

No. 742,247.

PATENTED OCT. 27, 1903.

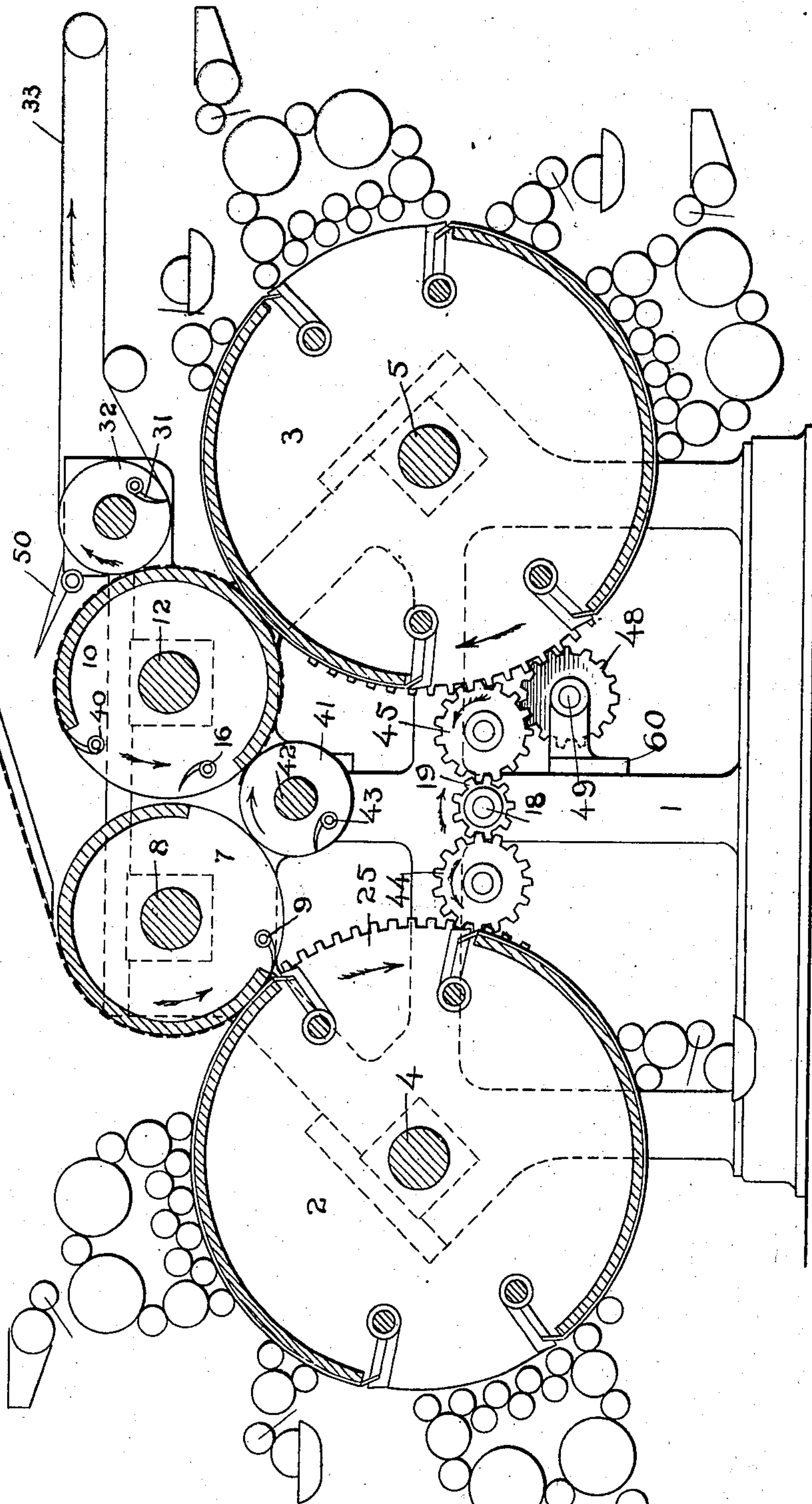
W. SPALCKHAVER.  
MULTICOLOR AND PERFECTING PRINTING MACHINE.

APPLICATION FILED MAR. 20, 1901.

NO MODEL.

3 SHEETS—SHEET 1.

Fig. 1



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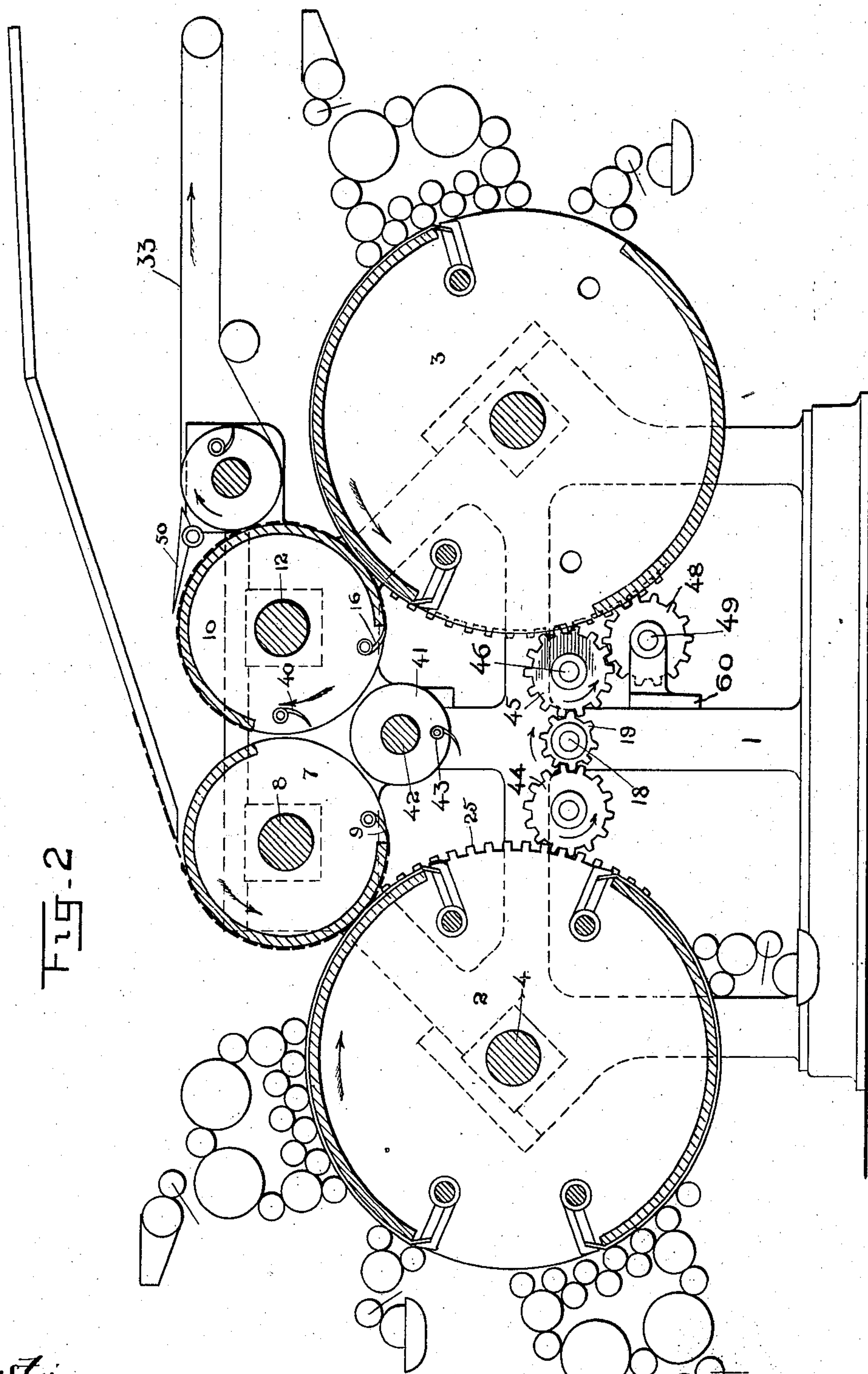
W. SPALCKHAVER.

# MULTICOLOR AND PERFECTING PRINTING MACHINE.

APPLICATION FILED MAR. 20, 1901.

NO MODEL.

3 SHEETS—SHEET 2.



FD-35 (Rev. 5-22-64)

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MULTICOLOR AND PERFECTING PRINTING MACHINE.

APPLICATION FILED MAR. 20, 1901.

NO MODEL.

3 SHEETS—SHEET 3.

Fig. 3

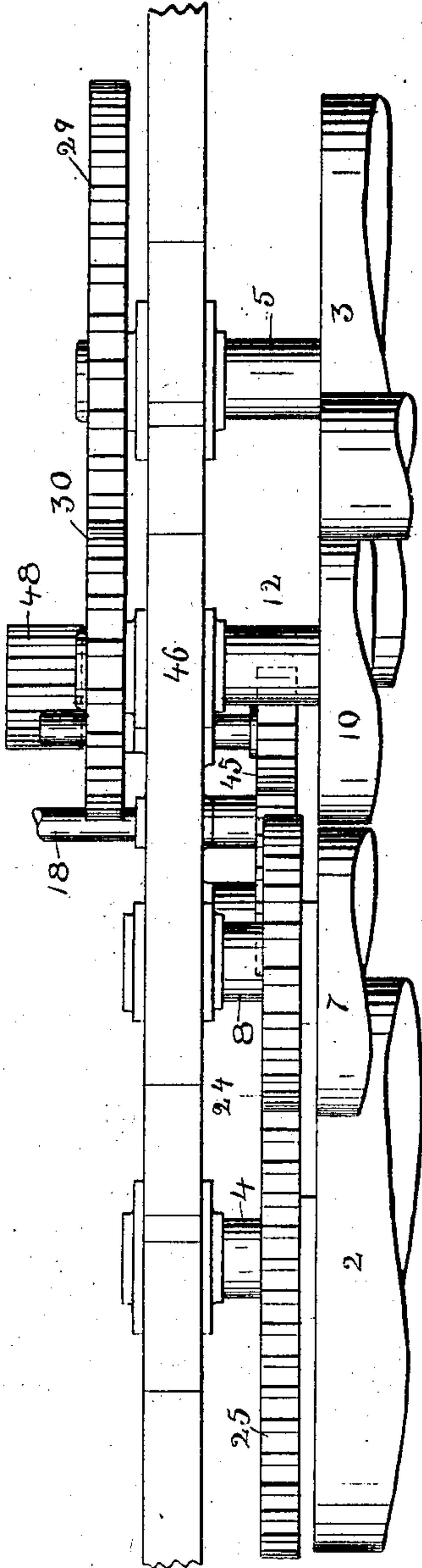
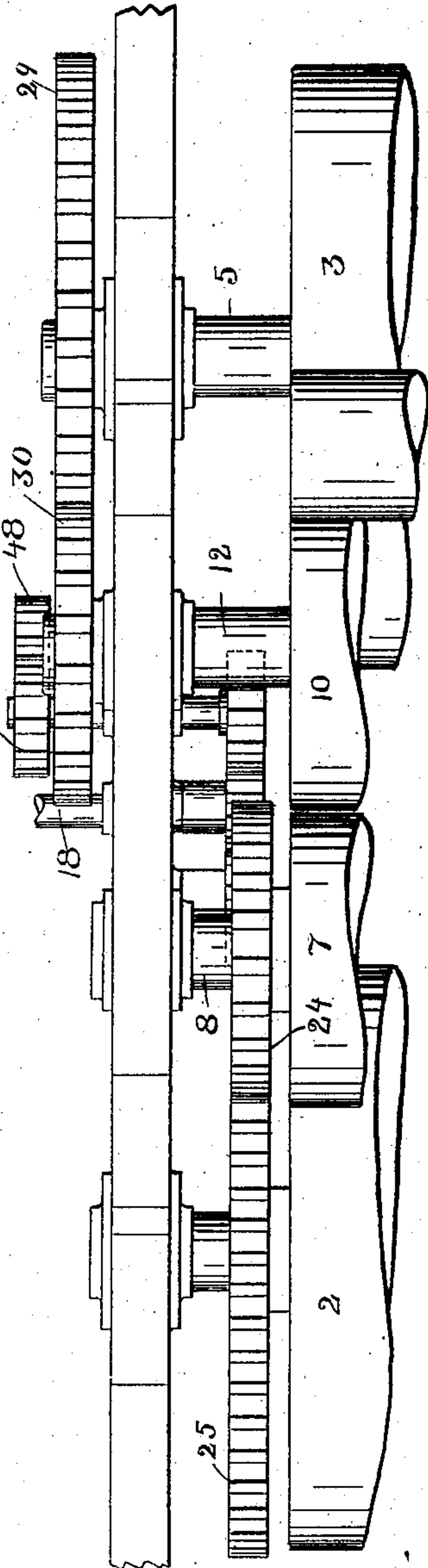


Fig. 4



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# UNITED STATES PATENT OFFICE.

WILLIAM SPALCKHAVER, OF NEW YORK, N. Y., ASSIGNOR TO ROBERT HOE,  
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## MULTICOLOR AND PERFECTING PRINTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 742,247, dated October 27, 1903.

Application filed March 20, 1901. Serial No. 52,029. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM SPALCKHAVER, a citizen of the United States, residing at New York, county of Kings, and State of New York, have invented certain new and useful Improvements in Multicolor and Perfecting Printing-Machines, fully described and represented in the following specification and the accompanying drawings, forming a part  
10 of the same.

This invention relates to certain improvements in printing-machines.

The invention has for its object to produce a machine which shall be capacitated to give  
15 a sheet a plurality of impressions on the same side or perfect it, as may be desired.

With this and other objects in view the invention consists in certain constructions and in certain parts, improvements, and combinations, as will be hereinafter fully described and then specifically pointed out in the claims hereunto appended.

In the accompanying drawings, which form a part of this specification, and in which like characters of reference indicate the same parts, Figure 1 is a sectional side elevation of so much of a printing-machine as is necessary to an understanding of the invention, the machine being arranged to give a sheet a plu-  
25 rality of impressions on the same side. Fig. 2 is an elevation similar to Fig. 1, but showing the machine arranged to give a sheet impressions on opposite sides. Fig. 3 is a plan of the gearing employed with the machine ar-  
30 ranged as in Fig. 1. Fig. 4 is a plan of the gearing employed when the machine is arranged as in Fig. 2.

Referring to the drawings, which illustrate one embodiment of the invention, 1 indicates  
40 a frame, which may be of any usual or desired construction. The frame in the present instance is arranged to support the form-carriers of two printing-couples. The printing-couples will preferably be of the rotary type, and the form-carriers thereof consist of two cylinders, said cylinders being marked 2 and 3. The form-carrier 2 is mounted on a shaft 4, and the form-carrier 3 is mounted on a shaft 5, said shafts being sup-  
50 ported in boxes of any usual description. Coöperating with the form-carrier 2 is an im-

pression member 7, which, as shown, consists of a cylinder mounted on a shaft 8, supported in boxes of any usual description. The cylinder 7 is provided with sheet-taking devices, 55 which may be of any suitable description. As shown, the sheet-taking devices consist of grippers 9, which may be operated by any of the usual devices well known in the art for this purpose. Since, however, these devices 60 form no part of the present invention, they are not illustrated.

The impression member which coöperates with the form-carrier 3 is also a cylinder, said cylinder being marked 10 and being mounted 65 on a shaft 12, which is supported in boxes of any usual description. The impression-cylinder 10 is provided with any usual form of sheet-taking devices, said devices in the present instance consisting of grippers 16, which, 70 as will appear from the description herein-after given, operate to take the sheet from the grippers 9 of the cylinder 7 and retain it on the impression-surface of the cylinder 10. In addition to the sheet-taking grippers 16 75 the cylinder 10 is provided with a second set of sheet-taking devices, which, as shown, consist of grippers 40, said grippers being operated by any of the usual devices for this purpose. 80

When the machine is arranged so that the second couple delivers its impression on the side of the sheet opposite to that which has been printed by the first couple, the grippers 16 on the cylinder 10 take the sheet directly 85 from the grippers 9 on the cylinder 7 in a manner which is well understood, said grippers thus acting as a transferring means. It is to be understood, however, that the machine might be arranged so that other transferring 90 means could be employed. When, however, the machine is arranged so that the second couple delivers its impression on the same side as the first couple, an intermediate transfer device is employed, which may be of any 95 suitable description. As shown, it consists of a cylinder 41, mounted on a shaft 42 and provided with any usual form of sheet-taking devices—as, for instance, grippers 43, which are operated by any usual mechanism. (Not 100 shown.) When the transfer-cylinder is employed to transfer the sheet, the grippers 43



take it from the grippers 9 on the cylinder 7 and transfer it to the grippers 40 on the cylinder 10.

Any suitable driving mechanism may be employed. In the machine shown this driving mechanism is of such a character that when the couples are printing on the same side of the sheet the cylinders of the second couple move in the same direction as the cylinders of the first couple, (the direction of movement being referred to a common standard—as, for instance, the hands of a watch;) but when the machine is arranged to print on opposite sides of a sheet one couple moves in a direction opposite to that of the other couple.

In the construction shown in the drawings the main shaft of the machine is indicated at 18, this shaft being provided with a driving-pinion 19. The pinion 19 meshes with a gear 44, which in turn meshes with a gear 25, which is mounted on the shaft 4 of the form-carrier 2. The gear 25 meshes with a gear 24 on the shaft 8 of the impression member 7. This train of gearing operates to drive the first couple always in the same direction. The gear 19 further meshes with a gear 45, mounted on a short shaft 46, which is suitably supported on the frame. This short shaft 46 has on its outer end (see Fig. 4) a gear 47, which may be caused to mesh with a gear 29 on the shaft 5 of the form-carrier 3 when the machine is arranged as in Fig. 2—that is to say, when it is running as a perfecting-machine. The gear 47 may be further caused to mesh with a broad-faced gear 48, mounted on a stud 49, suitably supported in a bracket 60 on the frame of the machine. This broad-faced gear 48 is movable endwise on its stud and may be caused to mesh simultaneously with the gear 47 and the gear 29, or it may be out of mesh with both of them. Its position when it is out of mesh with both these gears is shown in Fig. 3. When it is in mesh with both these gears, its position is shown in Fig. 4, and the machine is then being driven as indicated in Fig. 2—that is to say, the machine is arranged so that both couples deliver their impressions on opposite sides of the sheet.

Suitable delivery mechanism is employed, and this delivery mechanism is preferably so arranged as to take the sheet from the second impression-cylinder no matter in which direction the cylinder is running. To this end therefore the delivery mechanism is provided with two sets of delivery devices. In the construction shown the delivery mechanism includes a set of tapes 33, which operate in connection with a set of delivery devices, consisting of a cylinder 32 and grippers 31, and also in connection with another delivery device, which consists of a switch 50. When the machine is operating as a color-machine—that is, when it is arranged as shown in Fig. 1—the sheet is taken from the grippers 40 on the cylinder 10 by the grippers 31 on the cyl-

inder 32, is carried around on said cylinder, and then run off on the tapes. When, however, the machine is arranged as a perfecting-machine—that is, as shown in Fig. 2—the grippers 31 are inoperative and the sheet is taken from the grippers 16 by the switch 50 and delivered to the tapes 33.

The operation of the machine is as follows: The form-carriers 2 and 3 are in this instance shown as provided with two form-carrying surfaces, upon which are mounted two planographic printing-surfaces. Each form-carrier is accordingly provided with two sets of inking and water rolls, as common in such cases. When the machine is arranged as shown in Fig. 1, a sheet will be taken from the feed-board or any other suitable delivery means by the grippers 9 on the cylinder 7 and retained by said grippers on said cylinder until both forms on the carrier 2 have delivered their impression. After being printed by the forms on the carrier 2 the sheet is taken by the grippers 43 on the transfer-cylinder 41 and delivered to the grippers 40 on the cylinder 10. It is retained by these grippers on the cylinder 10 until it has received an impression from each form on the form-carrier 3, these impressions being delivered on the same side of the sheet as the impressions from the forms on the carrier 2. The sheet is therefore in this arrangement of the machine printed in four colors. After having been thus printed it is taken by the grippers 31 on the cylinder 32 and delivered to the tapes 33, by which it is carried out of the machine. When it is desired to perfect, the gearing is arranged so as to reverse the direction of movement of the second couple and the transfer-cylinder is thrown out of operation. One of the sets of inking devices which cooperate with the form-carrier 3 is also thrown out of operation and one of the forms is removed from the machine. With this arrangement of the machine the sheet is taken as before by the grippers 9 on the cylinder 7 and receives two impressions on one side. When these impressions are completed, the sheet is taken by the grippers 16 and transferred to the impression-cylinder 10, where it remains until it has received an impression from the form on the carrier 3. After this has been accomplished the switch 50 is dropped and the sheet is run off onto the tapes. With this arrangement of the machine the sheet receives two impressions on one side and a perfecting-impression on the opposite side. With this arrangement, furthermore, the cylinder 10 makes one idle revolution to every two revolutions of the cylinder 7.

While the invention has been shown as embodied in a machine in which the form-carriers are provided with two forms, it will be understood that the invention is not restricted to this type of machine. While, furthermore, the particular means shown for carrying the invention into effect constitute a preferred embodiment of the invention, it



is to be understood that the invention is not to be limited to such means.

What is claimed is—

1. The combination with a printing-couple, of a second printing-couple, means for driving said couples, means for transferring a sheet directly from the sheet-carrying member of the first couple to the sheet-carrying member of the second couple, means for reversing the direction of rotation of the second couple, a transfer device operating to transfer a sheet from the sheet-carrying member of the first couple to the sheet-carrying member of the second couple, and a delivery mechanism coöperating with the sheet-carrying member of the second couple and constructed to take the sheet when said member is moving in either direction, substantially as described.

2. The combination with a printing-couple, of a second printing-couple, means for driving said couples in opposite directions, means for transferring a sheet from the first couple to the second couple, means for reversing the direction of rotation of the second couple, a transfer device operating to transfer a sheet from the sheet-carrying member of the first couple to the sheet-carrying member of the second couple, and a delivery mechanism employing two sets of delivery devices, one set operating when the second couple is moving in one direction and the other set operating when said couple is moving in the opposite direction, substantially as described.

3. The combination with a printing-couple, of a second printing-couple, means for driving said couples in opposite directions, means for transferring a sheet from the first couple to the second couple, means for reversing the direction of rotation of the second couple, a transfer device operating to transfer a sheet from the sheet-carrying member of the first couple to the sheet-carrying member of the second couple, and a delivery mechanism employing a set of sheet-taking devices and a bridge or switch, the sheet-taking devices operating when the second couple is moving in one direction and the switch operating when said couple is moving in the opposite direction, substantially as described.

4. The combination with a printing-couple, of means for driving said couple in opposite directions, and a single delivery mechanism

operating in connection with the sheet-carrying member of the couple having two sets of devices for removing the sheet from the sheet-carrying member, one set operating when the couple is moving in one direction and the other set operating when the couple is moving in the opposite direction, substantially as described.

5. The combination with a rotary printing-couple consisting of an impression-cylinder and a form-carrier having a plurality of forms, of a second rotating printing-couple consisting of an impression-cylinder and a form-carrier having a plurality of forms, means for taking and retaining a sheet on the impression member of the first couple until it has received an impression from each of the forms on the form-carrier thereof, means whereby the sheet is transferred either side out to the sheet-carrying member of the second couple, and means for retaining it on said member until it has received an impression from each of the forms on the form-carrier of the second couple, substantially as described.

6. The combination with a rotary printing-couple consisting of an impression-cylinder and a form-carrier having a plurality of forms, of a second rotating printing-couple consisting of an impression-cylinder and a form-carrier having a plurality of forms, means for rotating said couple in opposite directions, means for taking and retaining a sheet on the impression member of the first couple until it has received an impression from each form on the form-carrier thereof, means for transferring the sheet from one couple to the other when the couples are running in opposite directions, a transfer device also operating to transfer the sheet from one couple to the other when the couples are running in the same direction, and means for retaining the sheet on the impression member of the second couple until it has received an impression from each form on the form-carrier of the second couple, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

WILLIAM SPALCKHAVER.

Witnesses:

F. W. H. CRANE,  
L. ROEHM.