

No. 687,866.

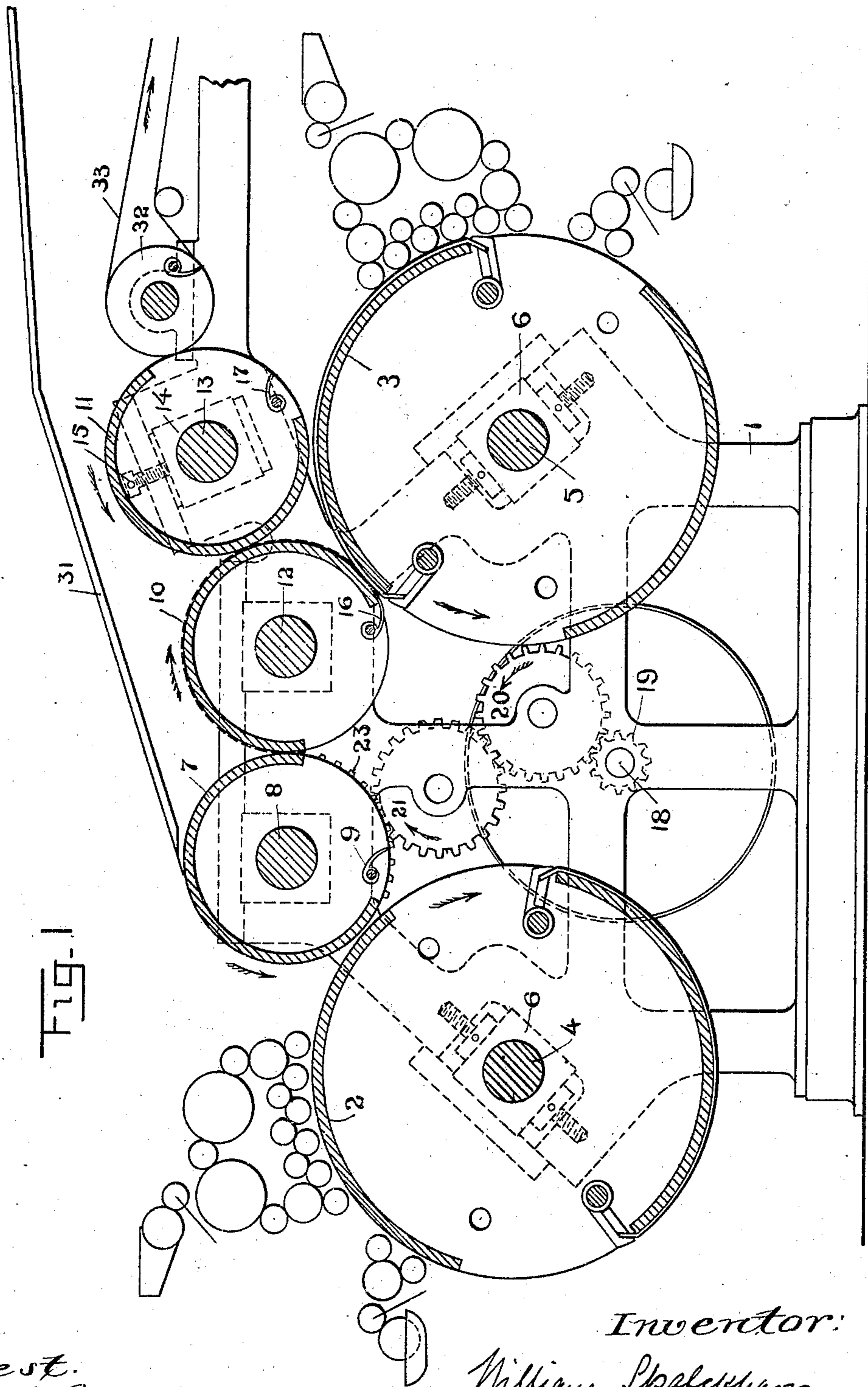
Patented Dec. 3, 1901.

W. SPALCKHAVER.  
MULTICOLOR AND PERFECTING PRINTING MACHINE.

(Application filed Mar. 20, 1901.)

(No Model.)

3 Sheets—Sheet 1.



Attest.  
Geo. H. Botts.  
T. A. H. Hoe

Inventor:  
William Spalckhaver  
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MULTICOLOR AND PERFECTING PRINTING MACHINE.

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3 Sheets—Sheet 2.

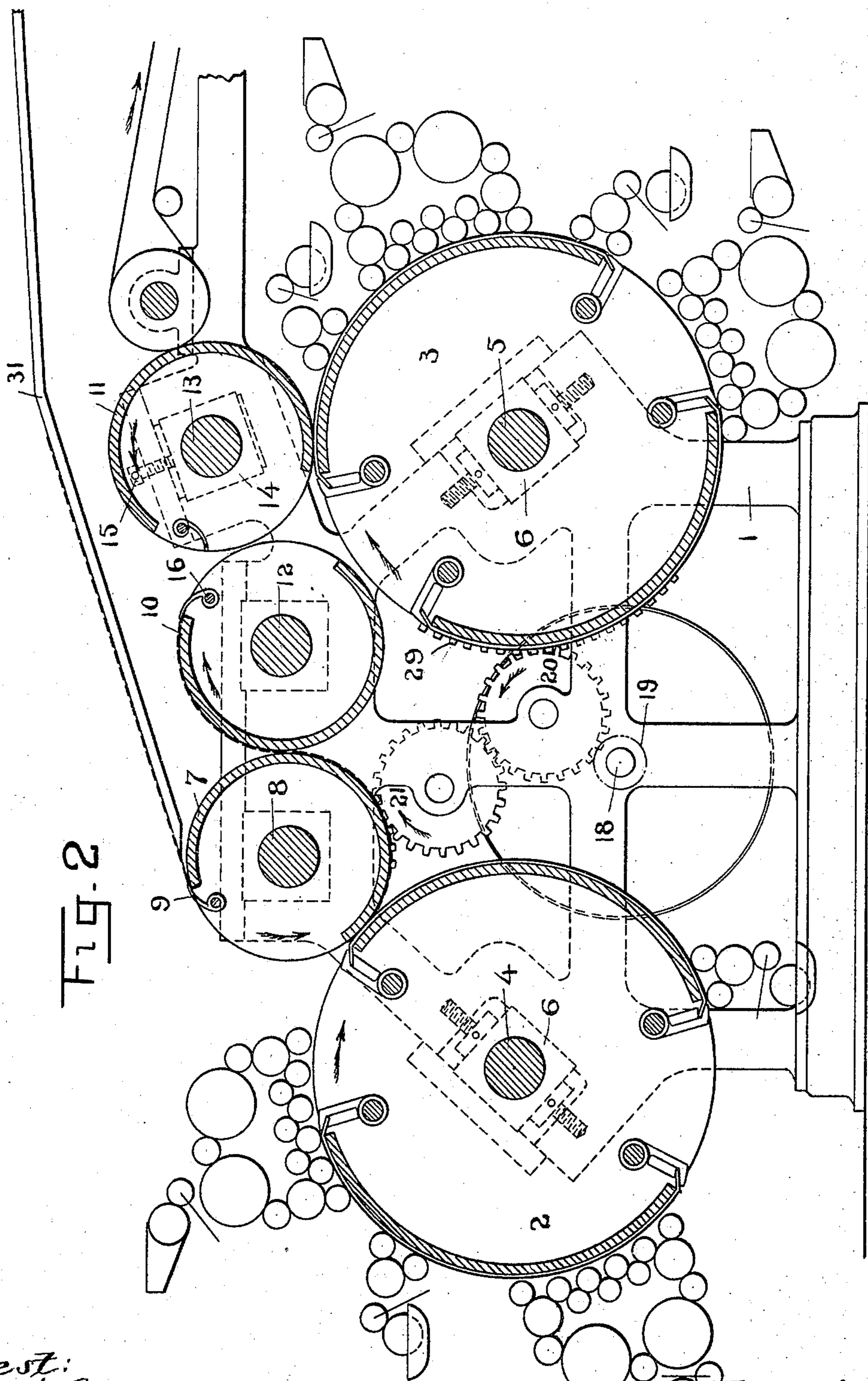


FIG. 2

Attest:  
Geo. H. Botts.  
O. F. Kohoe

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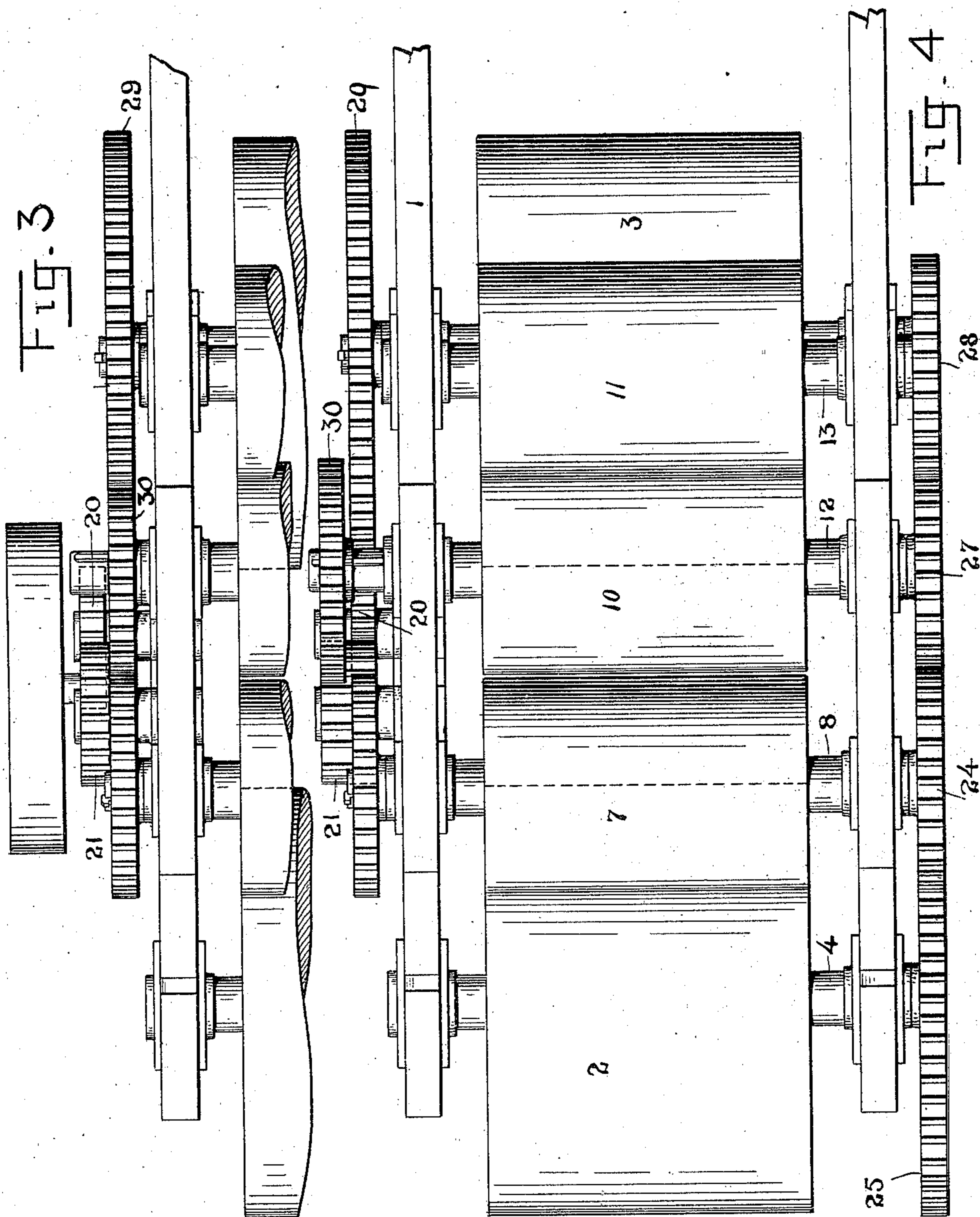
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MULTICOLOR AND PERFECTING PRINTING MACHINE.

(Application filed Mar. 20, 1901.)

(No Model.)

3 Sheets—Sheet 3.



Attest:  
Geo. H. Botts.  
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# UNITED STATES PATENT OFFICE.

WILLIAM SPALCKHAVER, OF NEW YORK, N. Y., ASSIGNOR TO ROBERT HOE,  
OF NEW YORK, N. Y.

## MULTICOLOR AND PERFECTING PRINTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 687,866, dated December 3, 1901.

Application filed March 20, 1901. Serial No. 52,030. (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 of the same.

This invention relates to certain improvements in printing-machines, and has for its object to produce a machine which will be capacitated to either print in colors or perfect, as may be desired.

The invention consists in certain constructions and in certain parts, improvements, and combinations, as will be hereinafter 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 side elevation of so much of a printing-machine as is necessary to an understanding of the invention, the machine being arranged to perfect a sheet. Fig. 2 is a side elevation of a similar machine arranged to print a sheet in four colors. Fig. 3 is an plan view illustrating the arrangement of the driving-gearing for the machine shown in Fig. 1. Fig. 4 is a plan view of the construction shown in Fig. 2, illustrating the driving-gearing.

Referring to the drawings, which illustrate one embodiment of the invention, 1 indicates 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, said form-carriers in the machine shown being cylinders and marked 2 and 3. The form-carrier 2 is mounted on a shaft 4 and the form-carrier 3 on a shaft 5, said shafts being preferably supported in the usual adjustable boxes 6. Coöperating with the form-carrier 2 is an impression member 7, which is shown as a cylinder mounted on a shaft 8, said shaft being supported in boxes of any usual description. This cylinder is provided with sheet-taking

devices, which may be of any suitable form. As shown, these sheet-taking devices consist of grippers 9. These grippers may be operated by any of the usual devices well known in the art for that purpose; but since these devices form no part of the present invention they are not illustrated.

In addition to the impression member so far described the frame serves to support two other members, either of which by suitable adjustments may be arranged to coöperate with the form-carrier 3 and act as an impression device for said carrier. In the present machine these coöperating members consist of cylinders 10 and 11, the cylinder 10 being supported on a shaft 12 and the cylinder 11 on a shaft 13. The shaft 12 of the cylinder 10 is mounted in boxes of any usual description. The shaft 13 of the cylinder 11 is so mounted as to enable a relative adjustment to be effected between the cylinder and the form-carrier 3. While this adjustment may be attained in any suitable or desired manner, the shaft is preferably mounted in boxes 14, which are or may be adjustable through the medium of screws 15, the construction being one which is well understood in the art.

By suitable relative adjustments the cylinder 3 may be caused to coöperate in the printing operation with either the cylinder 10 or the cylinder 11—that is to say, the cylinder 10 may act as the impression-cylinder for the form-carrier 3 or the cylinder 11 may act as the impression-cylinder for the form-carrier, according to the product to be printed. The means by which the relative adjustments are obtained may be varied and the adjustments may be obtained by moving any of the members. In the construction shown the cylinder 10 is made stationary, and the cylinder 3 is moved toward and away from it by means of its adjustable boxes. The cylinder 11 is made to follow the cylinder 10 by a movement given to the boxes in which its shaft 13 is mounted.

When the cylinder 11 is acting as an impression-cylinder, the cylinder 10 will act as a transfer device, said cylinder being provided with grippers 16 or any other form of sheet-taking devices which take the sheet

from the grippers 9 on the cylinder 7 and transfer it to grippers 17 or other suitable form of sheet-taking devices on the cylinder 11.

Any suitable form of driving mechanism may be employed. In the arrangement shown in Fig. 1 the main shaft is indicated at 18, said shaft being provided with a pinion 19, which through intermeshing gears 20 and 21 drives the cylinder 7, which is provided with a gear 23, which meshes with the gear 21. The shaft 8 (see Fig. 4) carries on the end opposite the gear 23 a gear 24, said gear meshing with a gear 25 on the shaft 4, and thus driving the form-carrier 2, and with a gear 27 on the shaft 12, thus driving the cylinder 10. The gear 27 on the cylinder 10 meshes with a gear 28 on the shaft 13, and thus serves to drive this cylinder.

The cylinders 10 and 11 rotate in opposite directions when referred to a common standard—that is, the direction of movement of the hands of a watch—and it is apparent, therefore, that when the cylinder 3 coöperates with one of these cylinders it must be driven in one direction and when it coöperates with the other cylinder it must be driven in the opposite direction. The shaft 5 of the form-carrier 3 is provided with a gear 29. The shaft 12 of the cylinder 10 is provided with a slip-gear 30, which is secured to the shaft by means of a feather or in any other suitable manner. When the cylinder 10 is to act as an impression-cylinder for the form-carrier 3, the gear 30 is slid into mesh with the gear 29. At this time the boxes in which the shaft 13 of the cylinder 11 is mounted are so adjusted that the cylinder is out of contact with the cylinder 3. With this adjustment of the machine a sheet fed to the machine from the feed-board 31 or from any other suitable source is caught by the grippers 9 and printed by the form on the cylinder 3. After being printed by this couple the sheet will be caught by the grippers 16 on the cylinder 10 and transferred to this cylinder. While on this cylinder it receives a second printing on the opposite side by the form on the cylinder 3, after which it is transferred to the grippers 17 on the cylinder 11 and is by this cylinder delivered to any suitable delivery mechanism, one consisting of a gripper-cylinder 32 and tapes 33 being indicated.

If the sheet is to be printed in colors, the gear 30 is slipped out of mesh with the gear 29, said gears then occupying the position indicated in Fig. 4. The form-carrier 3 is adjusted, as shown in Fig. 2, so that it is out of contact with the cylinder 10, and the cylinder 11 is adjusted, as shown in Fig. 2, so that it is in contact with the form-carrier. Since the cylinders 10 and 11 rotate in the opposite directions, it is obvious that the cylinder 3 must be driven in the opposite direction from what it is driven when the cylinder 10 is acting as the impression-cylinder. While any means may be used for reversing the direction of ro-

tation of the cylinder 3, the gear 20 is preferably formed as a slip-gear and the gear 21 is a broad-faced gear, so as to permit the movement of the gear 20 without disturbing the mesh of the two gears. With this arrangement of the machine the gear 20 is moved inward, so as to be in mesh with the gear 29, before described as mounted on the shaft 5 of the form-carrier 3. With this arrangement of the machine the cylinder 10, instead of acting as an impression-cylinder, merely acts as a transfer device, receiving the sheet from the grippers 9 on the cylinder 7 and transferring it to the grippers 17 on the cylinder 11. The sheet while on said cylinder receives a second impression on the same side. After receiving its second printing the sheet is delivered to the delivery mechanism.

The machine as so far described is arranged to perfect a sheet or to print it in two colors. By providing the form-carriers 2 and 3 with a plurality of forms the number of printings may be increased, as desired. As shown in Fig. 2, the form-carriers 2 and 3 are provided with two forms. With this construction, therefore, the sheet may be printed in four colors on one side, or may be printed in two colors on one side and perfected in a single color on the opposite side. Whenever a sheet is to be perfected, the last form-carrier—that is, the form-carrier 3—must have one impression-surface less than the number of impression-surfaces on the first form-carrier in order to allow the second impression-cylinder to make one idle or non-printing revolution in which to deliver. The gripper mechanism will of course be arranged to operate at proper times, according to the length of time the sheet is to be held on the impression-cylinders.

The machine is shown as printing from planographic surfaces and is provided, therefore, with the usual water and inking devices, which may be of any well-known description.

The specific means by which the invention is carried into effect may be varied widely. It is to be understood, therefore, that the invention is not to be limited to the particular means shown and described.

What is claimed is—

1. The combination with a printing-couple, of a second couple consisting of a form-carrier and two coöperating members, means whereby either of said members may be caused to act as an impression device, and means whereby the other of said members may be caused to act as a transfer device, substantially as described.

2. The combination with a printing-couple, of a form-carrier, means for rotating the form-carrier in opposite directions, two coöperating members, means whereby one of said members may be caused to act as an impression member and the other member as a transfer device when the form-carrier is rotating in one direction, and means whereby said other member may be caused to operate as an im-

pression member when the form-carrier is rotating in the opposite direction, substantially as described.

3. The combination with a printing-couple comprising a form-carrier and a rotating impression member, of a second rotating impression member arranged to take a sheet from the first rotating member, a third member, means for rotating it in a direction opposite to that of the second member, said member being arranged to take a sheet from the second member, a form-carrier, means for driving said form-carrier in opposite directions, and means for producing a relative adjustment between the form-carrier and the second and third members so that said carrier may cooperate with either of them, substantially as described.

4. The combination with a printing-couple comprising a form-carrier and a rotating impression member, of a second rotating impression member arranged to take a sheet from the first rotating member, a third member, means for rotating it in a direction opposite to that of the second member, said member being arranged to take a sheet from the second member, a form-carrier, means for driving said form-carrier in opposite directions, means for

moving the form-carrier toward and away from the second impression member, means for moving the third member toward and away from the form-carrier, substantially as described.

5. The combination with a rotating printing-couple comprising a form-carrier having a plurality of forms thereon, and a rotating impression-cylinder, of a second rotating cylinder arranged to take a sheet from the first cylinder, a third rotating cylinder arranged to take a sheet from the second cylinder, a second form-carrier provided with a plurality of forms, and means for producing a relative adjustment between the second and third cylinders and the second form-carrier, so that either the second or the third cylinder may act as an impression-cylinder for the second form-carrier, 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.