H. M. BARBER.

ROTARY SHEET PRINTING MACHINE.

APPLICATION FILED DEC. 18, 1912.

1,152,068.

Patented Aug. 31, 1915.

4 SHEETS—SHEET 1.

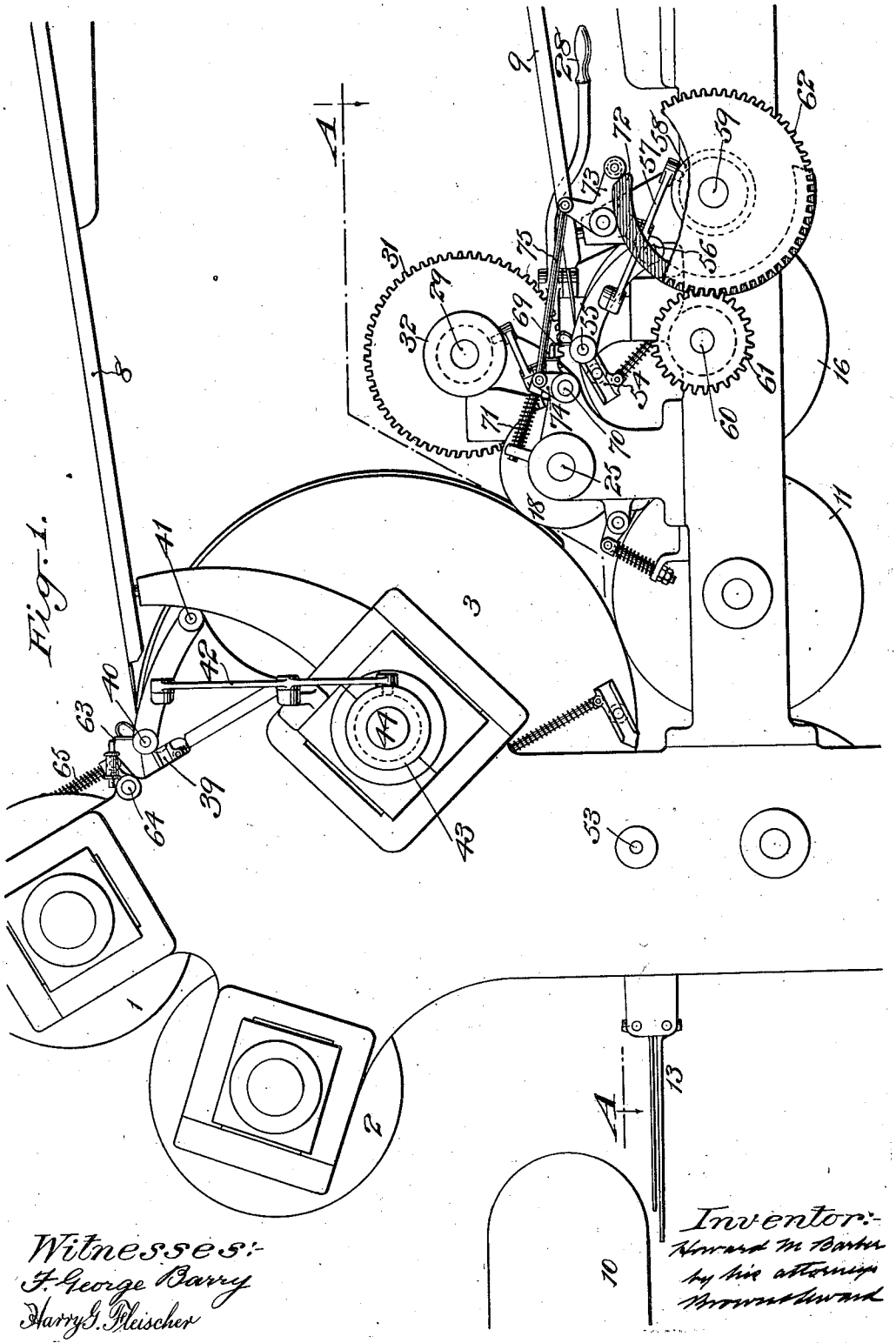

Fig. 1.

Witnesses:-
F. George Barry
Harry G. Fleischer

Inventor:-
Howard M Barber
by his attorneys
Brownell & Ward

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4 SHEETS—SHEET 2.

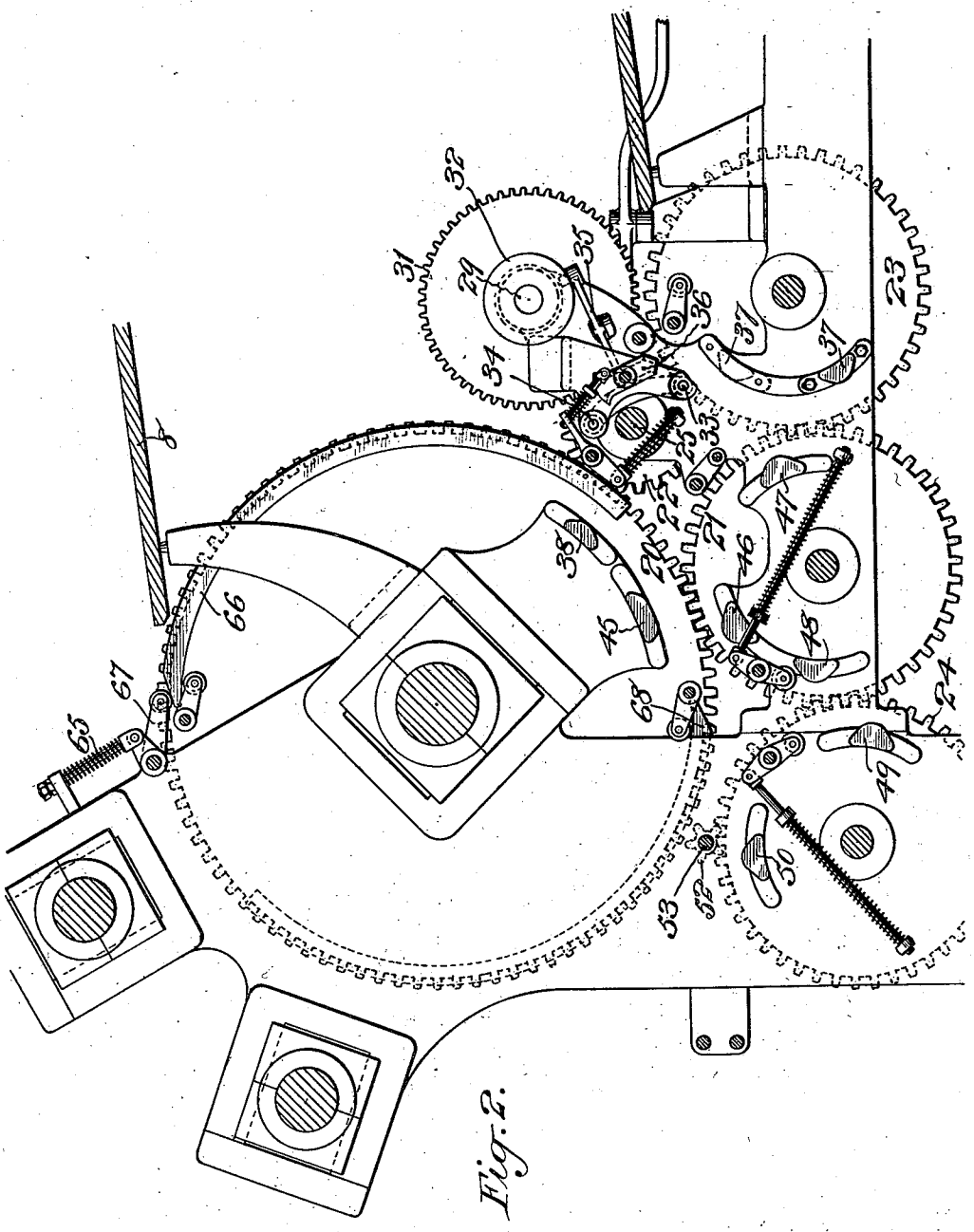

Fig. 2.

Witnesses:-
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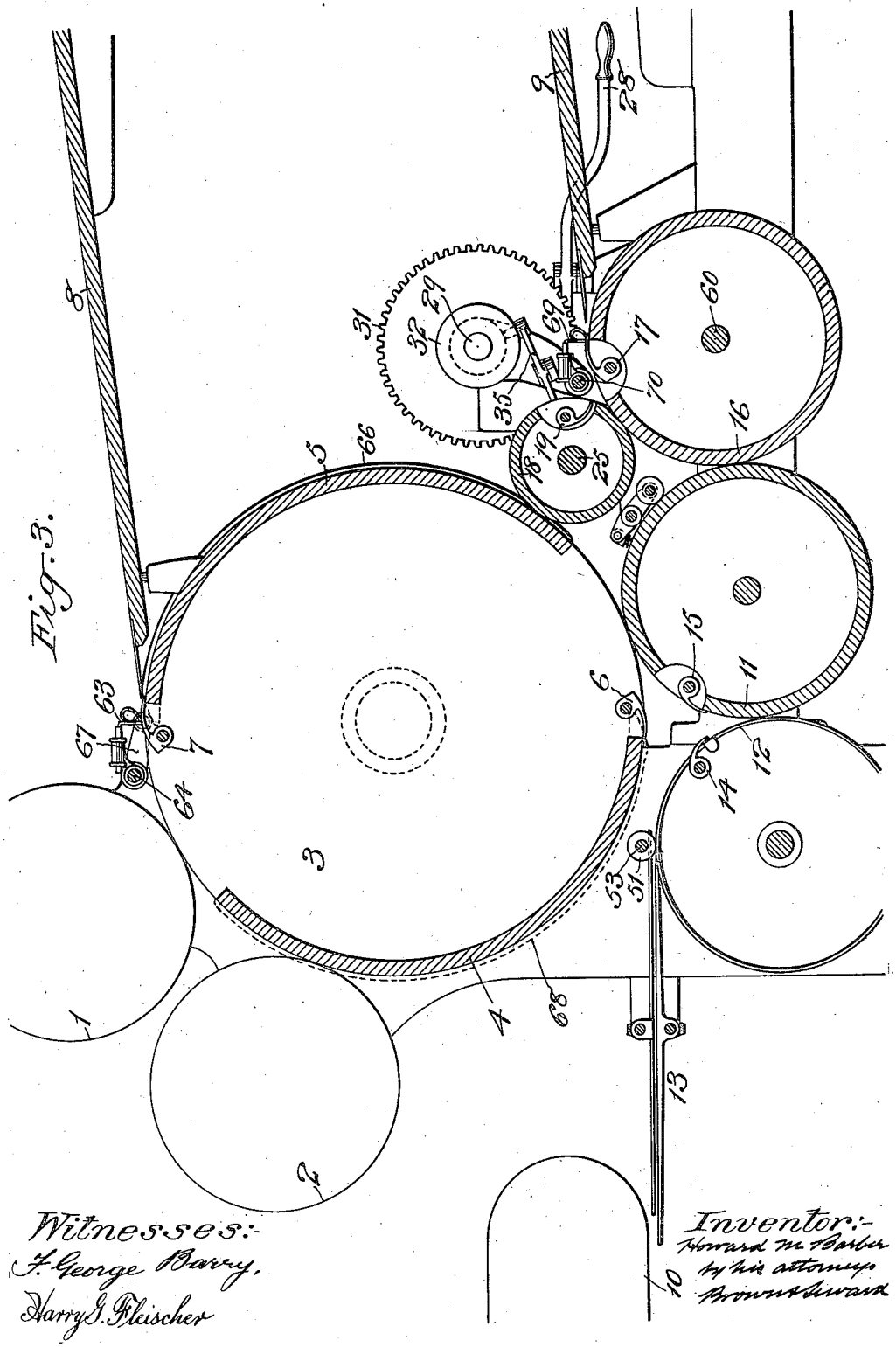
4 SHEETS—SHEET 3.

Fig. 3.



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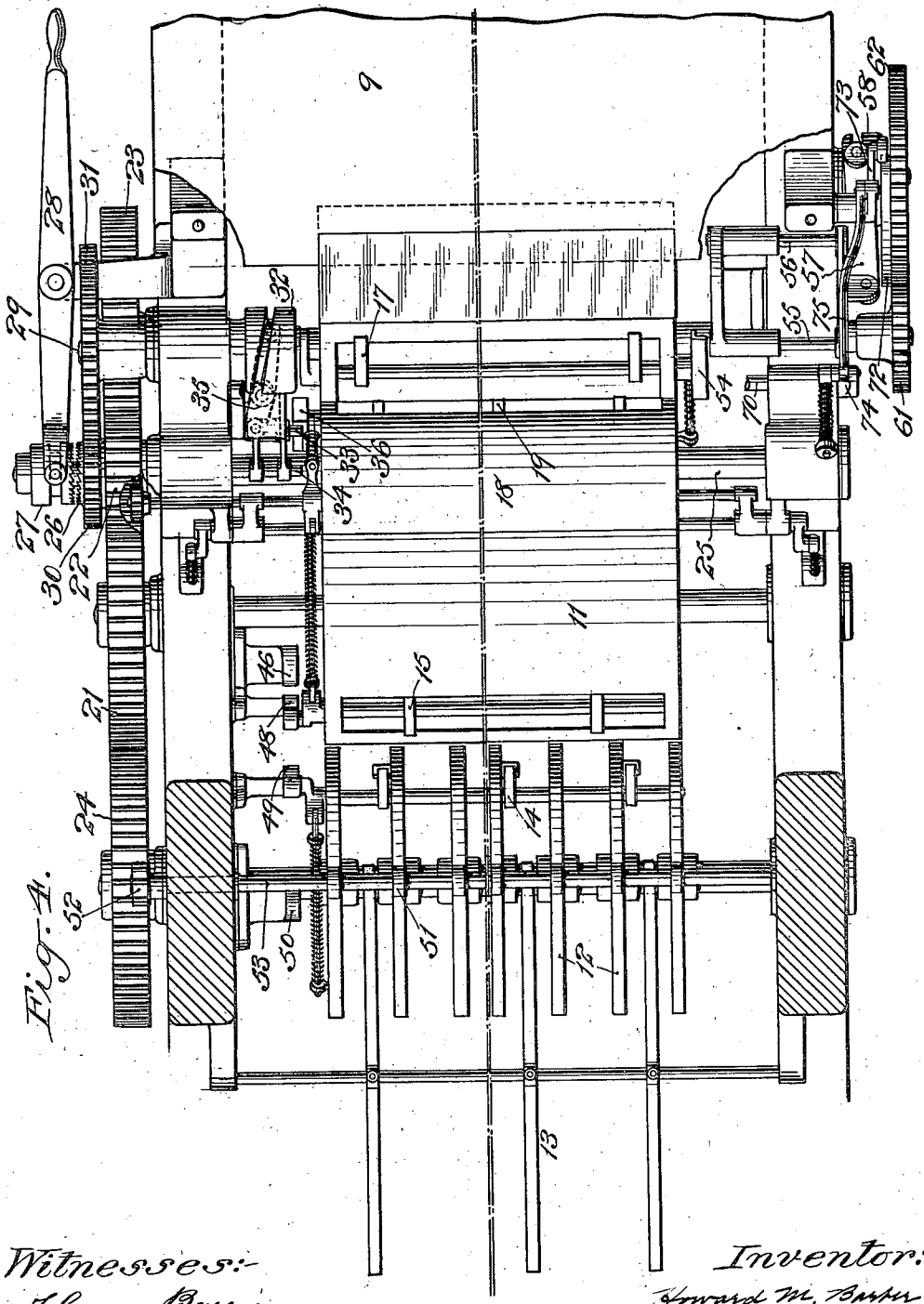

Fig. 4.

Witnesses:-
F. George Barry
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Inventor:-
Howard M. Barber
by his Attorneys
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UNITED STATES PATENT OFFICE.

HOWARD M. BARBER, OF STONINGTON, CONNECTICUT, ASSIGNOR, BY MESNE ASSIGNMENTS, TO C. B. COTTRELL & SONS COMPANY, OF NEW YORK, N. Y., A CORPORATION OF DELAWARE.

ROTARY SHEET-PRINTING MACHINE.

1,152,068. Specification of Letters Patent. Patented Aug. 31, 1915.

Application filed December 18, 1912. Serial No. 737,431.

To all whom it may concern:

Be it known that I, HOWARD M. BARBER, a citizen of the United States, and resident of Stonington, in the county of New London and State of Connecticut, have invented a new and useful Improvement in Rotary Sheet-Printing Machines, of which the following is a specification.

This invention relates to rotary sheet printing machines and particularly to that class of machines which may be used for single or multi-color printing and consists in a novel sheet feeding mechanism arranged to feed printing sheets from one source of sheet supply and either printing sheets or slip sheets from another source of sheet supply into the machine, as may be desired.

In single color and in most multi-color work on machines of the class above described, it is seldom, if ever, necessary to use slip sheets between the printed sheets to prevent offsetting or smutting. Printing sheets may then be fed into the machine from two different sources and thereby double the printed product delivered from the machine as the possible operating speed of a rotary printing machine of this character far exceeds the speed of a single feeder.

In some instances, it becomes very desirable to deliver a slip sheeted product and slip sheets may then be fed from one of the sources instead of the printing sheets.

In the accompanying drawings, Figure 1 represents in side elevation so much of a rotary printing machine as will give a clear understanding of my invention, Fig. 2 is a section from front to rear taken adjacent to the farther side frame, Fig. 3 is a central vertical longitudinal section from front to rear, and Fig. 4 is a horizontal section taken in the plane of the line A—A of Fig. 1.

The machine is herein shown as having two plate cylinders 1 and 2 and a single impression cylinder 3 having two impression surfaces 4 and 5 and two sets of sheet grippers 6 and 7.

The two sources of sheet supply are herein shown as tables 8 and 9, the table 8 being arranged for feeding printing sheets to the grippers 7 of the impression cylinder and the table 9 being arranged for feeding either printing sheets to the grippers 6 of the impression cylinder or slip sheets to the delivery mechanism, as the case may be.

A suitable printed sheet delivery may be provided, that shown herein comprising an endless delivery carrier 10, a printed sheet delivery cylinder 11, a delivery reel 12, and suitable guides 13 interposed between the endless delivery carrier 10 and the delivery reel 12. The set of grippers 15 on the delivery cylinder 11 is arranged to successively coact with the grippers 6 and 7 on the impression cylinder 3 for taking the sheets therefrom when printing sheets are being fed from both tables 8 and 9 and a double non-slip-sheeted product is being delivered. These grippers 15 are arranged to coact with the grippers 7, on the impression cylinder 3 when printing sheets are fed from the table 8 and slip sheets from the table 9. The delivery reel 12 is provided with a set of grippers 14.

A sheet feeding cylinder 16 has its set of grippers 17 arranged in position to take the sheets from the table 9 and when slip sheets are being used on the said table, these grippers are arranged to coact with the grippers 15 on the printed sheet delivery cylinder 11 of the delivery mechanism to transfer the slip sheets to the said grippers.

A sheet transfer cylinder 18 is provided with a set of grippers 19. When printing sheets are being fed from the table 9, the grippers 17 on the sheet feeding cylinder 16 will transfer a printing sheet to the grippers 19 on the transfer cylinder 18 and the said grippers 19 will transfer the sheet to the grippers 6 on the impression cylinder 3.

The impression cylinder 3, the transfer cylinder 18, the sheet feeding cylinder 16, the delivery cylinder 11, and the reel 12, are interconnected to rotate at the desired relative speeds by the gears 20, 21, 22, 23, 24. The gear 22 is loose on the shaft 25 and a clutch comprising a gear member 26 and a slidable member 27 fixed to rotate with the shaft 25 serves to lock the gear 22 to and release it from the shaft 25. A suitable operating lever 28 is provided for controlling the clutch member 27. The gear 22 is connected to the shaft 25 of the transfer cylinder 18 for rotating said cylinder when printing sheets are being fed into the machine and the said gear 22 is disconnected from the shaft 25 of the said transfer cylinder for permitting the cylinder to remain idle when slip sheets are being fed into the machine.

A cam shaft 29 for controlling the movements of the grippers 19 on the transfer cyl-

inder 18 is connected to rotate with the gear 22 through the gears 30, 31. This cam shaft 29 is provided with a cam 32 which controls the movements of the pins 33, 34, of a tumbler cam mechanism through the rock lever 35. The tumbler cam 36 on the shaft of the grippers 19 is operated every other revolution of the transfer cylinder 18 for opening the grippers 19 to receive a printing sheet from the grippers 17 on the cylinder 16, closing said grippers 19 and again opening the grippers for transferring the printing sheet to the grippers 6 on the impression cylinder 3. It is to be understood that the grippers 19 on the transfer cylinder take a sheet every fourth revolution of the transfer cylinder.

The stationary cam 37 is movable to two different positions according to whether the grippers 17 on the sheet feeding cylinder 16 are to open to feed printing sheets to the grippers 19 on the transfer cylinder 18 or slip sheets to the grippers 15 on the delivery cylinder 11. In the accompanying drawings, the cam 37 is shown in full lines in its position for transferring slip sheets to the cylinder 11 and in dotted lines in position for transferring printing sheets to the cylinder 18. A stationary cam 38 is arranged in position to open the grippers 6 for receiving a printing sheet from the grippers 19 on the cylinder 18.

The grippers 7 are opened to receive a printing sheet from the table 8 by a tumbler cam mechanism, the tumbler cam being denoted by 39, the tumbler pins by 40, 41, the rock arm by 42 and the cam for controlling the rock arm by 43, which cam is fixed on the shaft 44 of the impression cylinder. The tumbler cam mechanism is shown herein as being arranged to operate only the grippers 7. A stationary cam 45 is arranged in position to open both the grippers 6 and 7 at the proper time to transfer either the one printed sheet from the grippers 7 to the delivery cylinder 11 or where a double product is being produced to transfer the printed sheets from both the grippers 6 and 7. A fixed cam 46 is arranged to open the grippers 15 on the delivery cylinder 11 for receiving the printed sheets from the grippers 7 when a slip sheeted product is being delivered or printed sheets from both the grippers 6 and 7 when a double non-slip sheeted product is being delivered. A stationary cam 47 is arranged in position to open the grippers 15 on the cylinder 11 for receiving a slip sheet from the grippers 17 on the cylinder 16 when a slip sheeted product is being delivered. A stationary cam 48 is arranged in position to open the grippers 15 for transferring either successive printed sheets or the alternating printed and slip sheets, as the case may be, to the delivery reel 12. A stationary cam 49 is arranged to open the grippers 14 on the delivery reel 12 for receiving the sheets from the cylinder 11. A stationary cam 50 is arranged in position to open the grippers 14 for delivering the sheets to the guides 13; feed rollers 51 driven from the reel 12 being arranged to coact therewith for forwarding the sheets to the endless delivery carrier 10. These rollers 51 are driven from the gear 24 through the gear 52 on the shaft 53 of said rollers.

The grippers 17 on the cylinder 16 are opened to receive sheets from the table 9 every second revolution of the cylinder 16 by means of a tumbler cam mechanism including a cam 54 on the shaft of the grippers 17, the tumbler pins 55, 56, the rock lever 57 and the cam 58 on the cam shaft 59. This cam shaft is driven from the shaft 60 of the cylinder 16 through the gears 61, 62.

The sheet stop for the table 8 is denoted by 63, which stop is mounted to swing on a shaft 64 and the stop is normally held in its lowered position by the spring pressed means 65. The sheet stop is raised to permit the feeding of a sheet to the grippers 7 and held raised throughout the impression surface 5 by means of a cam 66 mounted to rotate with the impression cylinder 3, which cam engages the rock arm 67 of the said sheet stop. The said sheet stop 63 is also raised and held in its raised position to permit the passage of the next succeeding sheet on the impression surface 4 by means of a fixed cam 68 mounted to rotate with the cylinder 3. The sheet stop for the table 9 is denoted by 69 and its rock shaft by 70. This sheet stop is held in its lowered position by spring pressed means 71 and it is raised to permit the feeding in of a sheet from the table 9 and held in its raised position during the passage of the sheet, by means of a cam 72 fixed to rotate with the cam shaft 59, which cam engages one arm of a rock lever 73, the other arm of which is connected to the rock arm 74 on the shaft 70 by means of a connecting rod 75.

In the accompanying drawings, the parts are shown in the position which they assume for printing and delivering a slip sheeted product, the clutch interposed between the gear 22 and shaft 25 of the transfer cylinder being disconnected and the cam 37 being shown moved into its position to open the grippers 17 on the sheet feeding cylinder 16 at the proper time to deliver the slip sheets fed from the table 9 to the printed sheet delivery cylinder 11.

With the parts in the position shown, a printing sheet is fed from the table 8 to the grippers 7 and after passing by the plate cylinders 1 and 2, the printed sheet is trans-

ferred to the delivery cylinder 11. A slip sheet is fed from the table 9 to the grippers 17 on the cylinder 16 and the said slip sheet is delivered by the grippers 17 to the grippers 15 on the cylinder 11. The cylinder 11 therefore transfers first a printed sheet and then a slip sheet to the grippers 14 of the delivery reel 12 and the said delivery reel delivers the sheets to the delivery carrier 10 through the guides 13 and rollers 51. When it is desired to deliver a double non-slip-sheeted product, the printed sheets on the table 8 are delivered directly to the grippers 7 on the impression cylinder 3 and the printing sheets on the table 9 are fed by the grippers 17 on the cylinder 16 to the grippers 19 on the printing sheet transfer cylinder 18, the said cylinder being put into operative position by throwing in the clutch 26, 27, between its shaft 25 and the gear 22. The stationary cam 37 has also been moved to the dotted position shown in Fig. 2 so as to open the grippers 17 at the proper time to transfer the printing sheet to the grippers 19. These grippers 19 will transfer the printing sheet fed from the table 9 to the grippers 6 on the impression cylinder 3. These grippers 6 and 7 will successively transfer the printed sheets to the printed sheet delivery cylinder 11, which, in turn, will deliver the sheets successively to the grippers 14 on the delivery reel 12 and from thence to the endless delivery carrier 10 through the guides 13 and rollers 51.

While the parts are herein shown as being arranged when a slip sheeted product is being delivered to have the grippers 15 on the cylinder 11 take a printed sheet and deliver it one revolution and take a slip sheet and deliver it the next revolution, they may easily be adjusted so that every second revolution of the cylinder 11 the grippers 15 may first take a printed sheet from the grippers 6 of the impression cylinder and then a slip sheet from the grippers 17 of the feeding cylinder and then transfer the associated printed and slip sheets together to the grippers 14 of the delivery reel 12. To accomplish this last named result, it would only be necessary to set the feeding device a full revolution back or in advance of the position where alternate printed and slip sheets are delivered every revolution of the cylinder 11.

Where a double non-slip-sheeted product is being delivered, it will be seen that the delivery cylinder 11 will deliver a printed sheet every revolution thereof to the delivery reel.

By the use of the term "cylinders" in the feeding and delivery mechanisms, I wish to be understood as including any means capable of passing the sheets through the required paths for carrying out the results above described.

It is evident that slight changes might be resorted to in the form, construction and arrangement of the several parts without departing from the spirit and scope of my invention; hence I do not wish to limit myself strictly to the structure herein set forth, but

What I claim is:—

1. In a rotary printing machine, an impression cylinder, a sheet delivery mechanism and means arranged to feed printing sheets from a source of sheet supply to the impression cylinder and either printing sheets to the impression cylinder or slip sheets to the delivery mechanism but not to the impression cylinder from another source of sheet supply.

2. In a rotary printing machine, an impression cylinder, a sheet delivery mechanism, two sources of sheet supply and means arranged to feed printing sheets from one source of sheet supply to the impression cylinder and either printing sheets to the impression cylinder or slip sheets to the delivery mechanism but not to the impression cylinder from the other source of sheet supply.

3. In a rotary printing machine, an impression cylinder, a sheet delivery mechanism, a cylinder arranged to feed either printing sheets to the impression cylinder or slip sheets to the delivery mechanism but not to the impression cylinder, from a source of sheet supply.

4. In a rotary printing machine, an impression cylinder having two impression surfaces and their sets of grippers, a sheet delivery mechanism, two sources of sheet supply and means arranged to feed printing sheets from one source of sheet supply to one set of grippers and printing sheets to the other set of grippers or slip sheets to the delivery mechanism but not to the impression cylinder from the other source of sheet supply.

5. In a rotary printing machine, an impression cylinder, a delivery mechanism, a transfer cylinder, means arranged to feed printing sheets from a source of sheet supply directly to the impression cylinder and means arranged to feed printing sheets from another source of supply to the impression cylinder through the said transfer cylinder or slip sheets to the delivery mechanism but not to the impression cylinder.

6. In a rotary printing machine, an impression cylinder, a delivery mechanism, a transfer cylinder, means for feeding printing sheets from a source of sheet supply directly to the impression cylinder and a sheet feeding cylinder arranged to feed printing sheets from another source of sheet supply to the impression cylinder through the said transfer cylinder or slip sheets to the delivery mechanism but not to the impression cylinder.

7. In a rotary printing machine, an im-

pression cylinder, a sheet delivery cylinder, a sheet transfer cylinder, means for feeding printing sheets from a source of sheet supply directly to the impression cylinder and a sheet feeding cylinder arranged to feed the printing sheets from another source of sheet supply to the impression cylinder through the transfer cylinder or to feed slip sheets directly to said delivery cylinder.

8. In a rotary printing machine, an impression cylinder, a delivery cylinder, a transfer cylinder and means for feeding printing sheets to the impression cylinder through the transfer cylinder or slip sheets directly to the delivery cylinder from a source of sheet supply.

9. In a rotary printing machine, an impression cylinder, a delivery cylinder, a transfer cylinder and a sheet feeding cylinder arranged to feed printing sheets to the impression cylinder through the transfer cylinder or slip sheets directly to the delivery cylinder from a source of sheet supply.

10. In a rotary printing machine, an impression cylinder, means for feeding printing sheets thereto from one source, a sheet feeding cylinder arranged to feed either printing sheets or slip sheets from another source and a delivery cylinder arranged to take printed sheets from the impression cylinder or alternating printed sheets and slip sheets from the impression cylinder and sheet feeding cylinder.

11. In a rotary printing machine, an impression cylinder, means for feeding printing sheets thereto from one source, a sheet feeding cylinder arranged to feed either printing sheets or slip sheets from another source and a delivery cylinder arranged to take a printed sheet every revolution thereof from the impression cylinder or a printed sheet one revolution from the impression cylinder and a slip sheet the next revolution from the sheet feeding cylinder.

12. In a rotary printing machine, an impression cylinder having two impression surfaces and their grippers, means for feeding printing sheets from one source to one set of grippers, a delivery mechanism, a sheet feeding cylinder arranged to feed from another source either printing sheets to the other set of grippers on the impression cylinder or slip sheets to the delivery mechanism, said delivery mechanism including a cylinder arranged to take successive printing sheets from the impression cylinder or first a printed sheet from the impression cylinder and then a slip sheet from the sheet feeding cylinder.

In testimony, that I claim the foregoing as my invention, I have signed my name in presence of two witnesses, this thirteenth day of December, A. D. 1912.

HOWARD M. BARBER.

Witnesses:
A. R. STILLMAN,
E. M. GRANT.