

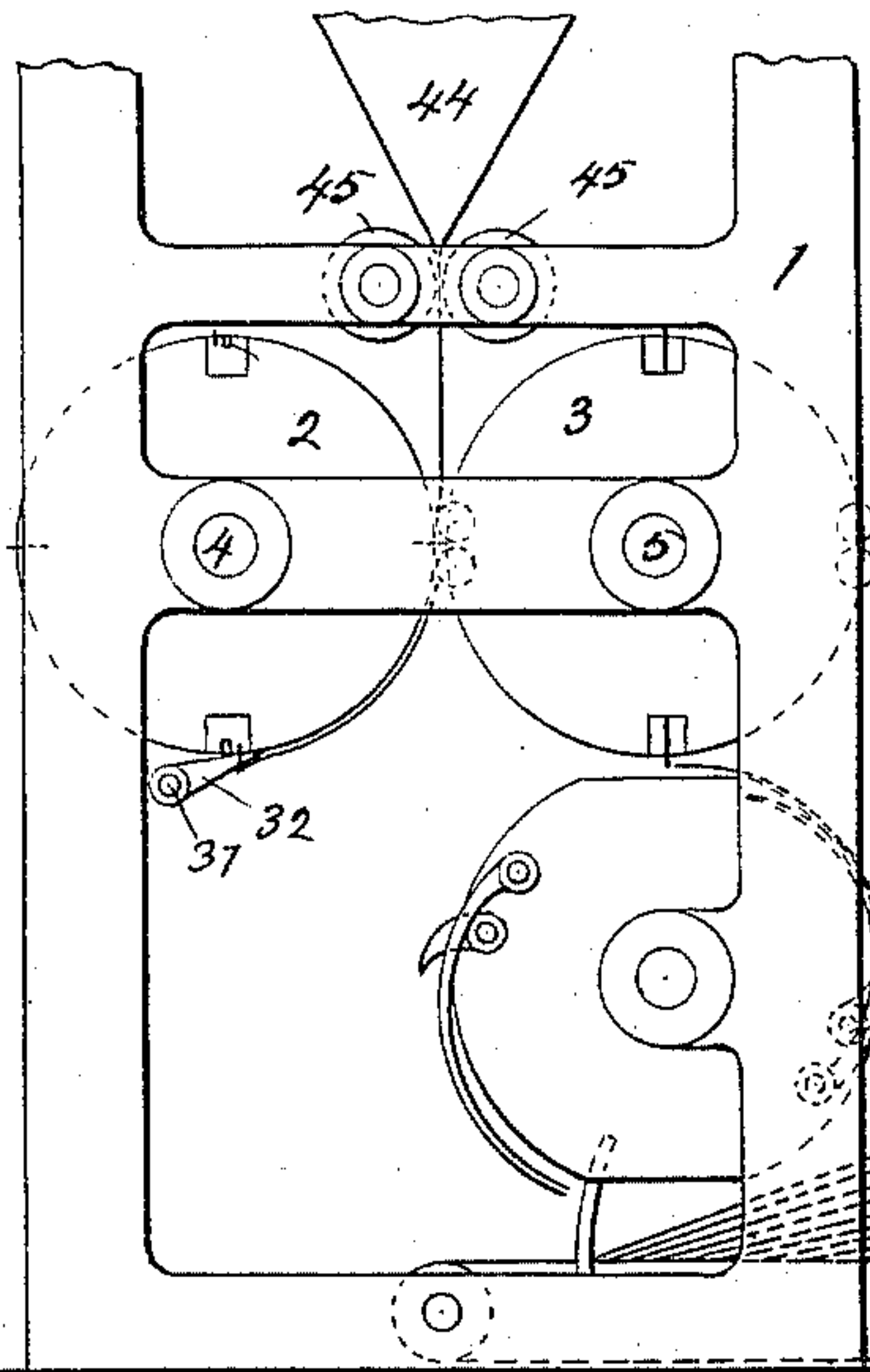
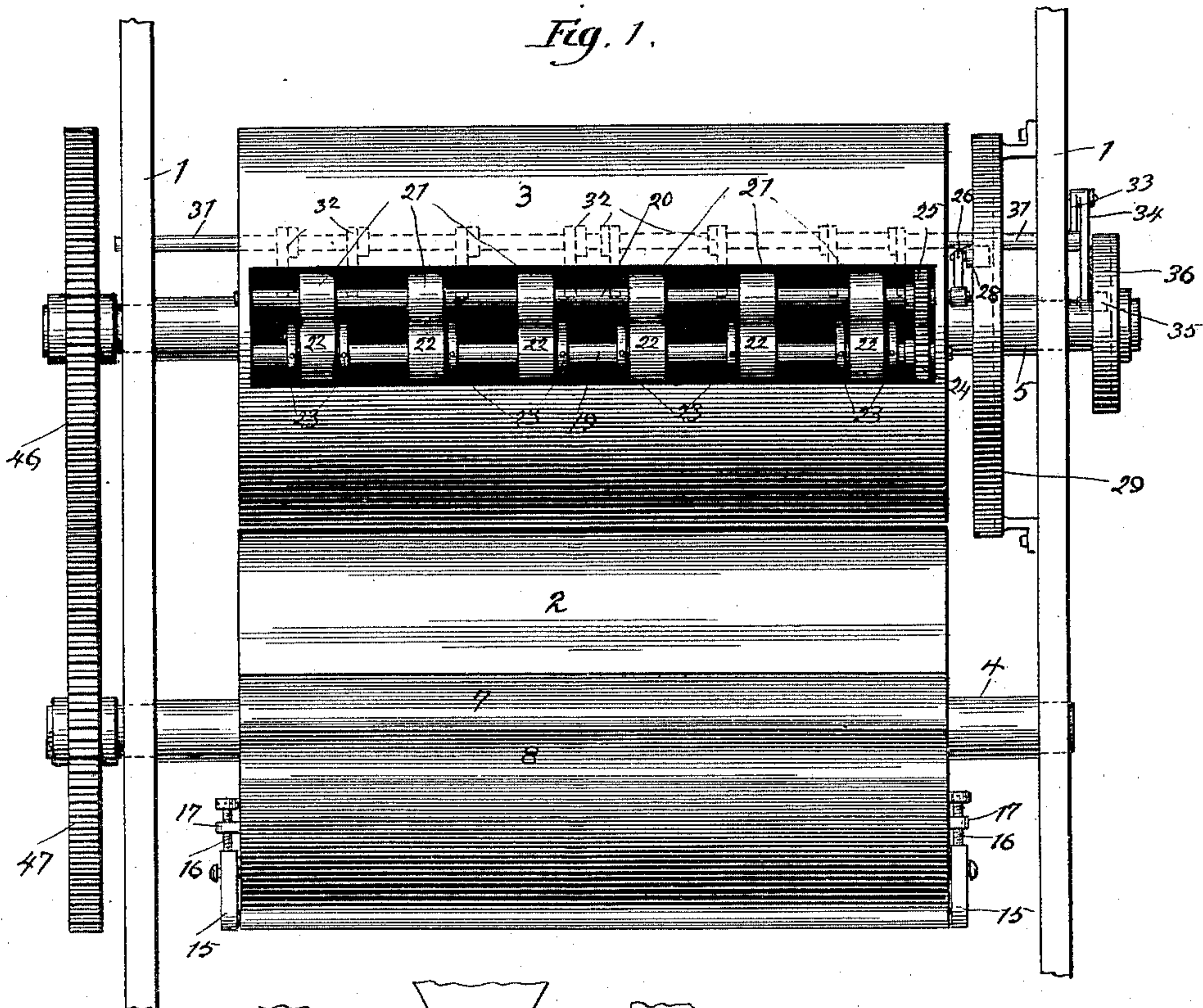
(No Model.)

3 Sheets—Sheet 1.

S. G. GOSS.
APPARATUS FOR FOLDING SHEETS.

No. 495,482.

Patented Apr. 18, 1893.



Witnesses:
Helle McKibben
Julia M. Bristol

Inventor
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Attorneys

(No Model.)

3 Sheets—Sheet 2.

S. G. GOSS.
APPARATUS FOR FOLDING SHEETS.

No. 495,482.

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Fig. 3.

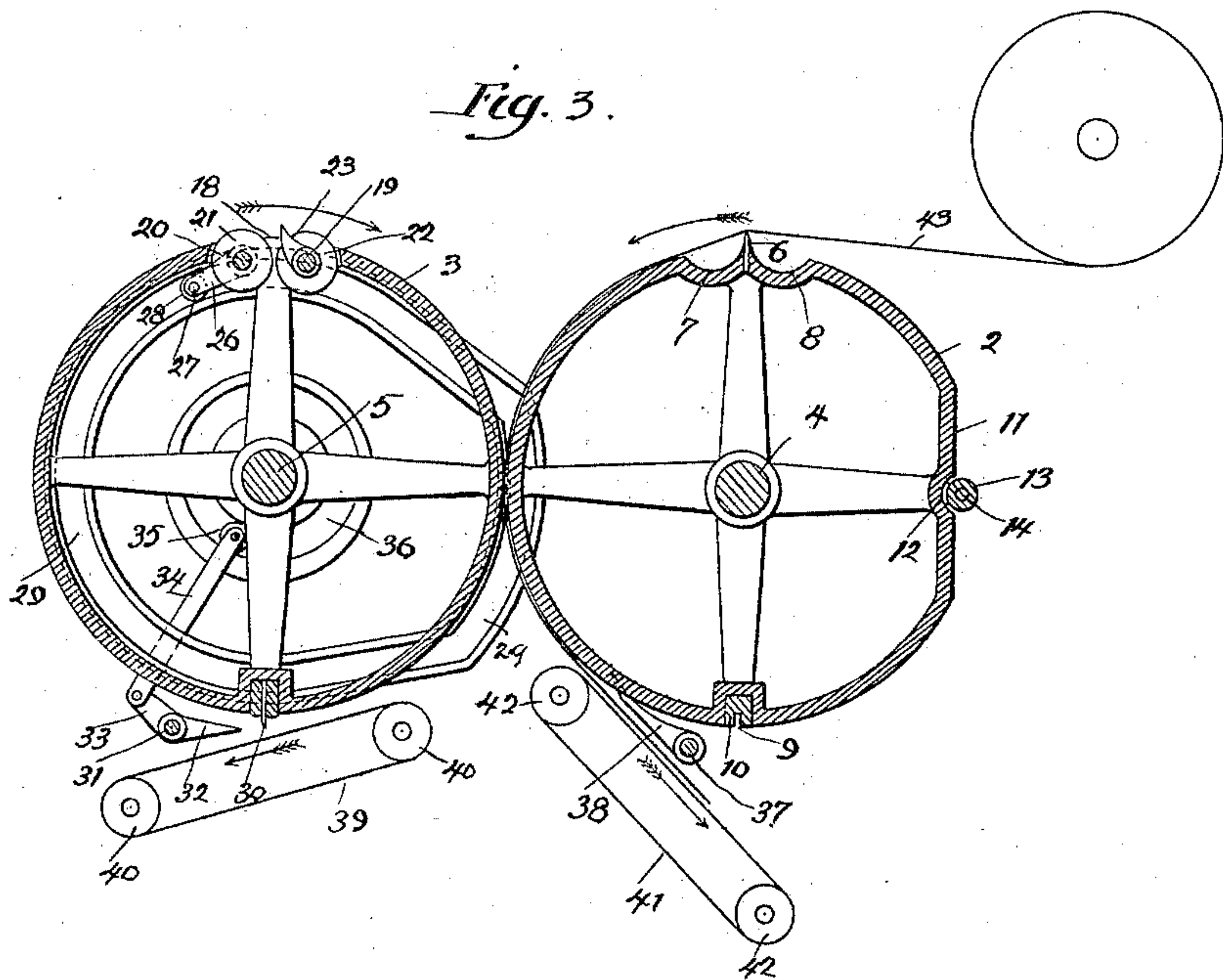
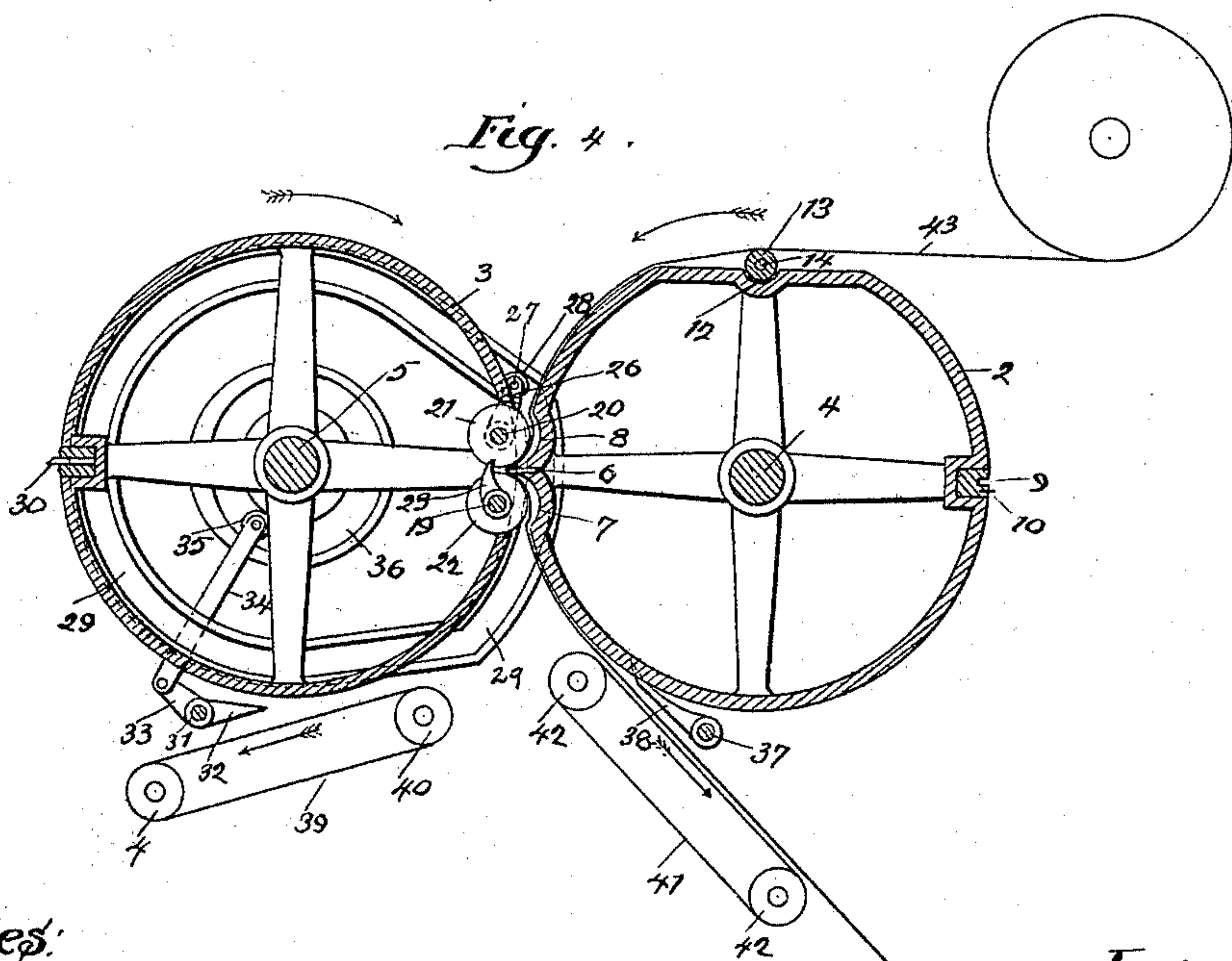


Fig. 4.



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(No Model.)

3 Sheets—Sheet 3.

S. G. GOSS.
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Fig. 5.

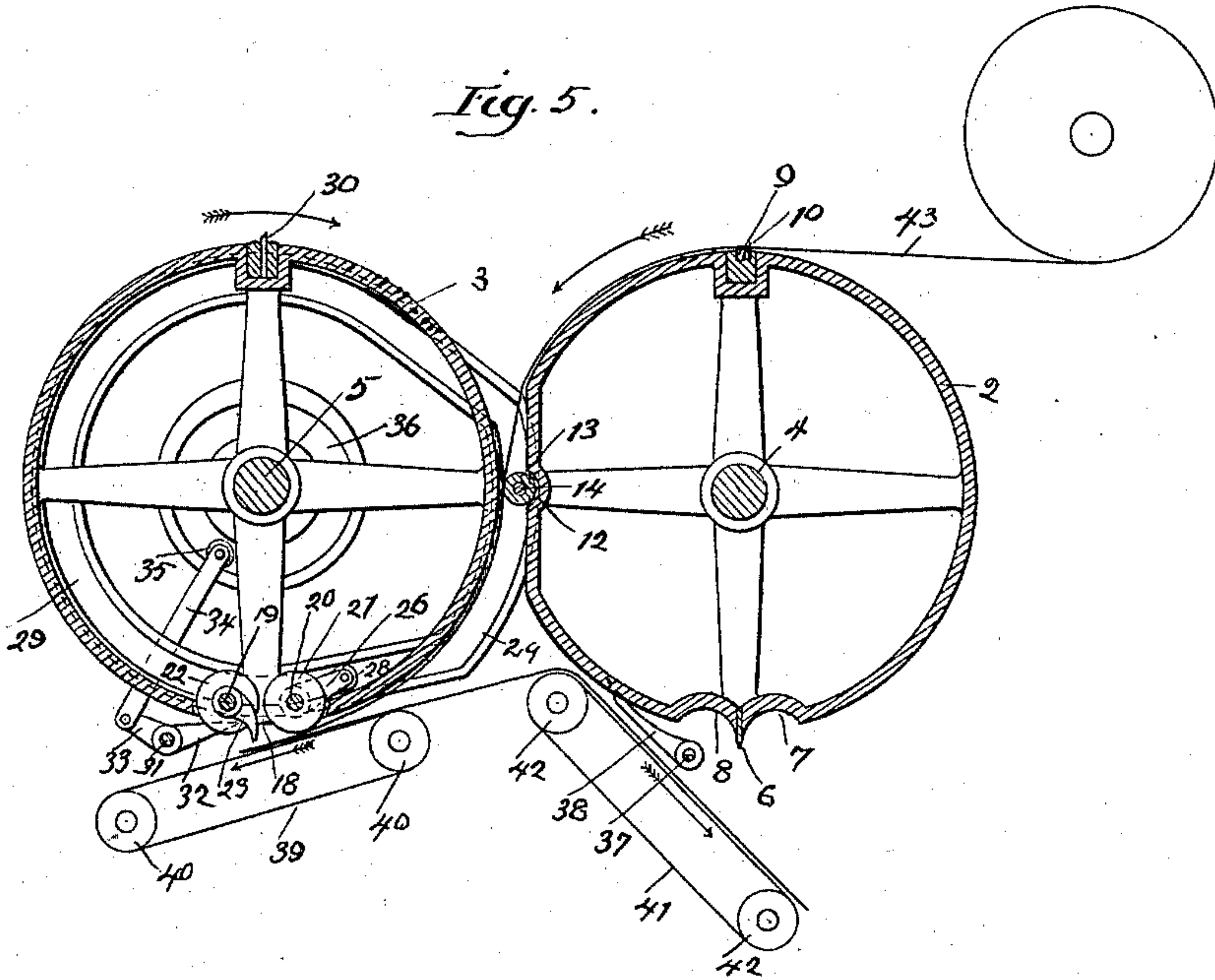
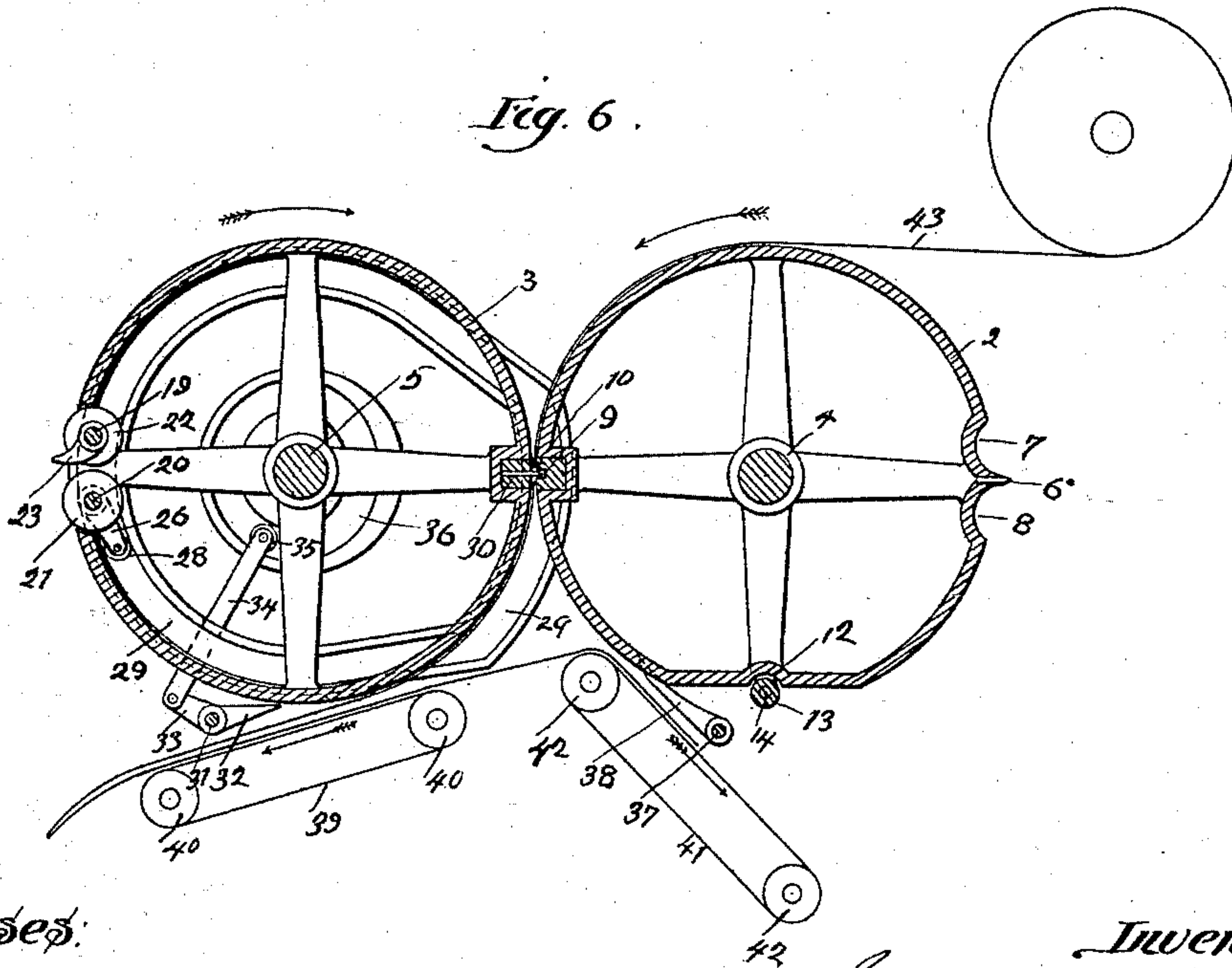


Fig. 6.



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UNITED STATES PATENT OFFICE.

SAMUEL G. GOSS, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE GOSS PRINTING PRESS COMPANY, OF SAME PLACE.

APPARATUS FOR FOLDING SHEETS.

SPECIFICATION forming part of Letters Patent No. 495,482, dated April 18, 1893.

Application filed May 12, 1892. Serial No. 432,807. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL G. GOSS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Apparatus for Folding Sheets, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 is a top or plan view of the folding cylinders. Fig. 2 is a side elevation of the folding cylinders, showing the delivery apparatus. Figs. 3, 4, 5 and 6 are vertical cross sections of the folding cylinders, showing them in their different positions and also showing the position of the web.

My invention relates to printing presses, and particularly to mechanism for delivering sheets with a single transverse fold.

The object of my invention is to provide a new and improved apparatus for delivering sheets with a single transverse fold, from a continuous web, which object I accomplish as illustrated in the drawings and as herein-after specified.

That which I regard as new will be pointed out in the claims.

In the drawings,—1 indicates a portion of the frame of a printing press, in which frame are supported the different portions of the folding mechanism.

2, 3 indicate the folding cylinders which are mounted upon shafts 4 and 5 respectively, as best shown in Figs. 1 and 2. The shafts 4 and 5 are in the same horizontal plane, and are parallel with each other, the cylinders 2 and 3 being of the same diameter. The cylinder 2 is provided at a suitable point on its periphery with a folding blade 6, which extends transversely of the cylinder and projects a short distance beyond its periphery, as shown in Fig. 3. At each side of the blade 6 the cylinder 2 is concaved as shown at 7 and 8 in Fig. 3, the object of which construction will be hereinafter more fully set forth. Diametrically opposite the folding blade 6 is a slot 9 which is formed in the periphery of the cylinder 2, and extends transversely thereof.

10 indicates a number of pins which project from the surface of the cylinder 2 at one side of the slot 9, as best shown in Fig. 3.

The pins 10 serve to impale the web and hold it as it is carried around the cylinder 2. Ninety degrees from the folding blade 8 the surface of the cylinder 2 is flattened transversely, as best shown at 11 in Fig. 3, and at the center of such flattened portion is provided a recess 12, as also shown in Fig. 3.

13 indicates a small roller which is mounted upon a shaft 14 mounted in bearings 15 at each side of the cylinder 2. The bearings 15 are carried by screws 16, working in threaded bearings 17 suitably secured to the ends of the cylinder 2, as best shown in Fig. 1. The bearings 15 are held in such position that the roller 13 will be held over the recess 12 in the cylinder 2, as shown in Fig. 3. By turning the screws 16 the roller 13 may be moved away from or toward the center of the cylinder 2, the object of which arrangement will be more fully hereinafter set forth. The cylinder 3 is provided with a slot 18, which is so placed as to register with the concave portions 7 and 8 of the cylinder 2, as shown in Figs. 1 and 4.

19, 20, indicate shafts which extend transversely of the cylinder 3, and are mounted in suitable bearings opposite the slot 18 and slightly below the surface of the cylinder, as shown in Fig. 3.

21, 22 indicate rollers which are mounted upon the shafts 20 and 19 respectively; the rollers 21 and 22 are of such size that they will be adapted to grip and hold a sheet of paper between them.

23 indicates fingers which are rigidly mounted upon the shaft 19, as shown in Fig. 3. The shafts 19 and 20 are geared together by means of gear wheels 24 and 25 mounted upon the shafts, as shown in Fig. 1, which gear wheels mesh with each other. By this construction, by rotating one of the shafts the other will be rotated an equal amount in an opposite direction.

26 indicates a crank arm which is mounted upon one end of the shaft 20 at the end of the cylinder, as shown in Fig. 1, which arm is provided with a pin 27 on which is mounted a roller 28, as shown in Figs. 1 and 3. The roller 28 is adapted to move in a cam guide 29 which is mounted in the frame 1 of the machine, as best shown in Fig. 1. Diametrically opposite

the rollers 21 and 22 is a cutting blade 30 which is mounted transversely in the cylinder 3, as shown in Fig. 3, and is adapted to register with the recess or slot 9 in the cylinder 2.

31 indicates a shaft which is mounted in the frame of the machine at a point slightly below the cylinder 3, as best shown in Fig. 3. Mounted upon the shaft 31 are a number of fingers 32, the points of which are adapted to be moved toward the cylinder to be interposed between the sheet carried by the cylinder to strip the sheet from the cylinder.

33 indicates an arm which projects rearward from the shaft 31 and is connected to a rod 34, which carries a roller 35. The roller 35 is adapted to move in a cam guide 36 mounted upon the outer end of the shaft 5, as best shown in Fig. 1.

37 indicates a shaft which is mounted in suitable bearings in the frame of the press, at a point slightly below the cylinder 2, which shaft carries a number of fingers 38 adapted to prevent the sheets from adhering to the cylinder 2. As shown in Fig. 3, the fingers 38 are rigidly fixed, their points being held at a short distance below the surface of the cylinder 2 in grooves formed in the cylinder. The folding blade is provided with notches at proper points to prevent the ends of the fingers from engaging the folding blade.

39 indicates tapes which are mounted upon rollers 40 and move in the direction indicated by the arrow in Fig. 3.

41 indicates tapes mounted upon rollers 42, which tapes move in the direction indicated by the arrow in Fig. 3.

43 indicates a web of paper, which is delivered by suitable apparatus to the folding cylinders 2 and 3. In Fig. 2 I have shown the web as being delivered to the cylinders 2 and 3 from a former 44, and as passing between rollers 45, by means of which, in connection with the former, it is given a longitudinal fold and thence passes to the folding cylinders; but I do not wish to limit myself to any particular mechanism for delivering the web to the folding cylinders 2 and 3.

46 and 47 indicate gear wheels, which are mounted upon the outer ends of the shafts 4 and 5, which gear wheels are of the same diameter and intermesh with each other, by which construction the cylinders 2 and 3 are rotated at the same rate of speed.

The operation of my improved folding mechanism is as follows: The web 43, passing between the cylinders 2 and 3, is impaled by the pins 10, the cutting blade 30 resting in the recess 9 in the cylinder 2. The cylinders 2 and 3 rotate in the direction indicated by the arrows in Fig. 3, and when they have made a quarter of a revolution from the position last indicated, they will assume the position shown in Fig. 3, the web being carried by the cylinder 2 to the tapes 41, where its end will be stripped from the cylinders by the fingers 38, as shown in Fig. 3. At this time the rollers 21 and 22 and the fingers 23 will

also be in the position shown in Fig. 3. When the cylinders have made another quarter of a revolution they will assume the position shown in Fig. 4, and the web will be pressed by the folding blades 6 into the bite of the rollers 21 and 22, as shown in Fig. 4, the free end of the web moving upon the tapes 41 to the position shown. At this time the fingers 23 will be turned back, as shown in Fig. 4, the cam 29 being of such shape as to throw the arm 26 outward, thereby rotating the shafts 19 and 20 and moving the fingers 23 to the position shown. The flat surface 11 of the cylinder 2 will at this time be on the upper side of the cylinder, and the roller 13 will be in contact with the web 43. The flattened surface of the cylinder slackens the tension on the web, thereby permitting of its moving more easily into the bite of the rollers 21 and 22. By adjusting the bearings 15 of the roller 13 the tension of the web may be regulated as desired. After another quarter of a revolution of the cylinders 2 and 3 they will assume the position shown in Fig. 5, the rollers 21 and 22 being now on the under side of the cylinder 3, and the cam 29 will have moved the arm 26 to the position shown in Fig. 5, thereby turning the rollers 21 and 22 and the fingers 23 outward and throwing the folded edge of the web out from between the rollers 21 and 22 and permitting it to fall upon the tapes 39, as shown. At the same time the ends of the fingers 32 will be moved inward toward the periphery of the cylinder 3 by the outward motion of the rod 34, into such position that they will strip the sheet from the cylinder and cause it to be carried by the tapes 39 to suitable delivery apparatus.

In Fig. 2 I have shown one form of a delivery apparatus which is adapted for use with the folding mechanism above described, but, as it forms the subject matter of a separate application, Serial No. 432,809, filed of even date herewith, I will not describe it further herein. The pins 10 will now be at the upper side of the cylinder 2, and will impale the web at that point. After another quarter of a revolution the cylinder will be in the position shown in Fig. 6, the cutting blade 30 fitting into the recess 9, and severing the web transversely into sheets; the severed sheet, which will have received a single fold, will now be carried off by the tapes 39; and at the next quarter of a revolution the parts will again be in the position shown in Fig. 3, in readiness to repeat the operations above described.

That which I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination with a cylinder, a folding blade carried thereby and projecting therefrom, and concave recesses in said cylinder at each side of said blade, of a second cylinder coacting with the first cylinder to effect the folding of a sheet, gripping rollers carried by said second cylinder and adapted to fit into said concave recesses, devices for

operating said rollers to cause them to grip the fabric to be folded, and mechanism for rotating said cylinders, substantially as described.

5 2. The combination with a cylinder, and a fixed folding blade carried thereby and projecting therefrom, of a second cylinder, gripping rollers carried thereby and coacting with the folding blade to effect the folding of a
10 sheet, said rollers being so located that the folding blade will fit between them, mechanism for rotating said rollers toward each other, and mechanism for rotating said cylinders, substantially as described.

15 3. The combination with a pair of folding cylinders, and a folding blade carried by one of said cylinders and projecting therefrom, of a pair of gripping rollers carried by the other folding cylinder, said gripping rollers being
20 so placed as to register with the folding blade, mechanism for rotating said rollers toward each other to cause them to grip the fabric which is being folded, and mechanism for reversing the rotation of said rollers to release
25 the folded fabric, substantially as described.

4. The combination with folding cylinders, and a folding blade carried by one of said cylinders, of shafts 19 and 20 carried by the other of said cylinders, rollers 21 and 22
30 mounted upon said shafts, mechanism for rotating said rollers to cause them to grip the fabric which is being folded, mechanism for rotating said rollers in the opposite direction to cause them to release said fabric at the
35 proper time, and fingers 23 mounted upon one of said shafts, said fingers acting to throw the edge of the fabric out from between the rollers after it has been folded, substantially as described.

40 5. The combination with folding cylinders, and a folding blade carried by one of said cylinders, of shafts 19 and 20 carried by the other of said cylinders, rollers 21 and 22 mounted upon said shafts, gear wheels 24 and
45 25 mounted upon said shafts and intermeshing with each other, arm 26 connected to one of said shafts, a roller 28 carried by said arm, a cam guide 29 adapted to receive said roller 28, said cam being so shaped as to cause said
50 shafts to rotate as the folding cylinders are rotated, to cause said rollers 21 and 22 to grip and then release the fabric, and mechanism for rotating said folding cylinders, substantially as described.

55 6. The combination with folding cylinders 2 and 3, and a folding blade 6 carried by said cylinder 2, of shafts 19 and 20 carried by said cylinder 3, rollers 21 and 22 mounted upon said shafts, mechanism for rotating said rollers

to cause them to grip and release the fabric which is being folded, fingers 32 adapted to be interposed between the folded fabric and the cylinder 3 to strip said fabric from the roller, and mechanism for moving the
60 points of said fingers toward or away from the cylinder 3, substantially as described.

7. The combination with folding cylinders 2 and 3, and a folding blade 6 carried by said cylinder 2, of shafts 19 and 20 carried by said cylinder 3, rollers 21 and 22 mounted upon
70 said shafts, mechanism for rotating said rollers to cause them to grip and release the fabric which is being folded, a shaft 31, fingers 32 mounted thereupon, cam 36, arm 33 projecting from said shaft 31, bar 34 connected
75 at one end to said arm 33, a roller 35 carried by said bar 34 and adapted to move in said cam 36, and mechanism for rotating said cylinders and said cam 36, substantially as described.

8. The combination with a folding cylinder and devices carried thereby for gripping the folded fabric, of a second folding cylinder, a folding blade carried thereby adapted to press the fabric into the bite of the grippers carried
85 by said first cylinder, the surface of said second cylinder being depressed at about ninety degrees from the folding blade, substantially as and for the purpose specified.

9. The combination with a folding cylinder, and devices carried thereby for gripping the folded fabric, of a second folding cylinder, a folding blade carried thereby adapted to press the fabric into the bite of the grippers carried
90 by said first cylinder, the surface of said second cylinder being depressed at about ninety degrees from the folding blade, tightening devices carried by said cylinder and projecting therefrom at such depressed portion, and means for adjusting said tightening
95 devices to increase or diminish the tension of the fabric, substantially as described.

10. The combination with a folding cylinder 3, and gripping devices carried thereby, of a folding cylinder 2, a folding blade carried
105 thereby adapted to press the web into the bite of said grippers, said cylinder 2 having a depressed portion 11, shaft 14 carried by said cylinder 2, bearings 15 for said shaft, means for adjusting said bearings to move the shaft
110 14 radially from the center of the cylinder 2, and a roller 13 carried by said shaft, substantially as described.

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