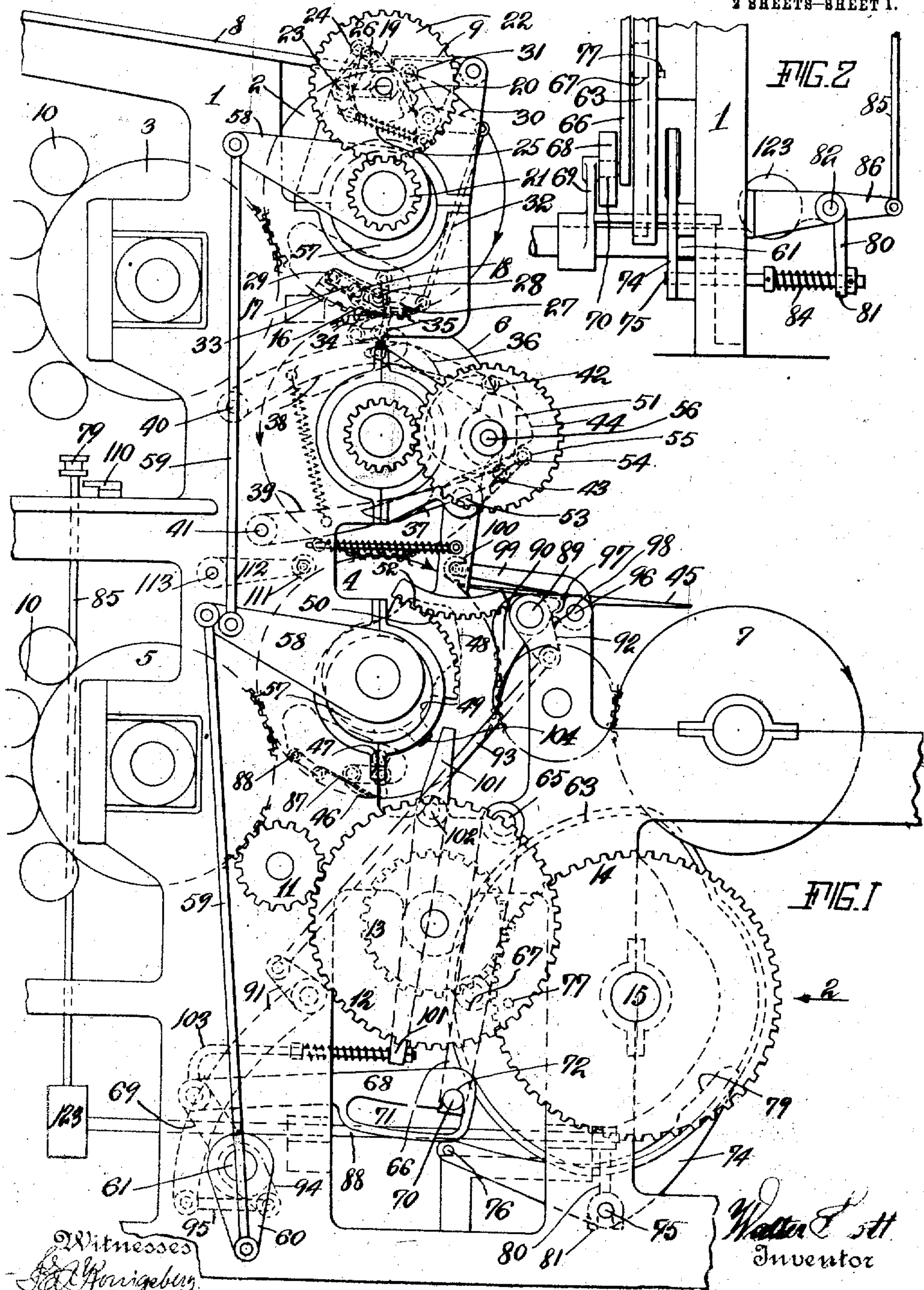


W. SCOTT, DEC'D.  
I. & D. J. SCOTT, EXECUTORS.  
MULTICOUPLE MULTIREVOLUTION PRINTING MACHINE.  
APPLICATION FILED DEC. 30, 1905.

975,294.

Patented Nov. 8, 1910.  
2 SHEETS—SHEET 1.



Witnesses  
J. H. Forrester  
Anna H. Forrester

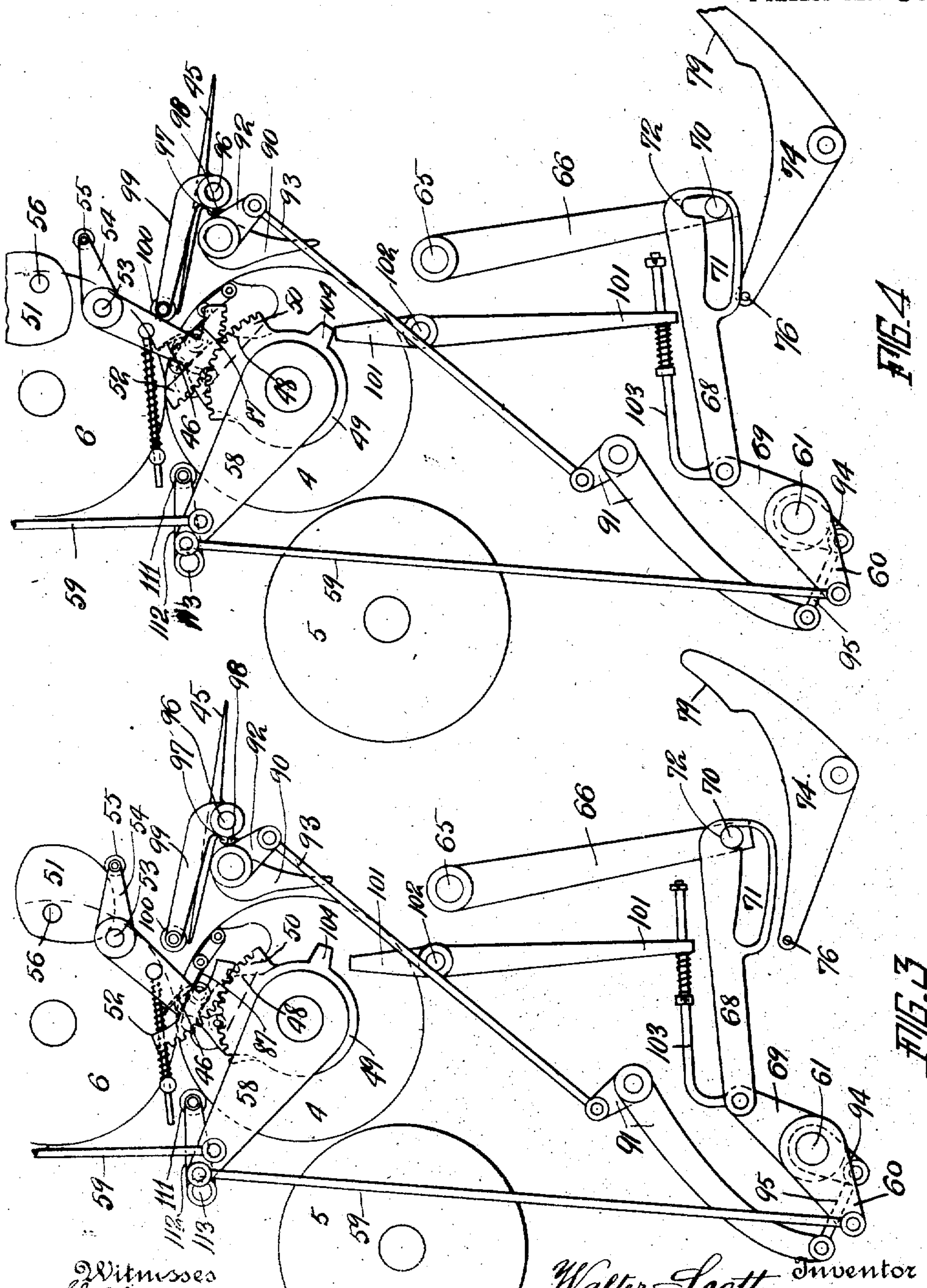
By his Attorneys

Walter E. Scott  
Inventor  
Baker & Spaulding

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Witnesses  
 Ed. H. H. H. H.  
 Anna H. H. H.

Walter Scott Inventor  
 Attorney  
 Decker & Spaulding



# UNITED STATES PATENT OFFICE.

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

## MULTICOUPLE MULTIREVOLUTION PRINTING-MACHINE.

975,294.

Specification of Letters Patent.

Patented Nov. 8, 1910.

Application filed December 30, 1905. Serial No. 293,884.

*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 Multicouple Multirevolution Printing-Machines, of which the following is a specification.

The present invention relates generally to printing machines, and has more particularly reference to the arrangement and construction of the parts of a multi-couple, multi-revolution machine and to tripping mechanism connected therewith.

In some of my prior applications, such as the one filed on the 17th day of November, 1905, Ser. No. 287863, a construction was disclosed embracing a plurality of printing couples adapted to print on the same side of the sheet, in combination with means for automatically and periodically, at regular intervals, tripping and untripping the impression of the members composing the several couples, together with means, under the control of the operator, or of an automatic feeder, for maintaining the members in their separated or tripped position, the said means being operable from a single actuating device to communicate the motion to the members of all the couples in regular sequence, and whereby, when the said actuating device is released, the machine will resume its normal operation, and be tripped and untripped again automatically. The above arrangement, whereby the interrupting means act sequentially on the several couples, is desirable, in order to avoid the spoiling of the sheet or sheets which have already been properly printed by the first printing couple and in order that it may be properly acted upon by the remaining printing couples.

The present invention embraces a printing couple, the impression member of which is provided with grippers adapted to hold the sheet for more than one revolution, in combination with automatic means for tripping and untripping the impression at regular intervals to properly print the sheet, together with means for interrupting the action of the automatic means aforesaid, whereby the members composing the printing couple are maintained in their tripped position, and means for interrupting the normal operation of the grippers, whereby the sheet is held on the impression member

as long as the members are maintained in their tripped position.

When several couples are used, the invention will comprise a combination with the form and impression members of two adjacent printing couples, of automatic means for tripping and untripping the impression of the several couples at regular intervals, the said impression members having grippers, together with means for operating the grippers on the impression member of the first printing couple to release the sheet once to a number of revolutions, means for opening the grippers on the impression member of the second printing couple once to a number of revolutions to release the sheet, means for interrupting the action of the automatic means acting simultaneously on the members of the several couples to maintain them in their tripped position, and means, acting simultaneously therewith, to interrupt the normal action of the grippers on the impression member of the second couple, whereby the sheet is held on the impression member of the second couple as long as the impression is tripped.

Other objects and features of construction will appear as the specification proceeds.

The invention is embodied in a concrete and preferred construction in the accompanying drawings; it is, however, susceptible of wide modification, without departing from the true spirit of the invention.

In the said drawings: Figure 1 is a side elevation of so much of a printing machine as is necessary to properly illustrate the invention, showing the members adjacent to the impression member of the second printing couple in the proper position to deliver the sheet. Fig. 2 is an end view looking in the direction of the arrow 2 of Fig. 1 with parts broken away. Fig. 3 is a detail view of the members adjacent to the impression member of the second printing couple showing them in the position which they occupy when the said impression member is about to receive a sheet. Fig. 4 is a view similar to Fig. 3, but showing the effect of the interrupting means on the members adjacent to the impression member of the second printing couple.

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

1 indicates a framework of any suitable construction for properly supporting the



parts comprising the machine. In this framework are mounted a plurality of printing couples, preferably of a rotary nature, there being in the present instance two such couples arranged substantially one above the other. It will be understood, however, that the present invention may be extended to include three or more printing couples, if desired. Each couple consists of a form and impression member, and is adapted to make a number of revolutions to each impression. In the present instance the cylinders revolve twice to each impression.

2 is the impression cylinder, and 3 the form cylinder of the first printing couple, while 4 is the impression cylinder and 5 the form cylinder of the second printing couple. A transfer cylinder 6 is interposed between the two impression cylinders, and a second transfer cylinder 7 is located adjacent to the second impression cylinder. This cylinder 7 may be a collecting cylinder, if desired.

8 is the feed board, adjacent to which are the gages 9, against which the sheets are fed, which are raised in a well known manner when the grippers on the cylinder 2 seize the sheet.

10 indicates inking mechanism of any suitable construction used in connection with each plate cylinder.

All of the cylinders are geared together, being driven from the pinion 11, which latter also transmits its motion through the intermediate gear 12 and pinion 13 to the gear 14 mounted on the cam shaft 15. The cylinder 2 is provided with grippers 16 which are arranged to tumble backward and forward nearly one-half a revolution by means of the cross-head 17, provided with a slot in the usual manner, and mounted on the gripper shaft 18.

19 and 20 indicate two rotating cams which are driven so as to rotate once to a number of revolutions of the impression cylinder by means of the pinion 21 and the gear 22.

Mounted on the stud 23 in the framework, is an arm 24 having a friction roll which is held in constant engagement with the cam 19 by means of the spring 25. This stud 23 carries a second arm having a pin 26 which projects at the beginning of every other revolution in the plane of the cross-head 17 of the gripper shaft so as to close the said grippers and seize the sheet.

Pivoted in the framework and adjacent to the underside of the cylinder 2 is a lever or arm 27 adapted to rock around the center 28 as a pivot, and provided at its outer end with the friction roll 29 which is designed to move into the plane of the cross-head 17 once to every two revolutions in alternation with the movements of the pin 26. This lever 27 is operated from the cam 20 by means of the bell crank 30 provided with a friction

roll 31 at one end and having a connecting rod 33 attached to its other end, whereby motion is transmitted to the lever 27. A suitable stop as 33 may be employed for the purpose of limiting the outward movement of the roll 29, if desired.

The transfer cylinder 6 is provided with spring-seated grippers 34 of the usual construction, provided with a crank carrying the roll 35. These grippers are opened and closed twice during the same revolution by means of the two rocking cams 36 and 37, mounted on the arms 38 and 39, which are pivoted at 40 and 41 in the framework. At the outer end of the arms 38 and 39 are the friction rolls 42 and 43, which, in the present instance, both engage with the cam 44, so shaped and timed as to move the rocking cams 36 and 37 into and out of the plane of the grippers on the cylinder during alternate revolutions.

The second impression cylinder preferably does not deliver its sheet to the transfer cylinder 7, but delivers it to suitable guides 45 interposed between the said impression and transfer cylinders, so that the sheet may be carried on to be delivered with its printed side up. From the transfer or collecting cylinder 7 the sheet may be delivered in any suitable way, as by means of a drop delivery or otherwise. The said second impression cylinder is provided with spring-seated grippers 46 of the usual and ordinary construction, having a crank with friction roll 47 adapted to come in contact with a suitable cam for opening the said grippers. Inasmuch as the delivery point of this cylinder is but a short distance away from the receiving point or from the axial line between the transfer cylinder 6 and the impression cylinder 4, only one cam is necessary in this instance to open the gripper mechanism both to receive and release the sheet. This cam, which is designated by the numeral 48, is adapted to open the gripper mechanism during the first revolution of the cylinder to receive the sheet, and again to open the gripper mechanism during its second revolution, to deliver the sheet, the said cam being moved into different positions to effect this operation. Preferably this cam is caused to oscillate around the shaft of the cylinder by being provided with the sleeve 49, which, at its outer end, is provided with the gear segment 50 adapted to be operated by any suitable means to shift the cam back and forth a certain distance or to properly position the said cam with reference to the receiving or the delivery point, as the case may be.

51 is a rotating cam which imparts proper motion to the gear sector 52, pivoted at 53, and provided with an arm 54 having a friction roll 55 which engages with the said cam 51. This cam 51 is conveniently mounted on



the same shaft 56 as the cam 44. The movement of the cam 51 will thus be imparted to the segment 50 through the instrumentality of the gear sector 52.

Each of the impression cylinders is mounted in an eccentric bushing 57 upon its shaft, whereby, when the said eccentric bushings are turned in opposite directions, the impression cylinders will be moved in and out of printing contact with the plate cylinders. The distance which it is necessary to raise these impression cylinders in order to trip the impression is only about one-eighth of an inch, so that the gears on the respective cylinders need not be out of mesh with each other. This tripping of the impression cylinders does not affect their relation to the transfer cylinder 6 to any appreciable extent, and the sheet is therefore always capable of being passed from the first to the second impression cylinder whether or not the impression is tripped. The said eccentric bushings 57 are connected by means of the short arms 58, connecting rods 59, and lever 60 to the rockshaft 61, there being in the present instance one rockshaft for both cylinders. Suitable means are provided for rocking this rockshaft at regular intervals so as to automatically trip and untrip the impression at predetermined intervals. In the present instance, the impression is tripped during the second revolution of each cycle of the machine. Obviously, the means for accomplishing this may be varied widely, but preferably there is mounted upon the cam shaft 15 a cam 63 which is given one revolution to a number of revolutions (in the present instance to every two revolutions) of the machine. Mounted loosely on the stud 65 is an arm 66 provided with a roller 67 adapted to engage in the cam groove of the cam 63. Suitable means are provided for communicating the motion of the arm 66 to the rockshaft 61. In the present instance, these means take the form of a slotted connection 68 connected, by means of the lever 69, to the rockshaft aforesaid, and receiving the motion of the arm aforesaid by means of the pin 70 carried at the lower end of the said arm and adapted to play in the slot 71 of the connection aforesaid, and to be locked with the said connection when the pin 70 is in the recess 72 of the said slot.

Interrupting means are provided for lifting the slotted connection so as to cause the pin 70 to play idly in the slot 71, whereby the form and impression members will be maintained separated or tripped as long as the slotted connection is held in its elevated position. In other words, an interrupting means is provided for the automatic tripping and untripping means. This interrupting means will preferably take the following form: A rocking cam 74 is mounted slidably on the shaft 75 and is provided with

the pin 76 extending in under the slotted connection so that when the said rocking cam 74 is moved into the plane of the cam or pin 77 conveniently mounted on the cam 63, the said pin 77 will come in contact with the cam surface 79 of the rocking cam 74, thereby rocking the latter and lifting the slotted connection up so that the pin 70 will play idly in the slot 71. The said interrupting means may of course be operated from any suitable actuating device under the influence of an automatic feeder, or, as in the present instance, under the control of the operator. I have here shown a conventional treadle 79 which, when it is depressed, will, through suitable connections, move the member 80 so as to cause the latter, by means of its bifurcated end 81 to move the rocking and sliding cam 74 into the plane of the pin 77. This may of course be effected by various mechanical contrivances, but, in the present instance, there is shown a rockshaft 82 suitably connected to the foot treadle by means of the rod 85 and lever 86.

Mounted on the second impression cylinder, are suitable throw-off fingers 87 having a crank carrying the roll 88 in the usual manner. Mounted on the stud 89 is a throw-off cam 90 which is adapted to be positioned so as to be in the plane of the roll 88 during the second revolution of the second impression cylinder, and to be out of the plane of the said roll 88 during the first revolution of the said cylinder. This throw-off cam is operated synchronously with the tripping and untripping of the impression, and is therefore conveniently operated from the rockshaft 61 by any suitable means such as the bell crank 91 connected to the arm 92 of the throw-off cam by means of the rod 93, and connected to the rockshaft 61 by means of the arm 94 and lever 95. The guides 45 are mounted on the pivot 96 and are positioned synchronously or simultaneously with the throw-off cam to receive the sheet, and are therefore conveniently operated from the latter by means of the projection 97 and the jaws 98. Preferably these guides carry a stop to prevent them from digging into the cylinder, conveniently taking the form of an arm 99 provided with a friction roll 100 which is adapted to rest on the surface of the cylinder.

101 is a stop for preventing the positioning of the cam 48 to release the sheet when the impression remains tripped. This stop 101 is pivoted at 102 and is also conveniently operated from the rockshaft 61 by means of the bent projection 103 connected to the lever 69 and connected at its other end to the lower end of the stop 101. A suitable means or projection 104 is provided on the sleeve 49 which is adapted to abut against the said stop 101 under certain conditions.

A sheet is fed from the feed board 8



against the gages 9, which are raised so as to allow the said sheet to be seized by the grippers 16 on the first impression cylinder. The sheet is then carried around and receives an impression between the cylinders 2 and 3 and is carried around a second time until the axial line between the cylinders 2 and 6 is reached when it is transferred to the transfer cylinder which carries it until the axial line between the cylinders 6 and 4 is reached when the cam 48 will be in the position shown in Fig. 3 so as to allow the grippers on the said second impression cylinder to seize the sheet. At this time, however, the guides 45 and the throw-off cam 90 will be in the position also shown in Fig. 3, so that the sheet will be carried past them and will receive an impression between the cylinders 4 and 5. At this time also the stop 101 will be in the plane of the projection 104. The sheet will then be carried around past the axial line between the cylinders 6 and 4, when the cam 48 will have moved into the position shown in Fig. 1, the throw-off cam 90 and guides 45 will be properly positioned so as to cause the sheet to be released from the cylinder 4, and deposited on the guides 45. The stop 101 will also have moved out of the plane of the projection 104, as shown.

It will be clear that during the normal operation of the machine, the automatic means previously described will trip and untrip the impression, the timing of the parts being such that the impression will be untripped after the sheet has been taken on by the impression cylinders and carried a certain distance over the same, which is well illustrated by the second impression cylinder where the grippers and throw-off finger must be carried past the throw-off cam before the cylinders are moved into printing contact. The cylinders are then moved into printing contact so as to allow the sheet to be properly printed during the first revolution and simultaneously therewith the connections from the rock shaft 61 will operate to position the throw-off cam 90 and the guides 45 while the cam 48 will be moved into the position shown in Fig. 1 and the stop 101 moved out of the plane of the projection 104. The impression is then tripped again, and the elements moved into the position shown in Fig. 3 before the next sheet is received. All this of course will operate synchronously or in harmony with the tripping and untripping of the impression, and both impression cylinders will be untripped and tripped simultaneously. Assuming now that one sheet has been printed by the first impression cylinder and has been taken by the transfer cylinder 6 and is about to be taken by the cylinder 4, the parts being in the position shown in Fig. 3, and a sheet is missed in feeding, the operator then will depress the

treadle before the printing cylinders are moved into printing contact thereby maintaining them in their separated position. Obviously then the parts will remain in the position shown in Fig. 3. The operating means for the cam 48 will attempt to move it into the position shown in Fig. 1, but the cam will be prevented from oscillating owing to the fact that the stop 101 will be in the path of the projection 104 and the parts will therefore assume the position shown in Fig. 4, whereby the sheet which has been received from the transfer cylinder will be carried around on the second impression cylinder without being printed, and as the cams 48 and 90, as well as the guides 45, are not properly positioned so as to release the sheet and deliver it to the guides 45, the sheet will be held on the said impression cylinder as long as it remains tripped. If it is desired to maintain the parts tripped for more than one cycle, the operator can move the locking member 110 into engagement with the treadle, and thus trip it for any period desired. Since, however, the cam 48 will be in the plane of the grippers on the second impression cylinder at the point where they receive a sheet, the said grippers will be opened once to every revolution, but there being no sheet to receive, they will close again on the same sheet which is already on the cylinder and continue to carry the same around. In order to assist in holding the said sheet in the bite of the grippers on the second impression cylinder, I provide the rollers 111, which are adapted to rest on the margins of the sheet or elsewhere, to assist in propelling the sheet at the time when the grippers are opened. These rollers are mounted on the arm 112, pivoted at 113. If a sheet is now fed properly to the first impression cylinder and the interrupting means released, the automatic means for tripping and untripping the cylinders will regain control of the machine, and the sheets on both the first and second impression cylinders will be printed during the succeeding revolution, the sheet on the first impression cylinder being then delivered to the transfer cylinder 6 and the sheet on the second impression cylinder being placed on the guides 45. Thus also when the machine is started, it will be preferable to start it with the impression tripped and the interrupting means effective, so that the first sheet fed will be carried on to the second impression cylinder where it will be held until a second sheet is fed to the first impression cylinder, when the impression will be untripped and the machine allowed to run normally. In this way it will be observed the smutting of the blanket on the second impression cylinder will be prevented by the presence of a sheet on the said second impression cylinder, for if the impression were untripped, the auto-



matic means acting simultaneously to trip and untrip both cylinders, the ink would be placed on the blanket of the second impression cylinder, and in that way a great many sheets would be spoiled before the ink would be removed again. When the treadle is released, the counterweight 123 will move the rocking and sliding cam out of the plane of the pin on the cam 63.

10 What is claimed is:

1. In a multi-revolution printing machine, the combination with the form and impression members of a printing couple, of grippers adapted to hold the sheet on the impression member for more than one revolution, automatic means for tripping and untripping the impression at regular intervals to properly print the sheet, means for interrupting the action of the automatic means aforesaid whereby the members are maintained in their tripped position, and means for interrupting the normal operation of the grippers whereby the sheet is held on the impression member as long as the members are maintained in their tripped position.

2. In a multi-revolution printing machine, the combination with the form and impression members of a printing couple, of grippers adapted to hold the sheet on the impression member for more than one revolution, automatic means for tripping and untripping the impression at regular intervals to properly print the sheet, means for interrupting the action of the automatic means aforesaid before the sheet on the impression member is printed, whereby the members are maintained in their tripped position, and means for interrupting the normal operation of the grippers, whereby the sheet is held on the impression member without being printed as long as the members are maintained in their tripped position, and is printed after the automatic means regain control of the machine.

3. In a multi-revolution printing machine, the combination with the form and impression members of a printing couple, of automatic means for tripping and untripping the impression at regular intervals, grippers on the impression member, means for opening the said grippers at a certain point once to a number of revolutions of the impression member, means for interrupting the action of the automatic means aforesaid, whereby the members of the couple are maintained in their tripped position, and for preventing the opening means for the grippers from acting on the latter, thereby holding the sheet on the impression member as long as the impression is tripped.

4. In a multi-revolution printing machine, the combination with the form and impression members of a printing couple, of automatic means for tripping and untripping

the impression at regular intervals, grippers on the impression member, means for opening the said grippers at a certain point once to a number of revolutions of the impression member, means for positioning the opening means at intervals corresponding to the tripping of the impression, means for interrupting the action of the automatic means aforesaid, whereby the members are maintained in their tripped position, and means for preventing the positioning of the opening means adapted to act synchronously with the operation of the interrupting means.

5. In a printing machine, the combination with the form and impression members of a printing couple, of grippers on the impression member, means for tripping the impression, means adapted to be positioned to trip the grippers, and means to prevent the proper positioning of such tripping means for preventing the grippers from releasing the sheet as long as the impression remains tripped.

6. In a multi-revolution printing machine, the combination with the form and impression members of two adjacent printing couples adapted to print on the same side of the sheet, means for automatically tripping and untripping the impression of both printing couples once to each cycle of the machine, interrupting means, normally inactive, but adapted, when actuated, to interrupt the normal operation of the automatic tripping and untripping means of both couples, grippers on the impression members, and means for interrupting the normal operation of the grippers on the impression member of the second couple, so that the sheet is held on the second impression member when the operation of the automatic tripping and untripping means is interrupted.

7. In a multi-couple, multi-revolution printing machine, the combination with the form and impression members of two adjacent printing couples, of automatic means for tripping and untripping the impression of the several couples at regular intervals, grippers on the impression member of the first printing couple, means for opening the said grippers once to a number of revolutions to release the sheet, grippers on the impression member of the second printing couple, means for opening the said grippers once to a number of revolutions to release the sheet, means for interrupting the action of the automatic means acting simultaneously on the members of the several couples to maintain them in their tripped position, and means acting synchronously therewith to interrupt the normal action of the grippers on the impression member of the second couple, whereby the sheet is held on the impression member of the said second couple as long as the impression is tripped.



8. In a multi-couple, multi-revolution printing machine, the combination with the form and impression members of two adjacent printing couples adapted to print on the same side of the sheet, of automatic means for tripping and untripping the impression of the several couples at regular intervals, grippers on the impression member of the first printing couple, means for opening the said grippers once to a number of revolutions to release the sheet, grippers on the impression member of the second printing couple, means for opening the said grippers once to a number of revolutions to release the sheet, means for interrupting the action of the automatic means acting simultaneously on the members of the several couples to maintain them in their tripped position, and means acting synchronously therewith to interrupt the normal action of the grippers on the impression member of the second couple, whereby the sheet is held on the impression member of the said second couple as long as the impression is tripped.

9. In a multi-couple, multi-revolution printing machine, the combination with the form and impression members of two adjacent printing couples, of automatic means for tripping and untripping the impression of the several couples at regular intervals, grippers on the impression member of the first printing couple, means for opening the said grippers once to a number of revolutions to release the sheet, grippers on the impression member of the second printing couple, means for opening the said grippers once to a number of revolutions to release the sheet, means for interrupting the action of the automatic means acting simultaneously on the members of the several couples to maintain them in their tripped position,

means acting synchronously therewith to interrupt the normal action of the grippers on the impression member of the second couple, whereby the sheet is held on the impression member of the said second couple as long as the impression is tripped, and a single actuating device for operating both interrupting means.

10. In a multi-couple, multi-revolution printing machine, the combination with the form and impression members of two adjacent printing couples adapted to print on the same side of the sheet, of automatic means for tripping and untripping the impression of the several couples at regular intervals, grippers on the impression member of the first printing couple, means for opening the said grippers once to a number of revolutions to release the sheet, grippers on the impression member of the second printing couple, means for opening the said grippers once to a number of revolutions to release the sheet, means for interrupting the action of the automatic means acting simultaneously on the members of the several couples to maintain them in their tripped position, means acting synchronously therewith to interrupt the normal action of the grippers on the impression member of the second couple, whereby the sheet is held on the impression member of the said second couple as long as the impression is tripped, and a single actuating device for operating both interrupting means.

Signed at New York city this 19 day of December 1905.

WALTER SCOTT

Witnesses:

ANNA N. WISSEMAN,  
GEO. A. HOFFMAN.