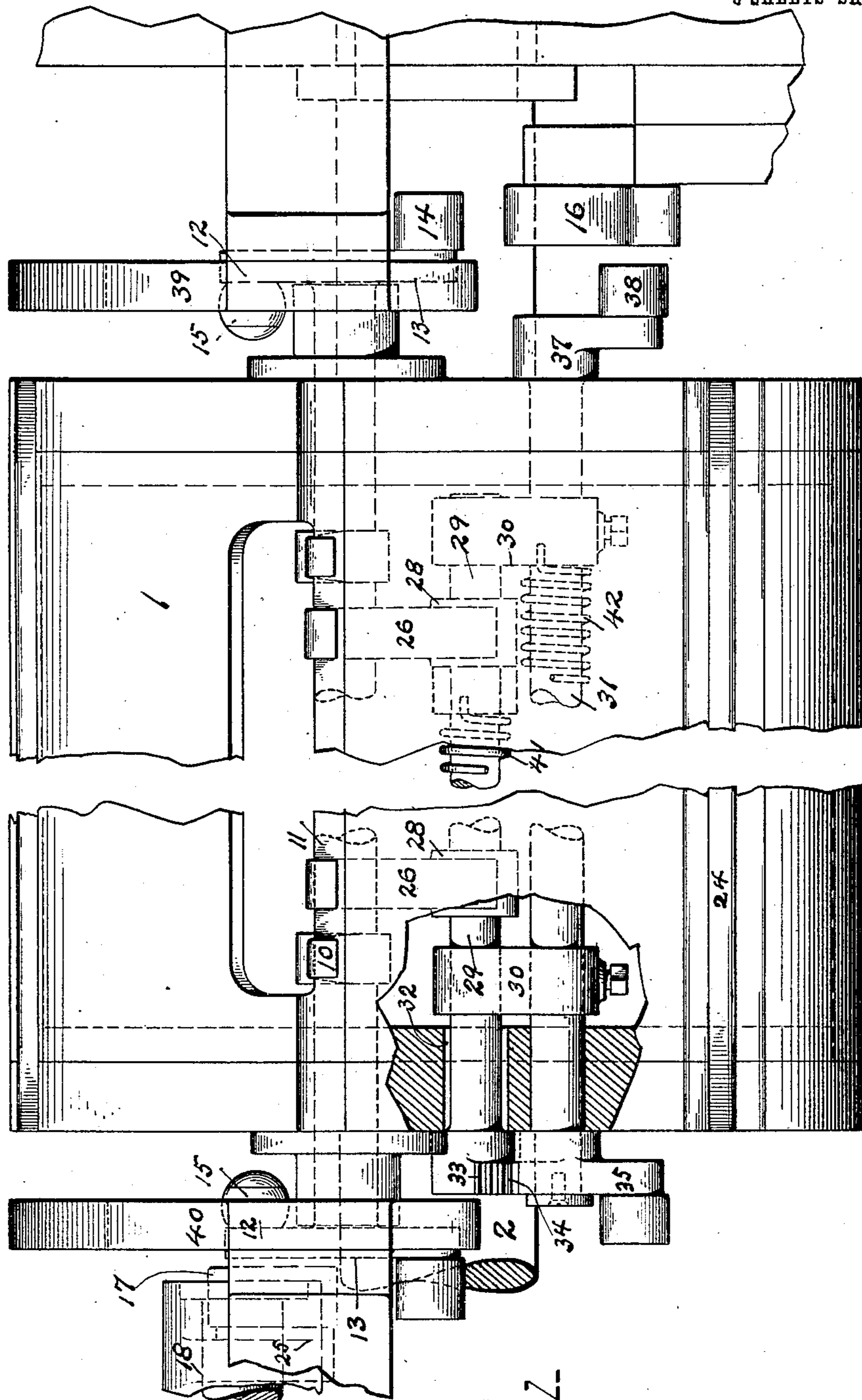


G. F. READ.  
SHEET CONTROLLING DEVICE.  
APPLICATION FILED MAY 11, 1906.

998,986.

Patented July 25, 1911.

5 SHEETS—SHEET 1.



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5 SHEETS—SHEET 2.

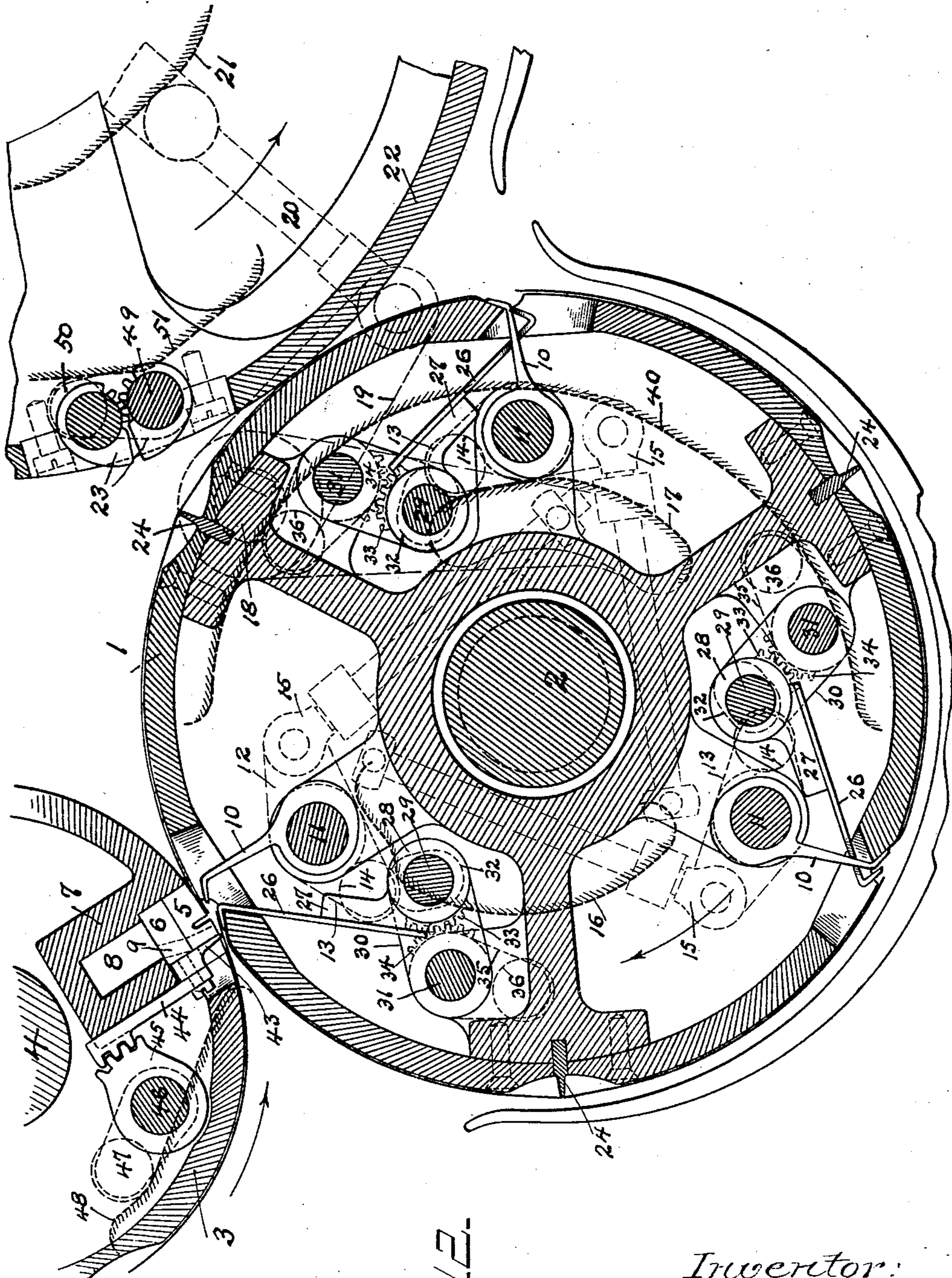


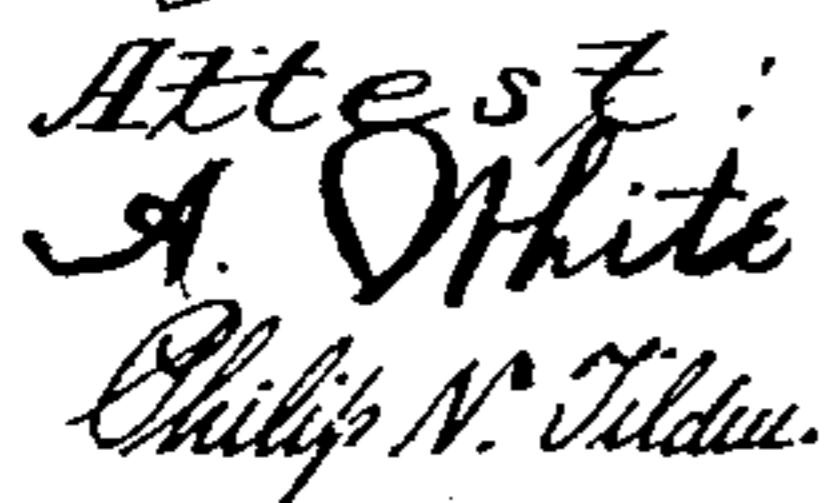
Fig. 2.

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**998,986.**

6 SHEETS—SHEET 3.



ΕΠΙΧΕΙΡΗΣΙΑΚΟ ΠΡΟΓΡΑΜΜΑ

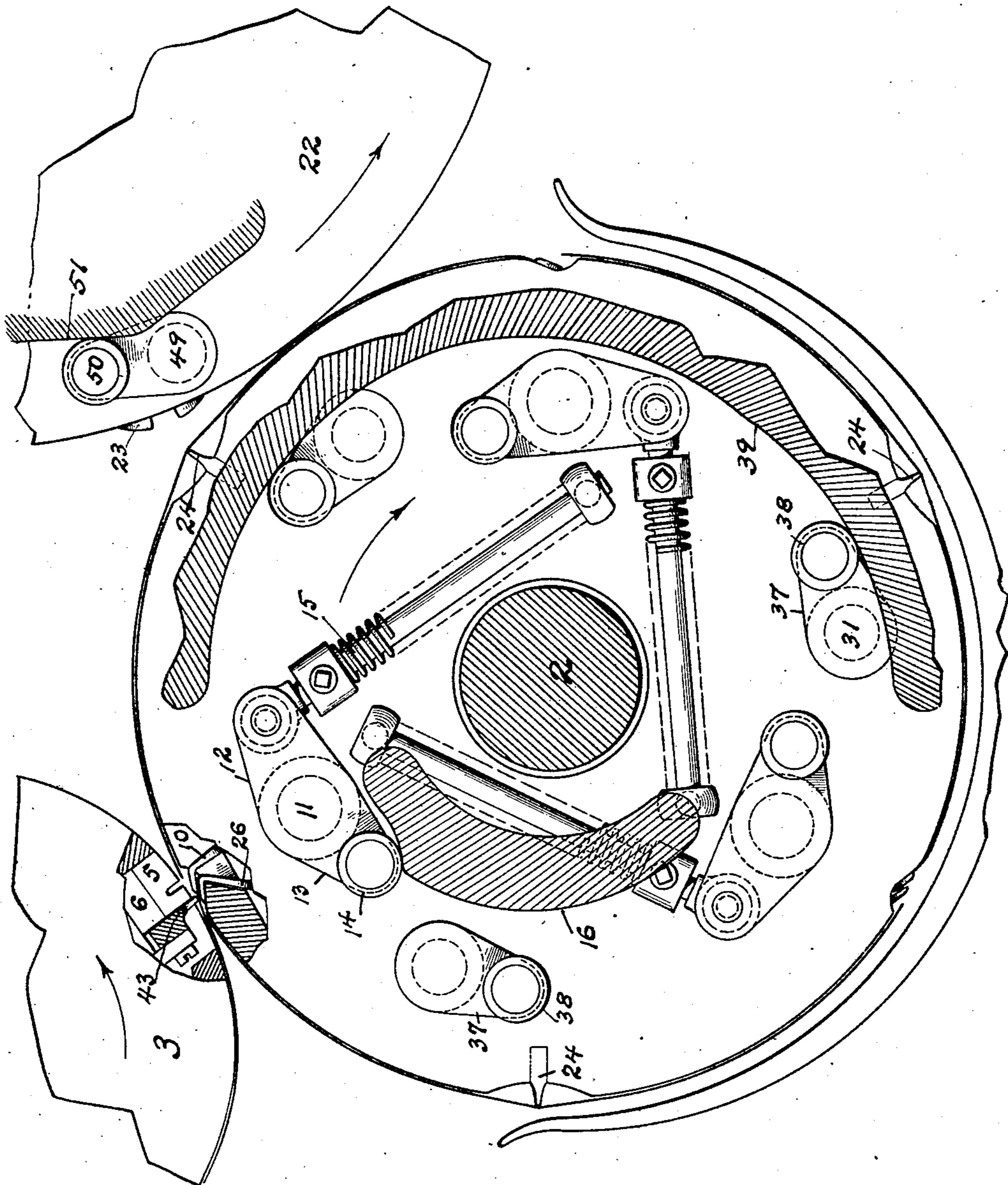
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5 SHEETS-SHEET 4.



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FIG. 4.

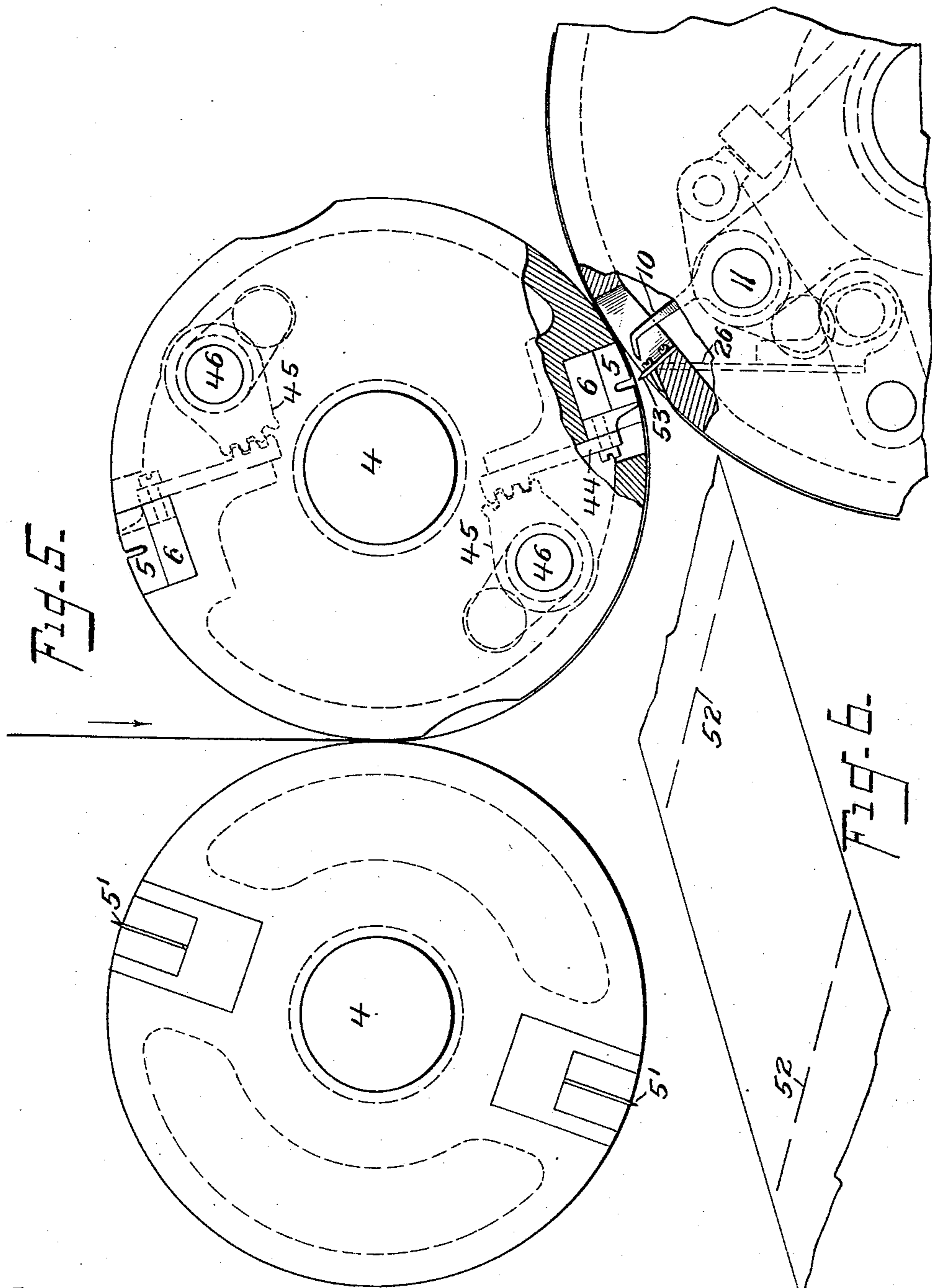
Inventor:  
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5 SHEETS—SHEET 5.



Attest:  
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# UNITED STATES PATENT OFFICE.

GEORGE F. READ, OF NEW YORK, N. Y., ASSIGNOR, BY MESNE ASSIGNMENTS, TO R. HOE AND CO., OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

## SHEET-CONTROLLING DEVICE.

998,986.

Specification of Letters Patent. Patented July 25, 1911.

Application filed May 11, 1906. Serial No. 316,260.

*To all whom it may concern:*

Be it known that I, GEORGE F. READ, 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 Sheet-Controlling Devices, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

10 This invention relates to certain improvements in sheet controlling devices for use in printing machines, or machines in which it is desired to maintain the register of a plurality of superposed sheets.

15 In printing machines and particularly in those machines in which a plurality of sheets is superposed on a carrier prior to delivery, such, for instance, as the ordinary collecting cylinder of a rotary printing machine, difficulty has been experienced in maintaining the superposed sheets in proper register. The sheet carriers are, as a rule, provided with some form of sheet taking devices, a usual form being grippers which release their hold upon the sheets already placed upon the carrier during the operation of taking an additional sheet. When a new sheet is placed upon those already laid upon the carrier, the hold of the sheet taking devices having been released, there is a liability that the sheets already on the carrier will shift their position, so that a fresh sheet does not come in proper position with respect to them. Various devices have been devised to overcome this liability of the sheets to shift, the device usually resorted to being a set of tapes which coöperate with the sheet carrier or collecting cylinder. Tapes are objectionable, however, for the reason that they are liable to smut the freshly printed sheets and for the further reason that it is difficult to so position the tapes as to cause them to operate on the leading ends of the sheets on the carrier at the time when the sheet holding grippers are opened, so that they do not effectively hold the superposed sheets.

50 The present invention has for its object to provide improved sheet controlling devices which operate in connection with a sheet carrier provided with sheet taking de-

vices, the construction being such that sheets already placed upon the carrier and superposed thereon will be effectively prevented from shifting at the time additional sheets are being taken.

Referring to the drawings Figure 1 is a plan view of the collecting cylinder of a printing machine illustrating the application of mechanism embodying the invention thereto. Fig. 2 is a sectional elevation, on a large scale, showing the collecting cylinder illustrated in Fig. 1, and also representing diagrammatically the position of the sheet forwarding cylinder and the cylinder to which the sheets are delivered from the collecting cylinder. Fig. 3 is a view similar to Fig. 2, but showing the parts in a different position. Fig. 4 is a view showing the end of the cylinders illustrated in Figs. 2 and 3, certain parts appearing in section. Fig. 5 is an end view with some parts broken out, illustrating certain modified features of the construction. Fig. 6 is a plan view of a portion of a web such as will be forwarded by the mechanism shown in Fig. 5.

The mechanism shown for the purpose of illustrating a concrete embodiment of the invention is the collecting delivery of a web printing machine, the collecting cylinder being of the three-part type. It will be understood, however, that the invention is not to be restricted to collecting cylinders of a three-part type, or, indeed, to use with collecting cylinders, as it might be employed in connection with other sheet carriers on which a plurality of sheets are laid in succession.

The sheet carrier or collecting cylinder, indicated at 1, is mounted, as is usual, on a shaft 2 which will be supported in suitable bearings in the printing frame.

Suitable means will be employed for forwarding or directing the sheets to the carrier. While these means may be varied in character, in the construction illustrated, the ordinary cutting cylinders 3 are employed for this purpose, the shafts of these cylinders being indicated at 4, (see Fig. 5). It will be understood, of course, that when this form of directing mechanism is employed, the cutting cylinders will carry a

knife or knives and the usual cutting wood or woods, as is usual, the cutting woods on the cylinder 3 being indicated at 5, each cutting wood resting, as is usual, on a metallic base 6. The knives illustrated are marked 5'.

Suitable means will be employed in connection with the directing mechanism, whatever be its type, to enable the sheets to be positively held and forwarded. In the construction illustrated in Figs. 1 to 4, the forwarding or directing cylinder is provided with castings as 7 which are chambered out as indicated at 8 to form air chambers which will be in communication with any suitable suction producing means, not shown. The metallic bases of the cutting woods close the chambers 8, suction perforations indicated in dotted lines at 9 in Figs. 2 and 3 being formed through the base and wood. These perforations are so located as to cause the leading ends of the sheets to be held on the cylinder by the suction. Suitable controlling means, not shown, are employed for cutting off the suction from the sheet at the proper time so as to enable it to be delivered to the collecting cylinder or other carrier.

The sheet taking devices employed in connection with the sheet carrier may be widely varied in construction. In the best constructions and as illustrated, the sheet taking devices will consist of grippers. In the construction shown, inasmuch as the cylinder is a three-part cylinder, three sets of sheet taking grippers 10 are employed, these grippers being mounted on shafts 11 journaled in the cylinder heads. Each of the shafts is provided with an operating means consisting of a double crank 12, 13, one arm 13 of the crank carrying a roll 14 which contacts with the cams which may be employed for operating the gripper shaft. The other arm of the crank has connected to it a spring rod construction 15 of the usual type which serves to rock the shaft 11 to close the grippers at proper times after they have been positively opened.

When the type of sheet taking grippers so far described is employed, suitable cams will be also employed for operating the gripper shaft. In the construction shown, the cam for opening and closing the grippers is illustrated at 16 (see Figs. 1 and 4), this cam being a stationary cam on the frame of the machine and being so positioned and of such a conformation as to open and close the grippers at the sheet taking point.

When the sheet taking devices consist of grippers, they should, of course, be opened at the time the sheets are to be delivered from the sheet carrier and with the type of grippers illustrated, this opening for the purpose of delivery will also be effected by a cam. Inasmuch, however, as the collecting cylinder illustrated is of the three-part

type, collecting four sheets before delivery, the cam employed must necessarily be of such a character as to allow the grippers to pass without opening for the purpose of delivery for three revolutions. An effective opening means which may be resorted to under such conditions is a swinging cam, such a cam being indicated at 17 (see dotted lines in Figs. 2 and 3). This swinging cam may be operated in any desired way, a usual construction being that indicated in dotted lines in Figs. 2 and 3, in which the shaft 18, on which the cam is mounted, is provided with an operating arm 19, this arm being moved by a connecting rod 20 working in connection with a cam 21 on the cylinder 22 to which the sheets are delivered. It may be remarked that this cylinder 22 is, in the particular construction illustrated, provided with a pair of intergeared nipping jaws 23, the collected sheets being tucked into these jaws by stationary tucking blades 24 mounted on the sheet carrier, there being, of course, three of these blades, one for each sheet receiving surface.

The swinging cam referred to may, if desired, be located on the end of the cylinder opposite to that on which the cam for opening and closing the grippers, in order to enable them to take the sheets, is located. When, as in the construction illustrated, this form of mechanism is adopted, the shafts 11 will be provided with additional cranks 25 on which the swinging cam may operate. This form of swinging cam construction for operating the grippers of multiple-part collecting cylinders is well-known in the art.

The sheet holding devices which operate to retain the sheets in position may be widely varied in construction and location. In the present construction, however, these devices will be arranged to operate on the leading ends of the sheets and also on the leading edges of these ends. In the construction illustrated, these sheet holding devices consist of sets of grippers 26. When the sheet holding devices referred to consist of grippers, the grippers may be mounted and operated in a variety of ways. As shown, the grippers are mounted on carrier blocks 27, these blocks being formed to provide hubs 28 which surround rock shafts 29. Each rock shaft 29 is carried in crank arms 30, these arms being mounted on a shaft 31 journaled in the cylinder heads. One end of each of the shafts 29 projects through the end of the cylinder, slots 32 (indicated in dotted lines in Fig. 2 and in full lines in Fig. 1) being provided in the cylinder head to accommodate the ends of the shafts. Each of the shafts 29 is, in the construction shown, provided with a segmental gear 33, these gears meshing with segments 34 loosely mounted on the ends

of the shafts 31. The hubs of these segment gears 34 are provided with operating arms 35, these arms carrying bowls 36 which contact with a suitable operating cam 40.

5 It will be understood, of course, that inasmuch as the holding grippers, when grippers are employed, operate to hold the sheets already laid on the cylinder during the time when an additional sheet is being laid there-  
10 on, this additional sheet will overlie the grippers. These holding grippers must, therefore, in constructions like that being described, be given a movement to withdraw them from beneath the overlying sheet and  
15 then a movement which will bring them back into operating position. The construction which has just been described is well adapted for effecting the movement of the holding grippers referred to. By op-  
20 erating each segment 34, it being remembered that the segments 34 are loose on the shafts 31 and that the segments 33 are fast on the shafts 29, it will be understood that the shafts 29 will be rocked about their  
25 axial centers, thus causing the holding grippers to be moved away from and out from underneath the sheet which has been laid over them. By then giving the shaft 31 proper movements, the crank arms 30 will  
30 impart a bodily movement to the shaft 29 and the grippers so as to cause them to again come into operative position to hold the sheet. In the particular construction illustrated, this bodily movement, which oc-  
35 curs after the grippers have been withdrawn from beneath the overlying sheet, is first slightly outward from the center of the cylinder and then inward and downward. The successive positions of the holding grip-  
40 pers are well illustrated in Figs. 2 and 3.

The shaft 31 is provided with a crank arm 37 carrying a bowl 38, this bowl contacting with a suitably located cam 39 which is stationary on the frame. The bowl 36  
45 on the arm 35 contacts with a cam 40 also stationary on the frame. In the operation of the mechanism, the cam 40 first acts on the bowl 36 to rock the segments, thus bringing the holding grippers into the position  
50 illustrated on the right hand side of Fig. 2, after which the cam 39 operates to give the grippers a slight outward movement. The cams 39 and 40 are located on opposite ends of the cylinders, as appears in Fig. 1.  
55 After the cam 39 has, through the mechanism described, moved the grippers into the position shown at the bottom of Fig. 2, the bowls 36 and 38 run off the cams and the grippers are allowed to close, the closing  
60 of the grippers being effected in any suitable manner, as, for instance, by torsional springs 41, 42 which are mounted on the shafts 29 and 31.

While the mechanism which has just been

described is a simple and effective mecha- 65  
nism for giving the holding grippers the movements referred to, any other suitable mechanism may be substituted therefor.

In the best constructions and as shown, means will be provided for positively posi- 70  
tioning the leading ends of the sheets, so that they may be acted upon by the taking grippers. While this may be effected in various ways, in the construction illustrated, there are provided tucking blades 43 which 75  
are mounted on slides 44 moving in suitable ways on the castings 7 referred to. The slides are operated by segments 45 mounted on rock shafts 46 supported in one of the cylinders 3. Each rock shaft is pro- 80  
vided with an operating arm and bowl 47, the bowl running on a cam 48 on the frame, this cam being indicated in Fig. 2. Notwithstanding the fact that the leading edge of the sheet when it is delivered to the sheet 85  
carrier overlies the holding grippers, it will by this positive positioning device be forced down so that it will be surely caught by the taking grippers or other sheet taking devices which may be employed. 90

The intergeared nipping jaws 23 may be operated by a rock-shaft 49 on which one of the jaws is mounted, this shaft being rocked by a cam roll and arm 50 operating in connection with a stationary cam 51 suitably 95  
mounted on the machine frame.

Instead of using a forwarding mechanism such as hereinbefore described in which sheets are cut and then retained on one of the cutting cylinders by retaining means 100  
such as suction devices, the sheets may be severed just prior to the time when they are taken by the sheet taking devices before described. While this may be effected in various ways, Fig. 5 illustrates an effective 105  
construction for accomplishing this result. In Fig. 5, the cylinders 3—3 are employed as before, but the knives 5' instead of operating to sever the webs completely will sever them along broken lines, as indicated at 52 in Fig. 110  
6, small holding bonds being left between the broken cuts. The suction mechanism before described is omitted, and the cylinder 1 is provided with three knives, one of which is illustrated at 53 in Fig. 5. These knives 53 115  
will be located in the openings in which the grippers 10 and 26 work, and will be so arranged as to cooperate with the grooves in the cutting woods 5. These knives 53, as the web is forwarded, complete the cuts along 120  
the broken lines 52 so as to sever the webs into sheets, the leading edges of the sheets being positioned by the tucking blades 43 before referred to, so as to be taken by the grippers in the manner hereinbefore de- 125  
scribed. These knives 53 will, in the best constructions, be provided with gaps through which the grippers 10 and 26 may

work. This form of construction is in some respects simpler than that employing suction mechanism, and further, is particularly adapted for use when it is desired to run a plurality of associated webs between the cutting cylinders.

Changes and variations may be made in the constructions by which the invention is carried into effect. The invention is not, therefore, to be limited to the specific constructions herein shown and described.

What is claimed is:—

1. The combination with a collecting cylinder having a rigid sheet supporting surface and cooperating sheet taking devices, of means for causing said devices to successively take each one of a plurality of sheets presented to said surface, sheet holding means, and mechanism for operating the sheet holding means to cause them to clamp the previous sheets taken by the sheet taking devices while said devices are being withdrawn from beneath the sheet last taken, and to clamp the sheets already collected while the sheet taking devices are taking the next sheet.

2. The combination with a collecting cylinder having a rigid sheet retaining surface, of a set of sheet taking grippers, a set of sheet holding grippers, means for operating the sheet taking grippers, and means for operating the sheet holding grippers to cause them to withdraw from beneath the sheet laid over them and to clamp the sheet last taken by the taking grippers.

3. The combination with a sheet carrier having a sheet supporting surface, of sheet taking devices cooperating therewith, means for positively positioning the leading end of the sheet so as to present it within the range of action of said devices, means for operating said sheet taking devices to cause them to take each one of a plurality of sheets presented to the sheet supporting surface before delivery, sheet holding means, and mechanism for causing said means to operate on the sheets taken by the taking devices during the time said devices are taking sheets.

4. The combination with a collecting cylinder having a sheet supporting surface, of means for delivering sheets thereto, sheet taking grippers on the cylinder cooperating with said surface, means for positively positioning the leading end of the sheets so that they will be taken by the sheet taking grippers, means for operating the taking grippers to cause them to take each sheet presented to the surface, sheet holding grippers, and means for operating them to cause them to retain in position the sheets taken by the taking grippers while said taking grippers are operating.

5. The combination with a collecting cyl-

inder, of a forwarding cylinder by which the sheets are directed to the collecting cylinder, a tucking blade carried by the forwarding cylinder, said blade being positioned so as to operate on the leading end of the sheet, sheet taking grippers, sheet holding grippers, and means for operating the holding grippers to retain in position the sheets taken by the taking grippers while said grippers are operating.

6. The combination with a collecting cylinder, of a sheet forwarding cylinder, sheet holding means mounted on the forwarding cylinder, sheet positioning means mounted on the forwarding cylinder, said holding and positioning means being arranged to operate on the leading ends of the sheets, a sheet receiving surface on the collecting cylinder, a set of sheet taking grippers cooperating therewith, a set of sheet holding grippers on the collecting cylinder also cooperating with the sheet receiving surface, means for operating the taking grippers to cause them to take each sheet presented to the surface, and means for operating the holding grippers to retain in position the sheets taken by the taking grippers while said grippers are operating.

7. The combination with a collecting cylinder, of sheet taking devices, means for operating said devices to take a plurality of sheets in succession, sheet holding grippers, a shaft on which the grippers are mounted, means for giving the grippers a movement about the axis of the shaft, and means for giving the shaft and grippers a bodily movement.

8. The combination with a sheet carrier having sheet taking devices, of means for operating the devices to cause them to take a plurality of sheets before delivery, means mounted on the carrier for holding the sheets in position while the sheet taking devices are being operated to take additional sheets, and means for severing a sheet just prior to the time the leading end of the next sheet is taken by the sheet taking devices.

9. The combination with a sheet carrier having sheet taking devices, of means for operating said devices to cause them to take a plurality of sheets before delivery, means mounted on the carrier for holding the sheets in position while the sheet taking devices are being operated to take additional sheets, means for severing a sheet just prior to the time the leading end of the next sheet is taken by the sheet taking devices, and means for positioning the ends of the sheets.

10. The combination with a collecting cylinder, of two sets of devices for retaining sheets on the cylinder, means for operating said sets of devices alternately to cause them to operate on the same sheets, and means for

severing a sheet from a web just prior to the time the leading end of the next sheet is taken by said devices.

11. The combination with a collecting cylinder, of two sets of devices for retaining sheets on the cylinder, means for operating said sets of devices alternately to cause them to operate on the same sheets, means for severing a sheet from a web just prior to the time the leading end of the next sheet is taken by said devices, and means for positioning the ends of the sheets so as to enable them to be taken.

12. The combination with a collecting cylinder, of a set of sheet holding grippers, a set of sheet taking grippers, means whereby said grippers may be alternately actuated to cause them to operate on the same sheets, and means for severing a sheet from a web just prior to the time the leading end of the next sheet is taken by the sheet taking grippers.

13. The combination with a collecting cylinder, of a set of sheet holding grippers, a set of sheet taking grippers, means whereby said grippers may be alternately actuated to cause them to operate on the same sheets, means for severing a sheet from a web just prior to the time the leading end of the next sheet is taken by the sheet taking grippers, and means for positioning the ends of the sheets to enable them to be taken.

14. The combination with a collecting cylinder, of a set of sheet holding grippers, a set of sheet taking grippers, means whereby said grippers may be alternately actuated to

cause them to operate on the same sheets, and a severing knife on the collecting cylinder operating to cut a sheet just prior to the time the leading end of the next sheet is taken by the taking grippers.

15. The combination with a collecting cylinder, of a set of sheet holding grippers, a set of sheet taking grippers, means whereby said grippers may be alternately actuated to cause them to operate on the same sheets, a severing knife on the collecting cylinder operating to cut a sheet just prior to the time the leading end of the next sheet is taken by the taking grippers, and means for positioning the ends of the sheets to enable them to be taken.

16. The combination with a collecting cylinder, of a set of sheet holding grippers, a set of sheet taking grippers, means whereby said grippers may be alternately actuated to cause them to operate on the same sheets, a pair of cutting cylinders between which a web or webs may be forwarded, knives on said cylinders for partially severing the webs, and a knife on the collecting cylinder for completing the severance of the web to form a sheet just prior to the time the leading end of the next sheet is taken by the sheet taking grippers.

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

GEORGE F. READ.

Witnesses:

A. WHITE,  
PHILIP N. TILDEN.