

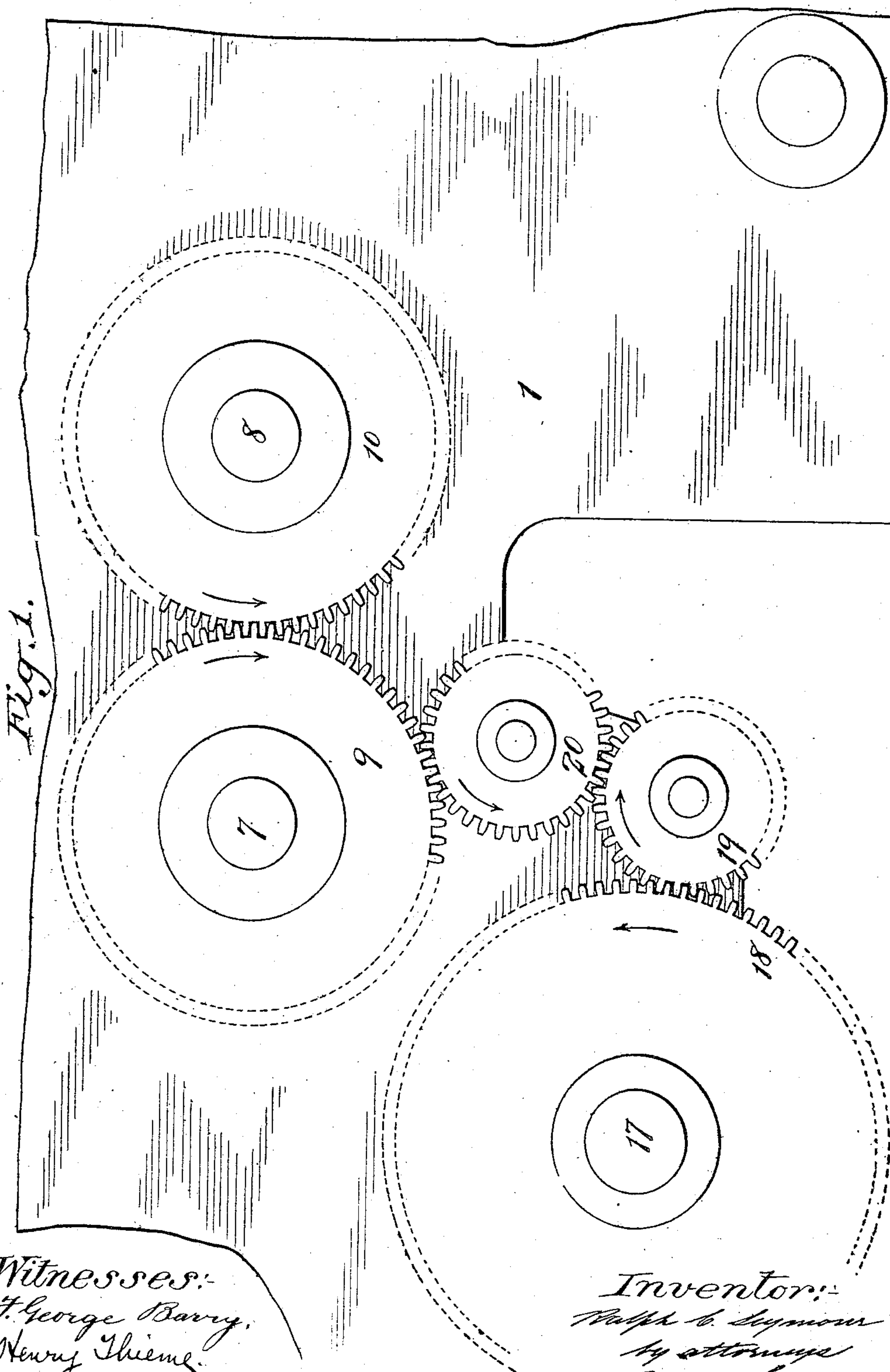
No. 879,418.

PATENTED FEB. 18, 1908.

R. C. SEYMOUR.
CUTTING AND FOLDING MACHINE.

APPLICATION FILED DEC. 15, 1906.

7 SHEETS—SHEET 1.



Witnesses:
J. George Barry,
Henry Thieme.

Inventor:
Ralph C. Seymour
By attorney
Thomson & Ward

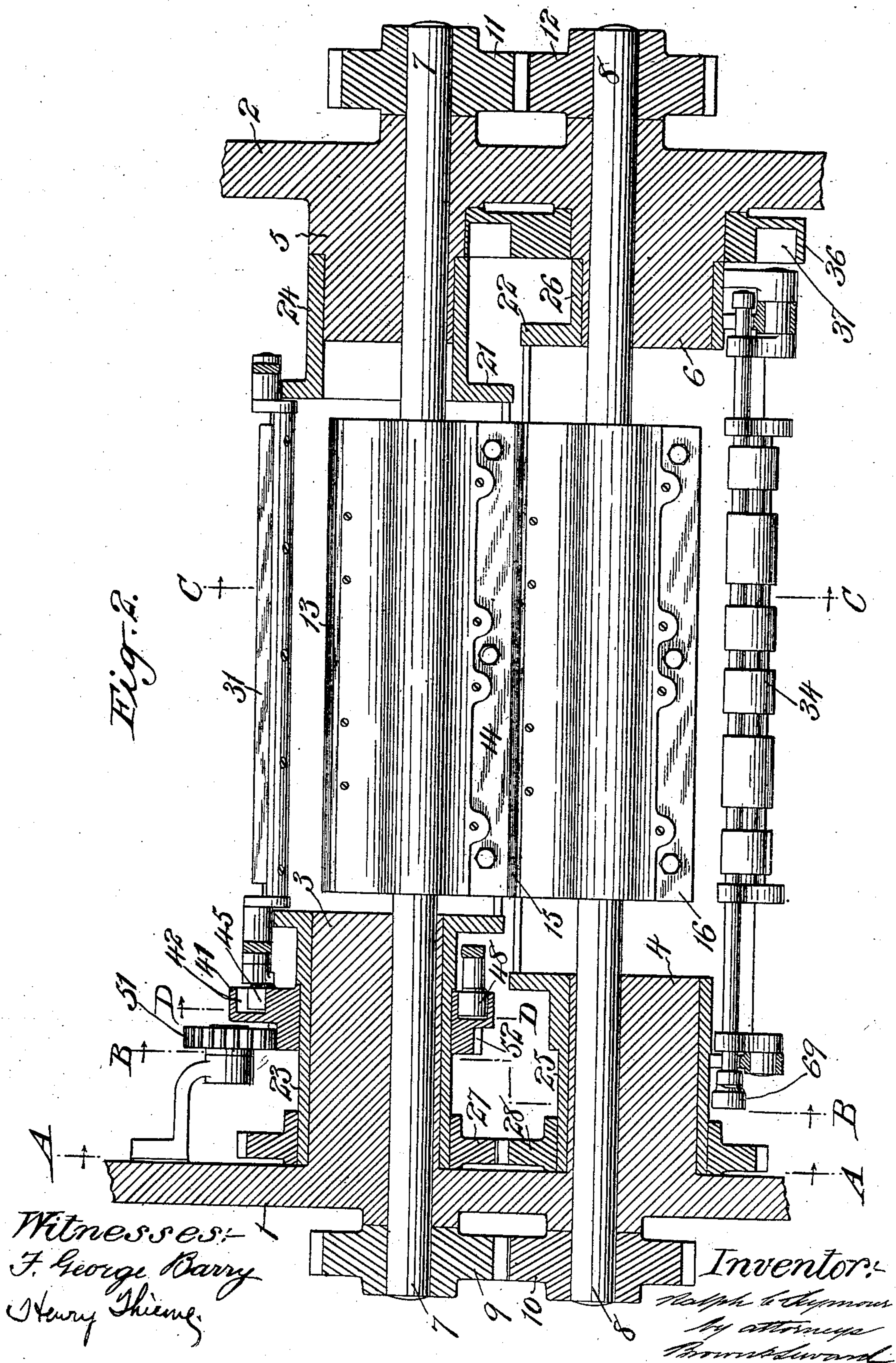
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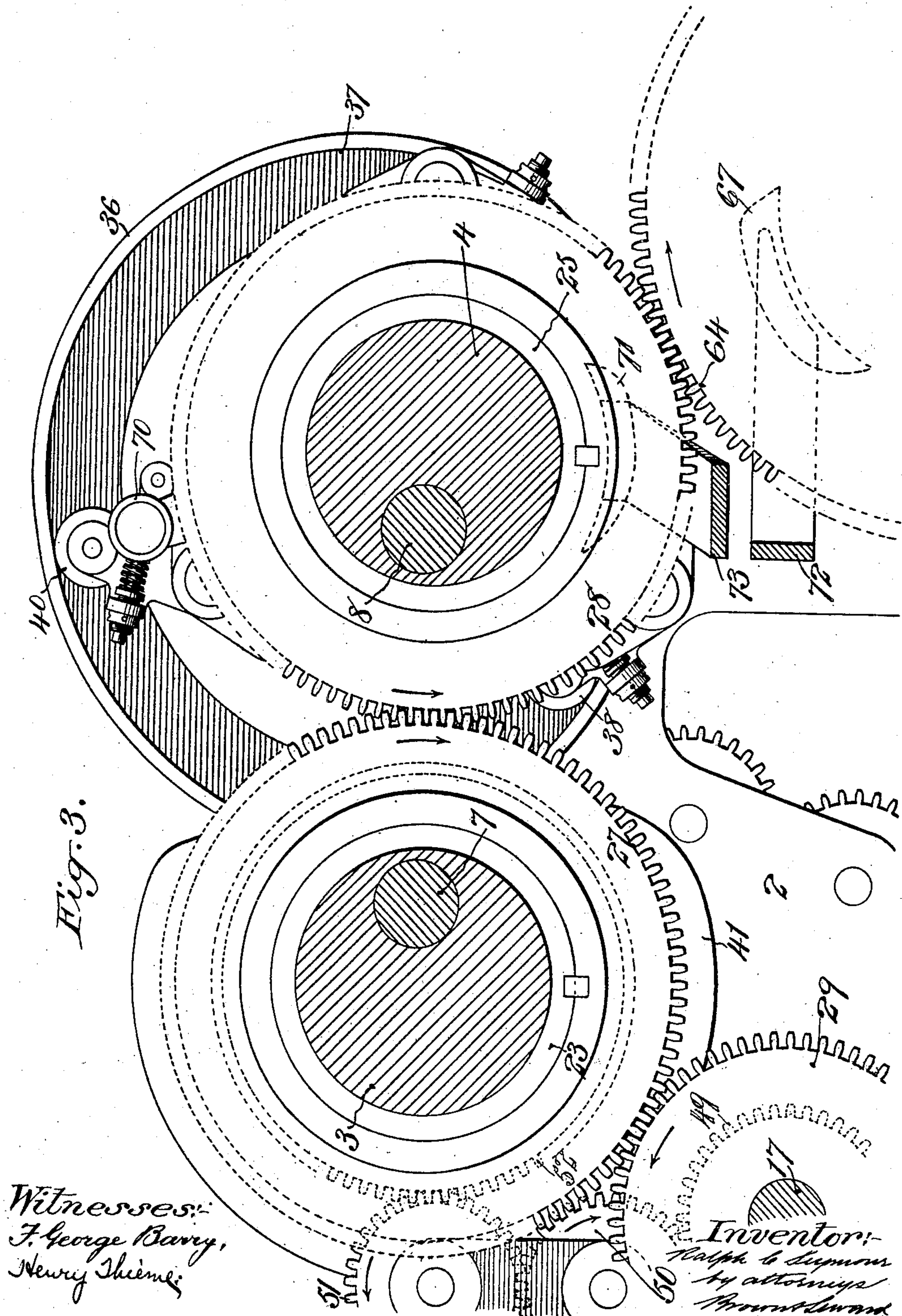
THE NORRIS PETERS CO., WASHINGTON, D. C.

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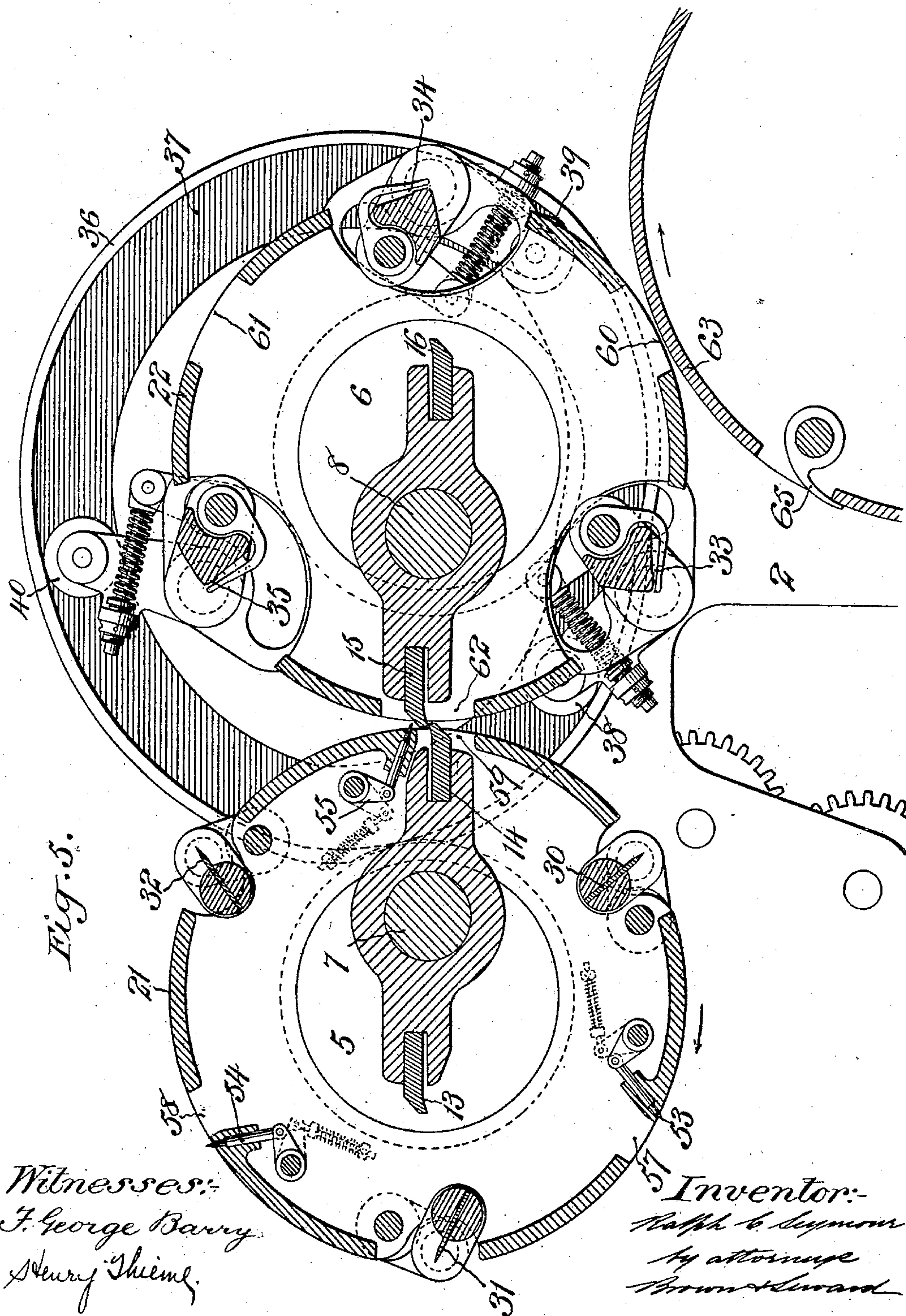
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7 SHEETS—SHEET 5.



Witnesses:
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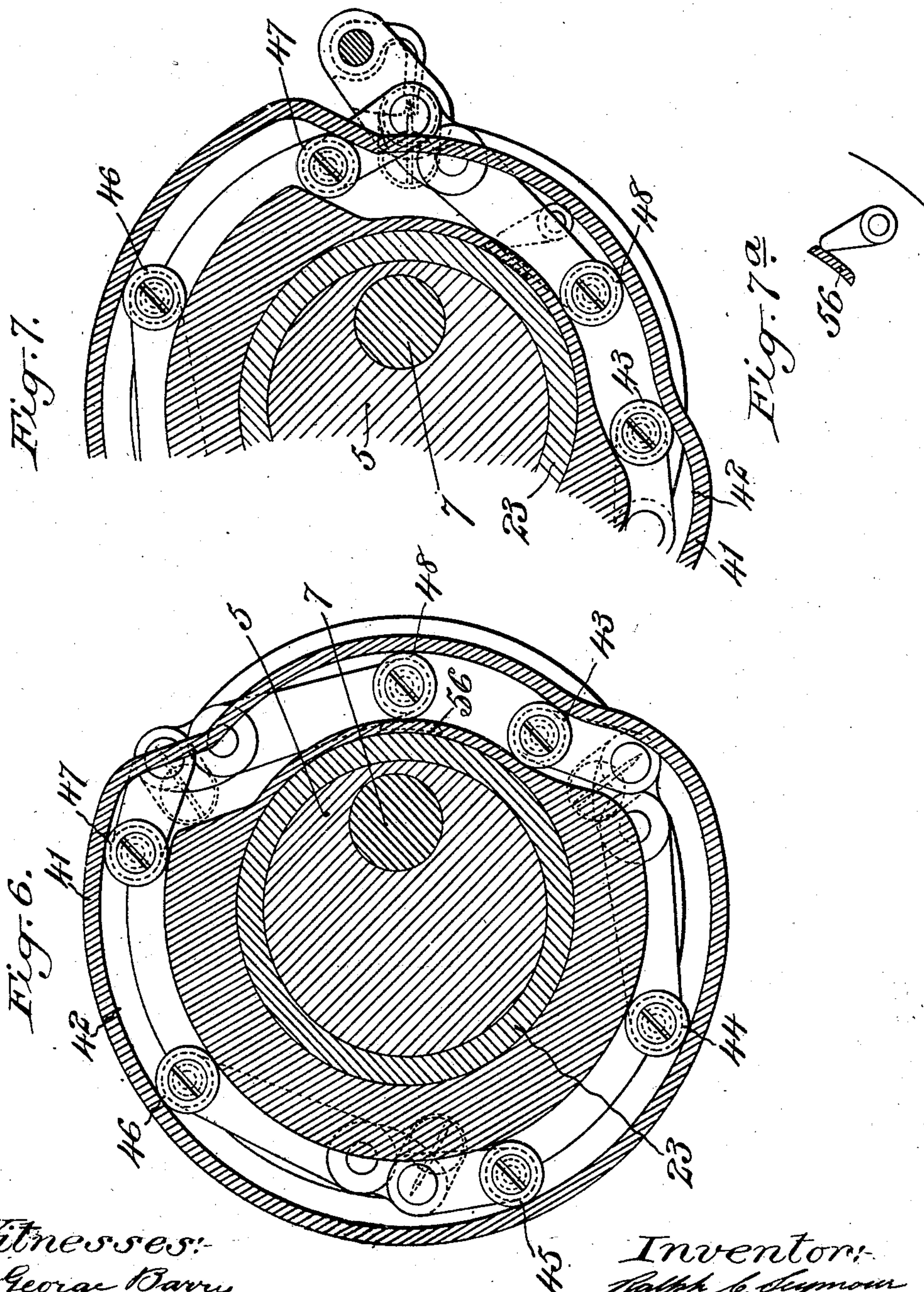
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7 SHEETS—SHEET 6.



Witnesses:
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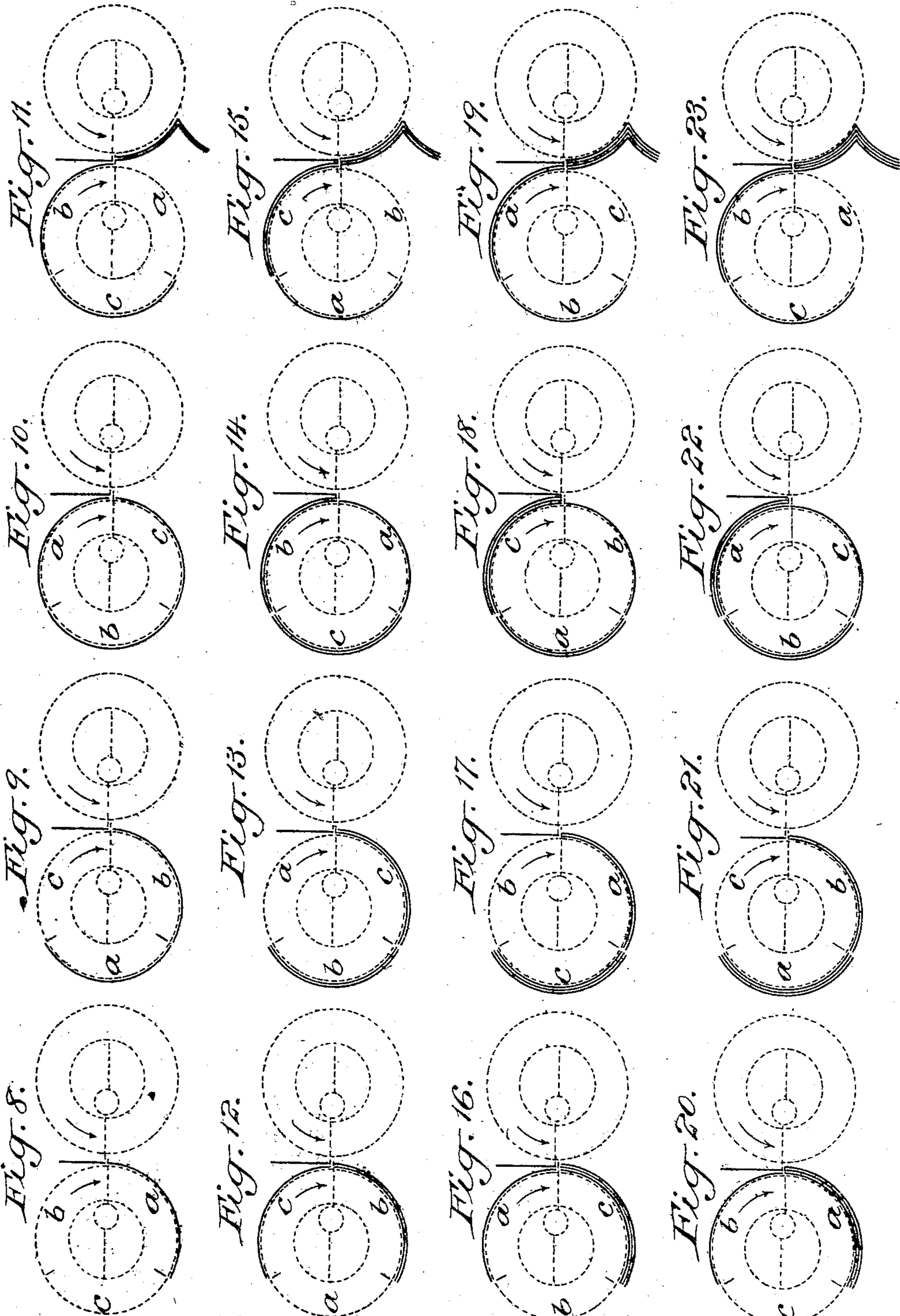
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7 SHEETS—SHEET 7.



Witnesses: { J. George Barry,
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Inventor: { Ralph C. Seymour
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UNITED STATES PATENT OFFICE.

RALPH C. SEYMOUR, OF NEW YORK, N. Y., ASSIGNOR TO C. B. COTTRELL & SONS COMPANY,
OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

CUTTING AND FOLDING MACHINE.

No. 879,418.

Specification of Letters Patent.

Patented Feb. 18, 1908.

Application filed December 15, 1906. Serial No. 347,952.

To all whom it may concern:

Be it known that I, RALPH C. SEYMOUR, a citizen of the United States, and resident of the borough of Manhattan, in the city and State of New York, have invented a new and useful Improvement in Cutting and Folding Machines, of which the following is a specification.

My invention consists broadly in two cylinders and rotary cutters within the said cylinders, and more particularly to mounting the cutters eccentrically within the cylinders whereby the cutters are brought into coaction at predetermined times in the rotation of the cylinders.

The object of my present invention is to materially simplify the means for cutting and folding sheets fed from a web, which means comprises rotary cutters mounted within the folding cylinders, the parts being so arranged that the operation of the folding devices and the rotary cutters will be properly timed with respect to each other. Furthermore, the parts are so arranged that the folding off of a predetermined number of sheets is accomplished which sheets are combined and delivered to the desired point.

A practical embodiment of my invention is represented in the accompanying drawings in which

Figure 1 represents in side elevation, the portion of a cutting and folding machine to which my invention is directed, this view showing the geared connection between the drive shaft and the rotary cutters. Fig. 2 is a horizontal section on one-half the scale of Fig. 1, the section being taken through the rotary cutters and folding cylinders. Fig. 3 is a transverse section on the same scale as Fig. 1, taken in the plane of the line A—A of Fig. 2. Fig. 4 is a transverse section on the same scale as Fig. 1, taken in the plane of the line B—B of Fig. 2, looking in the direction of the arrows. Fig. 5 is a transverse section on the same scale as Fig. 1, taken in the plane of the line C—C of Fig. 2, looking in the direction of the arrows. Fig. 6 is a transverse section on the same scale as Fig. 1, taken in the plane of the line D—D of Fig. 2, looking in the direction of the arrows. Fig. 7 is a partial section in the same plane as Fig. 6, showing the parts in another position, Fig. 7^a shows in detail the tail piece of one of the sheet carriers and the cam for operating the same, and Figs. 8 to 23 inclusive show dia-

grammatically the successive steps employed from the starting of the machine to the point where a signature of four sheets is regularly cut, collected, folded off and delivered to the desired point.

The side frames of so much of a cutting and folding machine as will be necessary to give a clear understanding of my invention are denoted by 1 and 2. These side frames 1 and 2 are provided respectively with inwardly extended cylindrical lugs 3, 4 and 5, 6, through the lugs 3, 5 of which extends the rotary cutter shaft 7 eccentrically with respect thereto, and through the lugs 4, 6, of which the other rotary cutter shaft 8 extends eccentrically with respect thereto. Inter-meshing gears 9, 10 for these shafts 7, 8, are provided exterior to the frame 1 and inter-meshing gears 11, 12 are provided for the said shafts exterior to the frame 2. The cutter shaft 7 carries two cutter blades 13, 14, arranged diametrically opposite each other and the cutter shaft 8 is provided with two blades 15, 16, arranged diametrically opposite each other, the blades 14, 15 and the blades 13, 16 of the two members being arranged to co-act successively during the rotary movement of the cutters. These cutters are driven from the main drive shaft 17 through a train of gears 18, 19, 20, located exterior to the side frame 1, the gear 20 meshing with the gear 9.

Two rotary folding cylinders 21, 22 are provided, the rotary cutter 7, 13, 14, being located eccentrically within the cylinder 21 and the rotary cutter 8, 15, 16, being located eccentrically within the cylinder 22. The folding cylinder 21 is provided at its ends with hollow hubs 23, 24, which are mounted to rotate on the cylindrical lugs 3, 5 and the cylinder 22 is similarly provided with hollow hubs 25, 26, mounted to rotate on the cylindrical lugs 4, 6. These two cylinders are rotated at the same speed in opposite directions through intermeshing gears 27, 28 fixed to the hubs 23, 25, of the two cylinders adjacent to the side frame 1. These cylinders are driven from the drive shaft 17 through a gear 29 located adjacent to the side frame 1, which gear meshes with the gear 27 fixed to the cylinder hub 23.

The cylinders 21, 22 are provided with three folding devices, in the present instance by providing the cylinder 21 with three floating folding blades 30, 31, 32, and

the cylinder 22 with three floating folding grippers 33, 34, 35, arranged to co-act at predetermined times with their respective folding blades. These folding devices are of the well known floating type, the box cam 36 for controlling the floating of the grippers as they are brought successively into position opposite the folding blades being stationary and mounted adjacent to the side frame 2 in position to have its groove 37 receive the operating stud rollers 38, 39 and 40 of the three folding grippers. The box cam 41 which is provided with a groove 42 for receiving the pairs of operating stud rollers 43, 44; 45, 46; and 47, 48 of the floating folding blades 30, 31, 32, is mounted to rotate on the hub 23 of the cylinder 21. This cam is driven from the drive shaft 17 through a train of gearing 49, 50, 51, 52, the gear 52 being fixed to the box cam 41.

Three sheet carriers 53, 54, 55, of the well known disappearing pin type, are mounted in the rotary cylinder 21 intermediate the three floating folding blades, which sheet carriers are arranged to be engaged successively by a cam 56 on the box cam 41, for the purpose of withdrawing the carriers from their engagement with the sheets at the time the sheets are folded off on to the cylinder 22. Three slots 57, 58, 59 are formed through the walls of the cylinder 21 adjacent to the sheet carriers 53, 54, 55, and three slots 60, 61, 62 are formed through the walls of the cylinder 22 for permitting the blades of the rotary cutters to project through these slots at the proper times during the rotary movements of the cutters and cylinders to sever the sheets from the advancing web.

A portion of a transfer cylinder 63 is shown, which transfer cylinder is provided with a gear 64 driven from the gear 28 fixed to the hub of the cylinder 22. This transfer cylinder 63 is provided with a set of grippers 65, the operating stud roller 66 of which is engaged by a stationary cam 67 to open the grippers at the proper time to receive the group of folded sheets from one of the folding grippers 33, 34, 35, the said grippers being provided with stud rollers 68, 69, 70, arranged to be engaged by a stationary cam 71 at the proper time to open and permit the transfer of the group of folded sheets to the set of grippers 65. These stationary cams 67 and 71 are carried by arms 72, 73, fixed to the side frame 1 of the machine.

The preliminary series of operations which are performed to bring the parts up to the point where a signature of four sheets is regularly cut, collected, folded off and delivered to the desired point, are diagrammatically represented in Figs. 8 to 23 inclusive. At the end of the first one and one-third revolutions of the folding cylinders (shown in Fig. 11) two sheets are delivered; at the end of the second one and one third revolutions of

the folding cylinders (shown in Fig. 15) three sheets are delivered; at the end of the third one and one third revolutions of the folding cylinders (shown in Fig. 19) four sheets are delivered; and at the end of every succeeding one and one third revolutions of the folding cylinders, four sheets are regularly delivered.

The present arrangement of the several parts of the cutting and folding machine is such that after the preliminary series of operations are performed, a group of four sheets is folded off from the cylinder 21 on to the cylinder 22 and delivered therefrom to the cylinder 63 every one and one-third revolutions of the cylinders 21, 22. This result is accomplished by imparting the following relative movements to the several parts. The cutters are rotated one revolution for two-thirds of a revolution of the rotary cylinders, thus causing a pair of cutting blades to co-act to sever a sheet from the advancing web every one-third of a revolution of the cylinder. The box cam 41 is rotated one revolution to every one and one-third revolutions of the rotary cylinders so that a folding blade is arranged to co-act with its gripper every one and one-third revolutions of the two cylinders for folding off a collected group of four sheets from the cylinder 21 on to the cylinder 22. This movement of the rotary box cam 41 will also withdraw the sheet carrier which engages the advance edges of the group of four collected sheets at the time they are folded off the cylinder 21.

The parts shown and described but not claimed herein form the subject-matter of a divisional application filed by me on February 4, 1907, Serial No. 355,538, entitled Cutting and folding machines.

It is evident that various changes might be resorted to in the construction, form 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 cutting and folding machine, two rotary cylinders having co-acting folding devices, and two coacting rotary cutters both mounted to rotate within said cylinders.
2. In a cutting and folding machine, two rotary cylinders having a plurality of co-acting folding devices, and two coacting rotary cutters both mounted to rotate within said cylinders.
3. In a cutting and folding machine, two rotary cylinders having three co-acting folding devices, and two coacting rotary cutters both mounted to rotate within said cylinders.
4. In a cutting and folding machine, two rotary cylinders one having a folding blade and the other a folding gripper arranged to co-act therewith, and two coacting rotary

cutters both mounted to rotate within said cylinders.

5 5. In a cutting and folding machine, two rotary cylinders one having a plurality of folding blades and the other a plurality of folding grippers arranged to co-act therewith, and two coacting rotary cutters both mounted to rotate within said cylinders.

10 6. In a cutting and folding machine, two rotary cylinders one having three folding blades and the other three folding grippers arranged to co-act therewith, and two coacting rotary cutters both mounted to rotate within said cylinders.

15 7. In a cutting and folding machine, two rotary cylinders having co-acting folding devices, and two coacting rotary cutters both mounted to rotate eccentrically within said cylinders.

20 8. In a cutting and folding machine, two rotary cylinders having a plurality of co-acting folding devices, and two coacting rotary cutters both mounted to rotate eccentrically within said cylinders.

25 9. In a cutting and folding machine, two rotary cylinders having three co-acting folding devices, and two coacting rotary cutters both mounted to rotate eccentrically within said cylinders.

30 10. In a cutting and folding machine, two rotary cylinders having co-acting folding devices, two coacting rotary cutters both mounted to rotate within said cylinders and means for operating the folding devices at predetermined intervals in the rotation of the cylinders.

35 11. In a cutting and folding machine, two rotary cylinders having co-acting folding devices, two coacting rotary cutters both mounted to rotate within said cylinders, means for operating the folding devices at predetermined intervals in the rotation of the cylinders and means for rotating the cutters at a predetermined speed with respect to the speed of rotation of said cylinders.

40 12. In a cutting and folding machine, two rotary cylinders having co-acting folding devices, two coacting rotary cutters both mounted to rotate eccentrically within said cylinders, means for operating the folding devices at predetermined intervals and means for rotating the cutters at a predetermined speed with respect to the speed of rotation of said cylinders.

55 13. In a cutting and folding machine, two rotary cylinders one having a plurality of folding blades and the other a plurality of folding grippers, rotary cutters mounted within said cylinders, a stationary cam for opening the grippers at predetermined intervals and a rotary cam for operating the folding blades at predetermined intervals.

60 14. In a cutting and folding machine, two rotary cylinders one having a plurality of folding blades and the other a plurality of

folding grippers, rotary cutters mounted eccentrically within said cylinders, a stationary cam for opening the grippers at predetermined intervals and a rotary cam for operating the folding blades at predetermined intervals. 70

15. In a cutting and folding machine, two rotary cylinders one having a plurality of folding blades and the other a plurality of folding grippers, rotary cutters mounted within said cylinders, a stationary cam for opening the folding grippers at predetermined intervals, a rotary cam for operating the folding blades at predetermined intervals, and means for rotating the cutters at a predetermined speed with respect to the speed of rotation of said cylinders. 80

16. In a cutting and folding machine, two rotary cylinders one having a plurality of folding blades and the other a plurality of folding grippers, rotary cutters mounted eccentrically within said cylinders, a stationary cam for opening the folding grippers at predetermined intervals, a rotary cam for operating the folding blades at predetermined intervals and means for rotating the cutters at a predetermined speed with respect to the speed of rotation of said cylinders. 85

17. In a cutting and folding machine, two rotary cylinders having co-acting folding devices, sheet carriers mounted on one of the cylinders and two co-acting rotary cutters both mounted to rotate within said cylinders. 90

18. In a cutting and folding machine, two rotary cylinders having co-acting folding devices, sheet carriers mounted on one of the cylinders and two co-acting rotary cutters both mounted to rotate eccentrically within said cylinders. 95

19. In a cutting and folding machine, two rotary cylinders having a plurality of co-acting folding devices, a plurality of sheet carriers mounted on one of the cylinders and two coacting rotary cutters both mounted to rotate within said cylinders. 100

20. In a cutting and folding machine, two rotary cylinders having a plurality of co-acting folding devices, a plurality of sheet carriers mounted on one of the cylinders and two coacting rotary cutters both mounted to rotate eccentrically within said cylinders. 105

21. In a cutting and folding machine, two rotary cylinders having three co-acting folding devices, three sheet carriers mounted on one of the cylinders, and two coacting rotary cutters both mounted to rotate within said cylinders. 110

22. In a cutting and folding machine, two rotary cylinders having three co-acting folding devices, three sheet carriers mounted on one of the cylinders and two rotary cutters both mounted to rotate eccentrically within said cylinders. 115

23. In a cutting and folding machine, two rotary cylinders having three sets of co-act- 120

ing folding devices, rotary cutters mounted within said cylinders and means for causing a set of folding devices to co-act every one and one-third revolutions of the cylinders.

5 24. In a cutting and folding machine, two rotary cylinders having three sets of co-acting folding devices, rotary cutters mounted eccentrically within said cylinders and means for causing a set of folding devices to co-act
10 every one and one-third revolutions of the cylinders.

25. In a cutting and folding machine, two rotary cylinders having three sets of co-acting folding devices, rotary cutters mounted
15 within said cylinders, means for causing a set of folding devices to co-act every one and one-third revolutions of the cylinders and means for rotating the cutters one revolution for every two-thirds of a revolution of said cyl-
20 inders.

26. In a cutting and folding machine, two rotary cylinders having three sets of co-acting folding devices, rotary cutters mounted eccentrically within said cylinders, means for
25 causing a set of folding devices to co-act every one and one-third revolutions of the cylinders and means for rotating the cutters one revolution for every two-thirds of a revolution of said cylinders.

30 27. In a cutting and folding machine, two rotary cylinders having three sets of co-acting folding devices, rotary cutters mounted within the said cylinders, means for causing a set of folding devices to co-act every one
35 and one-third revolutions of the cylinders and means for causing the cutters to co-act between every two sets of folding devices.

28. In a cutting and folding machine, two rotary cylinders having three sets of co-act-
40 ing folding devices, rotary cutters mounted eccentrically within said cylinders, means for causing a set of folding devices to co-act every one and one-third revolutions of the cylinders and means for causing the cutters
45 to co-act between every two sets of folding devices.

29. In a cutting and folding machine, two rotary cylinders one having three folding blades and the other three folding grippers
50 arranged to co-act therewith, rotary cutters mounted within said cylinders, a stationary cam for successively opening the folding grippers and a rotary cam for causing every fourth folding blade to co-act with its grip-
55 per, said rotary cam being arranged to rotate one revolution to one and one-third revolutions of the cylinder.

30. In a cutting and folding machine, two rotary cylinders one having three folding
60 blades and the other three folding grippers arranged to co-act therewith, rotary cutters mounted eccentrically within said cylinders, a stationary cam for successively opening the folding grippers and a rotary cam for causing

every fourth folding blade to co-act with its gripper, said rotary cam being arranged to rotate one revolution to one and one-third revolutions of the cylinders. 65

31. In a cutting and folding machine, two rotary cylinders one having three folding
70 blades and the other three folding grippers arranged to co-act therewith, rotary cutters mounted within the cylinders, a stationary cam for successively opening the folding grippers, a rotary cam for causing every
75 fourth folding blade to co-act with its gripper, said rotary cam being arranged to rotate one revolution to one and one-third revolutions of the cylinders, and means for causing the cutters to co-act between every two sets
80 of folding devices.

32. In a cutting and folding machine, two rotary cylinders one having three folding blades and the other three folding grippers
85 arranged to co-act therewith, rotary cutters mounted eccentrically within said cylinders, a stationary cam for successively opening the folding grippers, a rotary cam for causing every fourth folding blade to co-act with its gripper, said rotary cam being arranged to
90 rotate one revolution to one and one-third revolutions of the cylinders, and means for causing the cutters to co-act between every two sets of folding devices.

33. In a cutting and folding machine, two
95 rotary cylinders one having three folding blades and the other three folding grippers arranged to co-act therewith, rotary cutters mounted within said cylinders, three sheet carriers mounted intermediate the folding
100 blades, means for causing a folding blade and its gripper to co-act every one and one-third revolutions of the cylinders, means for causing the cutters to co-act every one-third of a revolution of the cylinders and means
105 for disengaging the sheet carriers at the time of the folding off operations.

34. In a cutting and folding machine, two rotary cylinders one having three folding blades and the other three folding grippers
110 arranged to co-act therewith, rotary cutters mounted eccentrically within said cylinders, three sheet carriers mounted intermediate the folding blades, means for causing a folding blade and its gripper to co-act every one
115 and one-third revolutions of the cylinders, means for causing the cutters to co-act every one-third of a revolution of the cylinders and means for disengaging the sheet carriers at the time of the folding off operations. 120

In testimony, that I claim the foregoing as my invention, I have signed my name in presence of two witnesses, this 7th day of December, 1906.

RALPH C. SEYMOUR.

Witnesses:

FREDK. HAYNES,
F. GEORGE BARRY.