitable blanket, is adapted to coact with the form carrying member to receive on the said blanket a transfer in ink of the matter to be printed, and sequentially to print the said transfer on the sheet carried by the impression member.

In printing machines for printing sheets, it is highly desirable to have the cylinders or other members constituting the printing mechanism make a number of revolutions to each impression or each cycle of the machine.

One of the advantages of this construction resides in the fact that it is possible to deliver the sheet in front of the impression cylinder with the printed side up, which is especially valuable when a high grade of printing is done. Furthermore with this construction the cylinders can be made much smaller without decreasing the size of the sheet to be printed.

One object of the invention is to produce a multirevolution printing machine whose printing mechanism consists of an impression member, a form carrying member, and a printing member interposed between the two, and to associate tripping mechanism in connection with a machine of this character. In planographic machines of this class it is desirable that the form carrying member shall be accessible when the machine is running, so that the pressman can wipe or

dampen the form as may be required. It is also desirable that the printing and impression cylinders be accessible for the purpose of cleaning or repairing.

Accordingly a further object of the invention consists in producing a structure where the cylinders are arranged so as to be accessible.

Other objects will appear as the specification proceeds.

Accordingly the invention resides in producing a multirevolution printing machine composed of an impression member, a form carrying member, and a printing member, interposed between the two, adapted to receive a transfer in ink, once to each cycle of the machine, from the form carrying member, and to print the said transfer during the same cycle of the machine on the sheet carried by the impression member.

The invention further consists in the combination of parts, features of construction, and arrangement of elements as will more fully hereinafter be described and pointed out in the claims.

In the accompanying drawings, the invention has been embodied in a suitable and preferred form, but changes of construction may of course be made without departing from the spirit of the invention.

In the said drawings: Figure 1 is a side elevation of a machine embodying the invention, and showing the parts in the position where a sheet is about to be printed. Fig. 2 is a plan view of Fig. 1 with some of the parts removed. Figs. 3 and 4 are diagrammatic views showing the various positions which the cylinders occupy at different times.

Similar characters of reference indicate corresponding parts in the different views.

1 indicates a framework of any suitable construction for properly mounting the parts comprising the machine.

2 denotes the impression cylinder provided with the grippers 3 and the throw offs 4 of the usual construction and operated in the usual way by cams or pins. (Not shown.) 5 indicates the form carrying cylinder, the form being shown in dotted lines and indicated by the numeral 6. Interposed

between these two cylinders is the printing member or cylinder 7 provided with a rubber blanket 8 secured in any suitable or well known manner as by means of the hooks 9. Each of these cylinders is geared to make two revolutions to each impression.

Means are provided for separating or tripping and untripping the several members composing the printing mechanism, in the present instance taking the form of means for tripping the form carrying member with relation to the printing member, and means for tripping the impression member with relation to the printing member. Preferably both of these tripping means are under the control of an actuating device common to both.

In a multirevolution structure, the tripping device will take the form of an automatic tripping mechanism for tripping and untripping the several members composing the printing mechanism once to each impression or once to each cycle of the machine. Interrupting means for interrupting the normal operation of the automatic means will further be provided so as to maintain the several members tripped. If, as is the case in the present structure, the form carrying and impression members are tripped with relation to the printing member, there will be an interrupting means for each of the two members, and these two interrupting means will be under the control of a single actuating device which when set in motion will cause both of the said interrupting means to be positioned to interrupt the operation of the automatic means. For reasons which will be more fully hereinafter disclosed, the tripping and untripping of the form carrying and printing members with relation to each other should take place ahead of the tripping and untripping of the impression and printing members with relation to each other. The interrupting means are therefore so arranged and constructed that when set in motion by the actuating device they act sequentially to correspond to the sequential and automatic tripping and untripping of the several members composing the printing mechanism.

The cylinders 2 and 5 are mounted in eccentric bushings 10 and 11 so as to be capable of being tripped and untripped with relation to the cylinder 7. These bushings are connected to the rock-shafts 12 and 13 by means of the arms 14 and 15 and connecting rods 16. Any suitable means may of course be used for rocking these shafts. Preferably there is mounted on the shaft 17, which is geared to make one revolution to each impression, two cams 18 and 19. Engaging with the grooves of these cams are the pins 20 of the pivoted levers 21 and 22, whose free ends are provided with the pins 23 and 24 entering recesses 24^a of the slotted

ends 25 of the levers 26 and 27, whose other ends are connected to the rock-shafts 12 and 13 by means of the arms 28. This effects the tripping and untripping of the form carrying and impression cylinders with relation to the printing cylinder automatically once to each impression. It will be understood, however, that the tripping and untripping of the form carrying member must be effected ahead of the tripping and untripping of the impression member since the leading end of the transfer in ink received by the printing cylinder must be at a point of the circumference of the said printing cylinder where it will meet the leading edge of the sheet carried by the impression cylinder, when the said impression cylinder is moved into contact with the printing cylinder. The cam 18 is so timed that, when the leading edge of a sheet taken by the impression cylinder arrives at the point X in Fig. 3, it will cause the form carrying member to begin its movement toward the printing member. When the leading edge of the sheet reaches the position indicated at Y in Fig. 4, the form carrying and printing members will be in contact with each other.

It will be observed that the distance from the leading end of the ink transfer of the printing cylinder indicated at Z to the point of contact between the printing and impression cylinders is substantially the same as the distance between the leading edge of the sheet indicated at Y and the point of contact between the printing and impression cylinders. In this way the leading end of the ink transfer and the leading edge of the sheet will arrive at the point of contact between the printing and impression members at the proper moment. The cam 19 is so timed as to bring the impression cylinder into contact with the printing cylinder subsequently to the movement of the form carrying cylinder into contact with the printing cylinder; the parts being so arranged that the said impression cylinder will come into contact with the printing cylinder substantially at the moment the leading edge of the sheet arrives at the point of contact between the two cylinders. When the complete transfer in ink has been supplied to the printing cylinder, the form carrying cylinder will be moved out of contact with the said printing cylinder by the cam 18, and during the second revolution of the impression cylinder the latter will be moved out of contact with the printing cylinder, the said form carrying and impression cylinders being separated from the printing cylinder sequentially or in the same order that they were moved into contact therewith.

The means for interrupting the operation of the automatic tripping means are preferably constructed as follows: 29 and 30 are

two sliding and rocking cams slidable in unison by being mounted on the transversely movable shaft 31, and capable of being rocked independently of each other around the said shaft. These cams are provided with the pins 32 and 33 which are of such a length as to always extend in under the slotted ends of the levers 26 and 27. 34 and 35 indicate stops against which one end of the said cams rest. Mounted on the rotating cams 18 and 19 are the pins 36 and 37 adapted to engage respectively with the cam surfaces 38 and 39 of the rocking cams 29 and 30 when the latter are in the plane of the said pins. Normally the cams 29 and 30 are held out of the plane of pins 36 and 37 by reason of the spring 40 which acts between the collars 41 and 42. The pins 36 and 37 are positioned one ahead of the other so as to make the interrupting means, when the latter are properly positioned, effective sequentially to correspond to the timing of the two cams 18 and 19.

The actuating device may be of any suitable kind operated by the automatic feeding machine, if such is used, or by the operator as by means of a foot treadle 43. This foot treadle is suitably connected to the rock-shaft 44 carrying the forked lever 45 embracing a portion of the shaft 31, and when depressed serves to move the two rocking cams 29 and 30 into the plane of the pins 36 and 37. The rotation of the cams 18 and 19 will then bring the pins 36 and 37 around thereby tilting the cams 29 and 30 which latter in turn lift the levers 26 and 27 so that the pins 23 and 24 will move idly in the slots of the said levers 26 and 27, thereby preventing the return of the cylinders into contact.

In planographic machines it is of great importance that the form carrying cylinder should be accessible at all times, and especially while the machine is running. In order to effect this, the cylinders are preferably arranged in contact to form a gradually descending structure as shown in Fig. 1, the impression cylinder being the uppermost one and the form carrying cylinder the lowermost one. The impression cylinder is arranged adjacent to the feeding end of the feed board 50 and the gradually descending structure preferably extends in under the feed board sufficient to allow the inking apparatus 51 to be arranged above the said form carrying cylinder. The water rolls are preferably located adjacent to the lower surface of the said form carrying cylinder. This arrangement, it will be observed, leaves the rear surface of the said form carrying cylinder exposed and renders it accessible to the pressman so that the form can be wiped or dampened while the machine is running. It is also desirable that the printing and impression cylinders be

accessible for the purpose of repairing or other manipulation. For this reason the feedboard is provided with a hinged leaf 62, which, when raised, exposes the upper surface of the impression and printing cylinders.

Great stress has been laid on the positioning of the several cylinders of the printing mechanism with relation to each other. The reason for this is very plain. If the printing cylinder were located in front of the impression cylinder, the sheet would have passed the point of contact between the two cylinders before the transfer in ink would have time to reach the said point of contact. For it will be readily understood that sufficient time must be allowed for the form carrying cylinder to move into contact with the printing cylinder and for the transfer in ink to reach the point of contact between the said printing and impression cylinders. The distance circumferentially from the feeding point of the impression cylinder to the point of contact between the impression and printing cylinders should therefore be longer than the distance circumferentially between the points of contact of the printing cylinder with the form carrying and impression cylinder. While the arrangement of these cylinders could doubtless be varied from the arrangement shown herein, the said arrangement should preferably be such that the printing cylinder is located at least rearwardly of the vertical center line of the impression cylinder. The said inking apparatus, if desired, may be connected to the tripping mechanism in a manner similar to the structure disclosed in an application filed March 30, 1906, Ser. No. 308839.

The style of delivery used in the present instance is a printed side up delivery located in front of the impression cylinder and is indicated by the tapes 52.

The gearing used in the present instance is of the usual character and is constructed as follows: 53 indicates the power shaft carrying the pinions 54 and 55 which latter meshes with the intermediate gear 56 which transmits its motion to the pinion 57 meshing with the gear 58 on the shaft 17. Pinion 54 meshes with the gear 59 on the printing cylinder which gear meshes with the gears 60 and 61 on the form carrying and impression cylinders.

What is claimed is:

1. In a printing machine, the combination with a printing mechanism composed of an impression member, a form carrying member, and a printing member interposed between the two, of a tripping mechanism for tripping and untripping the form carrying and impression members with relation to the printing member.
2. In a printing machine, the combination

- with a printing mechanism composed of an impression member, a form carrying member, and a printing member interposed between the two, of a tripping mechanism for sequentially tripping and untripping the form carrying and impression members with relation to the printing member, so timed that the form carrying member moves into and out of contact with the printing member ahead of the impression member.
3. In a printing machine, the combination with a printing mechanism, composed of an impression member, a form carrying member, and a printing member interposed between the two, of means for tripping and untripping the form carrying member with relation to the printing member, means for tripping and untripping the impression member with relation to the printing member, and an actuating device controlling both of the said tripping means.
4. In a printing machine, the combination with a printing mechanism composed of an impression member, a form carrying member, and a printing member interposed between the two, of means for tripping and untripping the form carrying member with relation to the printing member, means for tripping and untripping the impression member with reference to the printing member, timed to act subsequently to the tripping means of the form carrying member, and an actuating device controlling both tripping means.
5. In a multirevolution printing machine, the combination with a printing mechanism composed of an impression member, a form carrying member, and a printing member interposed between the two, of an automatic tripping mechanism adapted to trip and untrip the several members of the printing mechanism once to each cycle of the machine in such a manner that the form carrying and printing members are tripped and untripped ahead of the impression and printing members, and an interrupting means for interrupting the operation of the said automatic means acting sequentially to maintain the members tripped.
6. In a multirevolution printing machine, the combination with a printing mechanism composed of an impression member, a form carrying member, and a printing member adapted to receive a transfer in ink of the matter to be printed from the form carrying member once to each cycle of the machine, and sequentially to print the said transfer on the sheet carried by the impression member during the same cycle of the machine, of an automatic tripping mechanism adapted to trip and untrip the several members of the printing mechanism sequentially during each cycle of the machine, so that the form carrying and printing members are tripped and untripped ahead of the impression and printing members, and an interrupting means for interrupting the operation of the said automatic means acting sequentially to maintain the members tripped.
7. In a multirevolution printing machine, the combination with a printing mechanism composed of an impression member, a form carrying member, and a printing member interposed between the two, of an automatic tripping mechanism for tripping and untripping the form carrying and impression members with relation to the printing member once to each cycle of the machine.
8. In a printing machine, the combination with a printing mechanism composed of an impression member, a form carrying member, and a printing member interposed between the two, of an automatic tripping mechanism for sequentially tripping and untripping the form carrying and impression members with relation to the printing member so timed that the form carrying member is moved into and out of contact with the printing member ahead of the impression member.
9. In a printing machine, the combination with a printing mechanism composed of an impression member, a form carrying member, and a printing member interposed between the two, of an automatic tripping mechanism for sequentially tripping and untripping the form carrying and impression members with relation to the printing member so timed that the form carrying member is moved into and out of contact with the printing member ahead of the impression member, and an interrupting means for interrupting the operation of the automatic means so as to maintain the form carrying and impression members tripped with relation to the printing member.
10. In a printing machine, the combination with a printing mechanism composed of an impression member, a form carrying member, and a printing member interposed between the two, of an automatic tripping mechanism for sequentially tripping and untripping the form carrying and impression members with relation to the printing member so timed that the form carrying member is moved into and out of contact with the printing member ahead of the impression member.
11. In a multirevolution printing machine, the combination with a printing mechanism composed of an impression member, a form carrying member, and a printing member interposed between the two, of means for automatically tripping and untripping the form carrying member with relation to the printing member once to each cycle of the machine, means for automatically tripping and untripping the impression member with relation to the printing member once to each cycle of the machine,

and an actuating device controlling both of the said tripping means.

12. In a multirevolution printing machine, the combination with a printing mechanism composed of an impression member, a form carrying member, and a printing member interposed between the two, of means for automatically tripping and untripping the form carrying member with relation to the printing member once to each cycle of the machine, means for automatically tripping and untripping the impression member with relation to the printing member once to each cycle of the machine timed to act sequentially to the tripping means of the form carrying member, and an actuating device controlling both of the said tripping means.

13. In a multirevolution printing machine, the combination with a printing mechanism composed of an impression member, a form carrying member, and a printing member interposed between the two, of means for automatically tripping and untripping the form carrying member with relation to the printing member once to each cycle of the machine, means for automatically tripping and untripping the impression member with relation to the printing member once to each cycle of the machine, means for interrupting the operation of the automatic tripping means of the form carrying member so as to maintain the latter tripped, means for interrupting the operation of the automatic tripping means of the impression member so as to maintain the latter tripped, and an actuating device common to both interrupting means.

14. In a multirevolution printing machine, the combination with a printing mechanism composed of an impression member, a form carrying member, and a printing member interposed between the two, of means for automatically tripping and untripping the form carrying member with relation to the printing member once to each cycle of the machine, means for automatically tripping and untripping the impression member with relation to the printing member once to each cycle of the machine so timed so as to operate subsequently to the automatic means for tripping the form carrying member, means for interrupting the operation of the automatic means of the form carrying member, so as to maintain the latter tripped, means for interrupting the operation of the automatic means of the impression member so as to maintain the latter tripped, and an actuating device common to both interrupting means which when set in motion causes the said interrupting means to act sequentially.

15. In a multirevolution printing machine, the combination of two cylinders, two rockshafts means for tripping and untripping

the said cylinders from the said rockshafts, means for rocking the two rockshafts comprising two rotating cams making one revolution to each cycle of the machine, and timed one ahead of the other, connections between the said rockshafts and cams, two sliding and rocking cams adapted to render the connections aforesaid inoperative when properly positioned, an actuating device for simultaneously positioning both of said sliding and rocking cams, and means timed one ahead of the other for causing the said sliding and rocking cams to act sequentially during the same cycle of the machine to render the said connections inoperative.

16. In a printing machine, a printing mechanism consisting of an impression cylinder, a form carrying cylinder, and a printing cylinder interposed between the two and arranged so that the distance circumferentially from the feeding point of the impression cylinder to the point of contact between the impression and printing cylinders is longer than the distance circumferentially between the points of contact of the printing cylinder with the form carrying and impression cylinders.

17. In a printing machine, a printing mechanism consisting of an impression cylinder, a form carrying cylinder located in the rear of the impression cylinder, and a printing cylinder interposed between the two and located rearwardly of the vertical center line of the impression cylinder this arrangement being such that the distance circumferentially from the feeding point of the impression cylinder to the point of contact between the impression and printing cylinders is greater than the distance circumferentially between the points of contact of the printing cylinder with the form carrying and impression cylinders.

18. In a printing machine, the combination with a feedboard having a hinged leaf, of a printing mechanism comprising an impression cylinder located adjacent to the feeding point of the feedboard, a form carrying cylinder located in the rear of the impression cylinder and below the feedboard, and a printing cylinder interposed between the two, whereby the rear surface of the form carrying cylinder is exposed and accessible while the machine is running, and whereby the impression and printing cylinders can be exposed by lifting the leaf of the feedboard.

19. In a multirevolution printing machine, the combination with a feedboard having a hinged leaf, of a printing mechanism comprising an impression cylinder located adjacent to the feeding point of the feedboard, a form carrying cylinder located in the rear of the impression cylinder and below the feedboard, and a printing cylinder inter-

posed between the two, whereby the rear surface of the form carrying cylinder is exposed and accessible while the machine is running, and whereby the impression and printing cylinders can be exposed by lifting the leaf of the feedboard, and a delivery mechanism located in front of the impression cylinder.

20. In a printing machine, the combination with a printing mechanism composed of an impression member, a form carrying member, and a printing member interposed between the two, of a tripping mechanism for sequentially separating the several members of the printing mechanism, the separation between the form carrying and the printing members being effected ahead of the separation between the printing and impression members, the said form carrying and printing members being maintained in their separated position while the separation between the printing and impression members takes place.

21. In a multi-revolution printing machine, the combination with a printing mechanism, composed of an impression member, a form carrying member and the printing member interposed between the two, of an automatic tripping mechanism, for sequentially separating the several members of the printing mechanism, once to each cycle of the machine, the separation between the form carrying and printing members being effected ahead of the separation between the printing and impression members, the said form carrying and printing members being maintained in their separated position while the separation between the printing and impression members takes place.

22. In a multi-revolution printing machine, the combination with a printing mechanism composed of an impression member, a form carrying member, and a printing member, adapted to receive a transfer in ink of the matter to be printed from the form carrying member, once to each cycle of the machine, and sequentially to print the said transfer on the sheet carried by the impression member during the same cycle of machine, of an automatic tripping mechanism for sequentially separating the several members of the printing mechanism, once to each cycle of the machine, the separation between the form carrying and printing members being effected ahead of the separation between the printing and impression members, the said form carrying and printing members being maintained in their separated position while the separation between the printing and impression members takes place.

23. In a multi-revolution printing machine, the combination with a printing mechanism composed of a form carrying cylinder, an impression cylinder and a print-

ing cylinder interposed between the two, of an automatic tripping mechanism for tripping and untripping two of said cylinders with reference to the third of said cylinders one ahead of the other, once to each cycle of the machine, an interrupting means for interrupting the operation of the said automatic tripping mechanism, and an actuating device which when set in motion, causes the interrupting means to act sequentially during the same cycle of the machine to maintain the two cylinders tripped.

24. In a multi-revolution printing machine, the combination with a printing mechanism composed of an impression cylinder, a form carrying cylinder, and a printing cylinder interposed between the two, of an automatic tripping mechanism for tripping and untripping the impression and form carrying cylinders, with relation to the printing cylinder one ahead of the other once to each cycle of the machine, an interrupting means for interrupting the operation of the said automatic tripping mechanism, and an actuating device which, when set in motion, causes the interrupting means to act sequentially, during the same cycle of the machine, to maintain the cylinders tripped.

25. A two-revolution printing mechanism composed of an impression cylinder, a form-carrying cylinder and a printing cylinder adapted to receive a transfer in ink of the matter to be printed from the form-carrying cylinder once to each cycle of the machine and sequentially during the same cycle to print the said transfer on the sheet carried by the impression cylinder, the cylinders being so arranged that the distance circumferentially from the feeding point of the impression cylinder to the point of contact between the impression and printing cylinders is longer than the distance circumferentially between the points of contact of the printing cylinder with the form-carrying and impression cylinders, and automatic means for tripping and untripping the cylinders sequentially during the same cycle so that the form-carrying and printing cylinders contact ahead of the printing and impression cylinders.

26. A multi-revolution printing mechanism composed of an impression member, a form-carrying member, and a printing member adapted to receive a transfer in ink of the matter to be printed from the form-carrying member once to each cycle of the machine and sequentially during the same cycle to print the said transfer on the sheet carried by the impression member, the members being so arranged that the distance from the feeding point of the impression member to the point of contact between the impression and printing members is greater than the distance between the points of con-

tact of the printing member with the form-carrying and impression members, and automatic means for tripping and untripping the members sequentially during the same
5 cycle so that the form-carrying and printing members contact ahead of the printing and impression members.

Signed at New York city this 19th day
of April 1906.

WALTER SCOTT.

Witnesses:

AXEL V. BEEKEN,

IVAN E. A. KONIGSBERG.