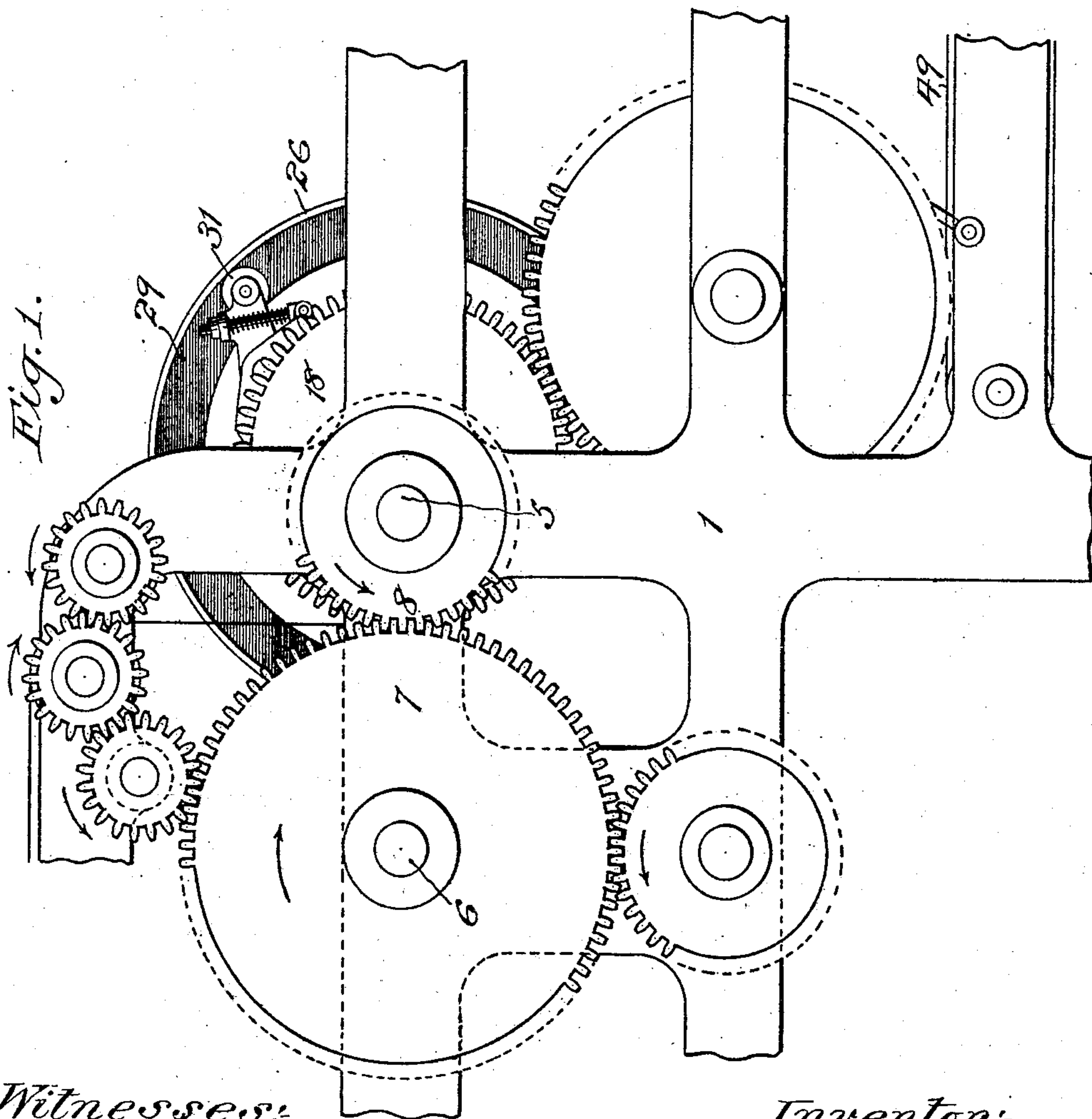


R. C. SEYMOUR.
CUTTING AND FOLDING MACHINE.
APPLICATION FILED OCT. 16, 1907.

908,155.

Patented Dec. 29, 1908.

4 SHEETS—SHEET 1.



Witnesses:
F. George Barry,
Henry Skime.

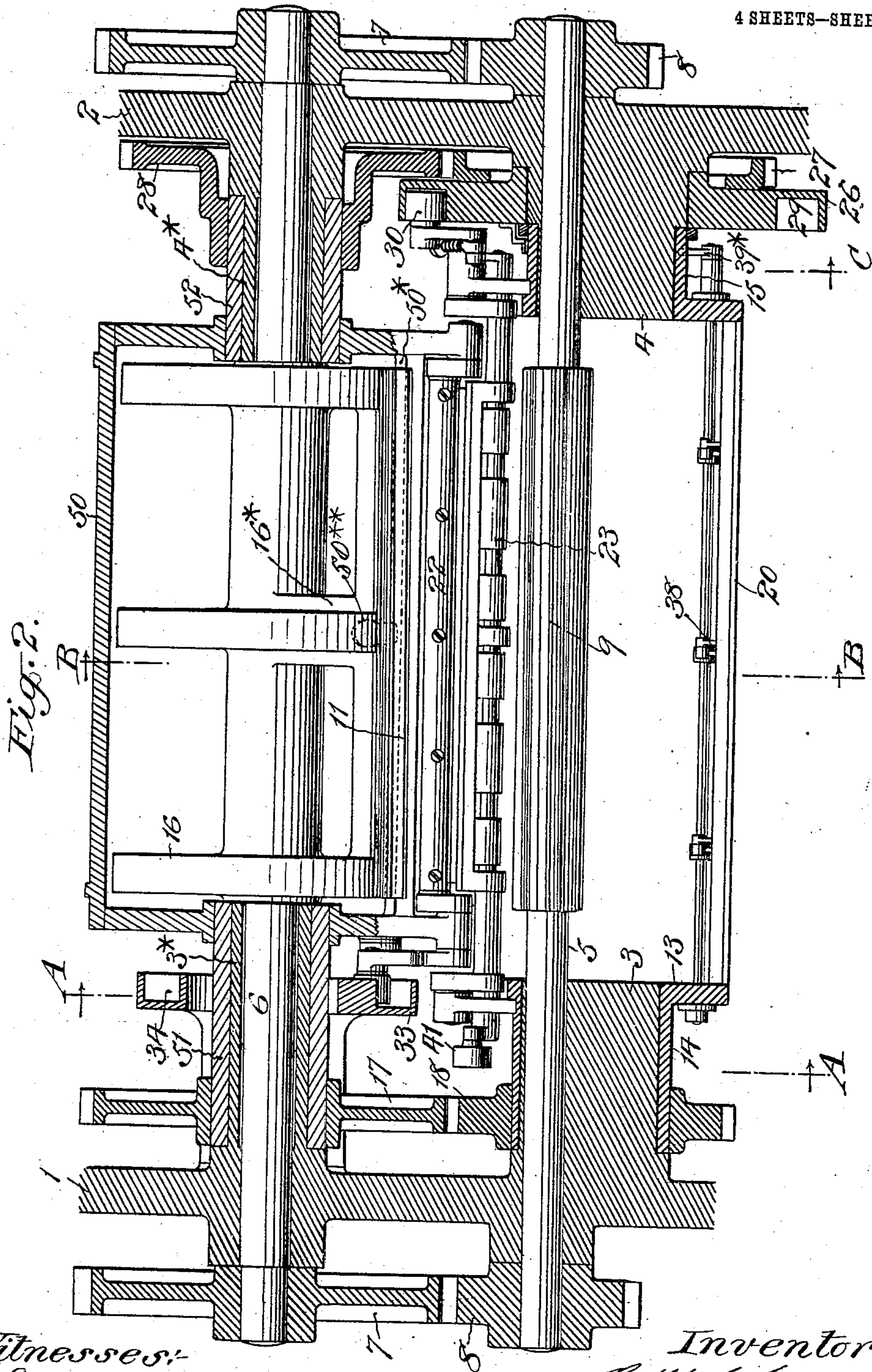
Inventor:
Ralph C. Seymour
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Brown & Seward

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4 SHEETS—SHEET 2.



Witnesses:
J. George Barry.
Henry O'Brien.

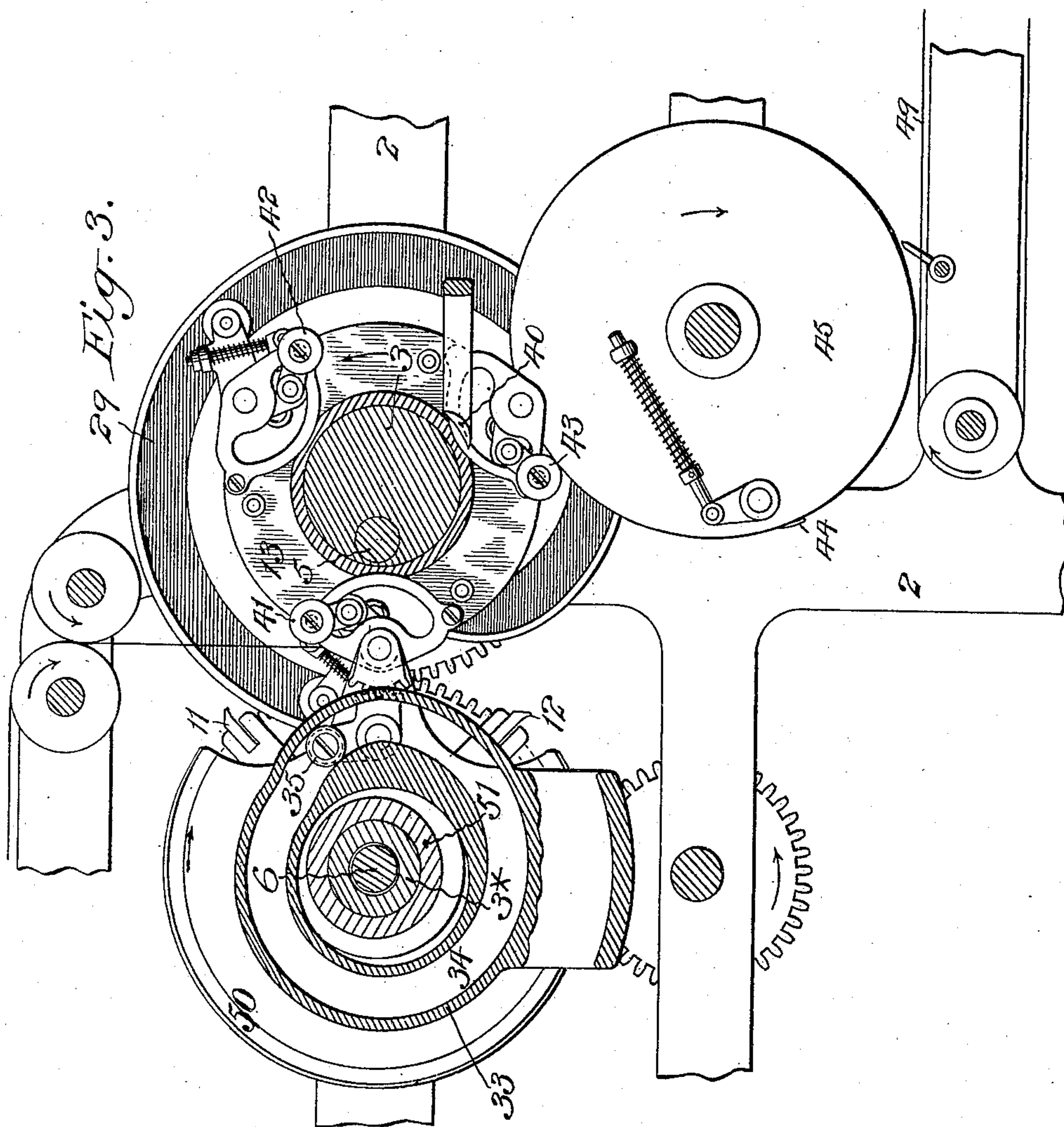
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4 SHEETS—SHEET 3.



Witnesses:
J. George Barry,
Henry Shime.

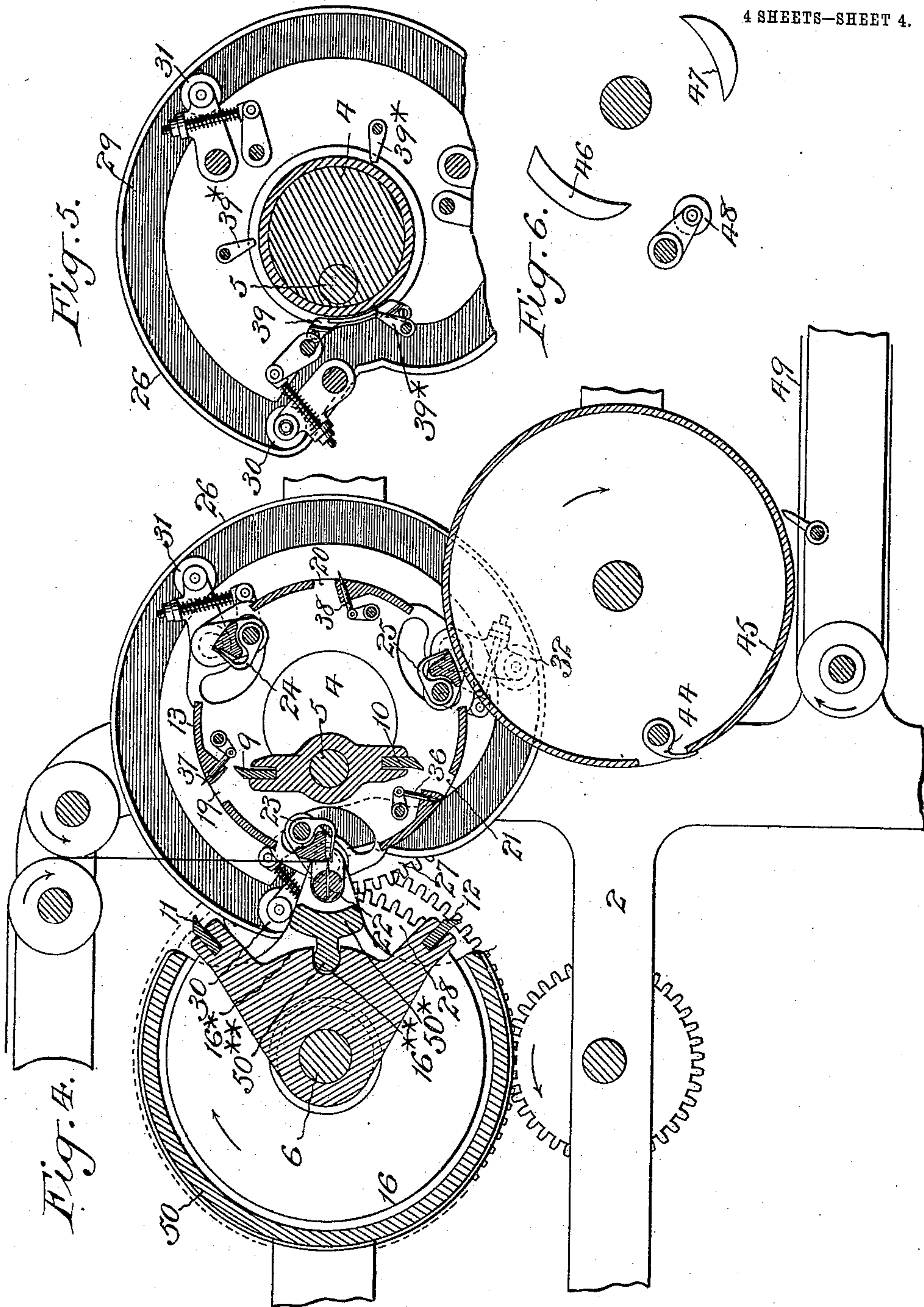
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R. C. SEYMOUR,
CUTTING AND FOLDING MACHINE.
APPLICATION FILED OCT. 18, 1907.

908,155.

Patented Dec. 29, 1908.

4 SHEETS—SHEET 4.



Witnesses:-
J. George Barry,
Harry Thime.

Inventor:-
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UNITED STATES PATENT OFFICE.

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

CUTTING AND FOLDING MACHINE.

No. 908,155.

Specification of Letters Patent.

Patented Dec. 29, 1908.

Application filed October 16, 1907. Serial No. 397,623.

To all whom it may concern:

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

The object of my present invention is to materially simplify the means for assembling, 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.

This invention is particularly directed to means for wrapping the web around one of the folding cylinders and then cutting the web to form a collected group of sheets and folding the said group of sheets together and delivering them to a predetermined 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 connections at one side of the machine, Fig. 2 is a detail horizontal section taken in the plane of the cutter and cylinder shafts, Fig. 3 is a detail vertical section taken in the plane of the line A—A of Fig. 2, looking in the direction of the arrows, Fig. 4 is a similar view taken in the plane of the line B—B of Fig. 2 looking in the direction of the arrows, Fig. 5 is a broken section taken in the plane of the line C of Fig. 2 looking in the direction of the arrow, and Fig. 6 is a fragmentary view showing the mechanism for controlling the opening and closing of the grippers on the transfer cylinder.

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 are provided, respectively, with inwardly extended cylindrical lugs 3, 3*, and 4, 4*, through which the rotary cutter shafts 5 and 6 extend in parallelism with each other, the shaft 5 being eccentrically mounted in its

lugs 3 and 4. The cutter shaft 6 is provided with geared connections 7, 8, with the cutter shaft 5, the proportions of the gears being such that the cutter shaft 5 will be rotated twice to every one revolution of the cutter shaft 6. The cutter shaft 5 carries two cutter blades 9, 10, arranged diametrically apart and the cutter shaft 6 is provided with a reel 16 having two cutter blades 11, 12, arranged ninety degrees apart so that during two revolutions of the cutter shaft 5, the blades 12, 10, and the blades 11, 9, will coact once.

The folding cylinder within which the rotary cutter 5, 9, 10, is eccentrically mounted, is denoted by 13 and has its hubs 14, 15, mounted to rotate on the cylindrical lugs 3 and 4. The folding cylinder within which the rotary cutter 6, 11, 12, is mounted is denoted by 50 and has its hubs 51, 52, mounted to rotate on the cylindrical lugs 3*, 4*. These two folding cylinders are in parallelism with each other but out of parallelism with the rotary cutters.

The periphery of the folding cylinder 50 is one-third greater than the periphery of the folding cylinder 13 and the two cylinders are driven at the same surface speed so that the cylinder 50 rotates one revolution to one and one-third revolutions of the folding cylinder 13. The geared connection between these two cylinders 50, 13, is denoted by gears 17, 18, mounted respectively on the hubs 51, 14 of the said cylinders. The folding cylinder 13 is provided with three slots 19, 20, 21, arranged at equal distances apart in its sides through which slots the blades 9 and 10 of the eccentrically mounted rotary cutter 5, 9, 10, are caused to extend to coact with the blades of the rotary cutter 6, 11, 12, at predetermined times. The folding cylinder 50 is provided with a floating folding blade 22 and the folding cylinder 13 is provided with three floating folding grippers 23, 24, 25, arranged to coact at predetermined times with the floating folding blade 22 of the folding cylinder 50. These folding devices are of the well known floating type, the box cam 26 for controlling the floating of the grippers as they are brought successively into position opposite the folding blade being mounted to rotate on the stud 4 of the frame and driven at the same speed as the said blade through the geared connection 27, 28, the gear 27 being on the cam 26 and the gear

28 on the hub 52 of the folding cylinder 50, the groove 29 in said cam being fitted to receive the operating stud rollers 30, 31, 32, of the three folding grippers.

5 The box cam 33 which is provided with the groove 34 for receiving the stud roller 35 of the floating folding blade 22, is stationary. By rotating the box cam 26 one revolution for every revolution of the floating folding
10 blade, the folding blade is brought into coaction with successive sets of folding grippers every one and one-third revolution of the folding cylinder 13.

Three sheet carriers 36, 37, 38, which may
15 be of the well known disappearing pin type are mounted in the rotary folding cylinder 13 intermediate the three floating folding grippers, the operating arms 39* of which sheet carriers are arranged to be engaged suc-
20 cessively by a cam 39 carried by the box cam 26 for the purpose of withdrawing the carriers from their engagement with the sheets at the time the sheets are being folded on the cylinder 13.

25 Stationary cam 40 is provided in position to engage the rollers 41, 42, 43, of the folding grippers 23, 24, 25, successively, every one and one-third revolution of the cylinder 13 for opening the sets of grippers to permit the
30 folded sheets to be engaged by the set of grippers 44 on the transfer cylinder 45. Two stationary cams 46, 47, are provided in position to engage the truck roller 48 of the set of grippers 44 for opening the grippers
35 to receive the folded sheets from the cylinder 13 and for opening the grippers to deliver the folded sheets onto a sheet carrier 49 of any desired form.

The folding cylinder 50 is driven from and
40 at the same speed as the cutter 6, 16, 11, 12, as follows. The cylinder 50 is provided with a cross bar 50* extending between its ends, upon which cross bar I provide an inwardly projecting ball 50** which is located in a
45 socket 16** in an enlarged portion 16* of the reel 16. This ball and socket connection is in the horizontal plane of the intersection of the axes of the cylinder and cutter so as to permit the free rotary movement of the
50 cylinder and cutter even though their axes are out of parallelism.

The present arrangement of the several parts of the cutting and folding machine is such that after the preliminary series of
55 operations are performed for wrapping the web around the cylinder 13, a group of four superposed sheets are cut from the web and folded together by the coaction of the cutting blades 12, 10, 11, 9, of the rotary cutters and
60 the coaction of the folding blade 22 with one of the sets of folding grippers 23, 24, 25; which folded group of sheets is transferred to the transfer cylinder 45 and from there delivered on to the carrier 49. The relative
65 speeds of the several parts are such that the

cutters and the folding devices are caused to coact every one and one-third revolutions of the cylinder 13, the folding cylinder 50 being caused to rotate one revolution to every one and one-third revolutions of the cylinder 13
70 and the cylinder 13 being caused to rotate one revolution for every one and one-half revolutions of the rotary cutter mounted eccentrically therein. It will thus be seen that the rotary cutter within the cylinder 13
75 rotates two revolutions for every one revolution of the cutter mounted to rotate within the folding cylinder 50.

The parts shown and described but not claimed herein form the subject-matter of
80 another application filed by me October 18, 1907, entitled "Cutting and folding machines", its serial number being 397982.

It is evident that various changes might be resorted to in the construction, form and
85 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 shown and described, but
90

What I claim is:

1. In a cutting and folding machine, two rotary cylinders of unequal sizes having co-acting folding devices, co-acting rotary cutters, and independent supports for mounting
95 the cutters within said cylinders.

2. In a cutting and folding machine, two rotary cylinders having co-acting folding devices comprising a plurality of folding grippers carried by one cylinder and a folding blade
100 carried by the other cylinder, and co-acting rotary cutters mounted within the said cylinders.

3. In a cutting and folding machine, two rotary cylinders of unequal sizes having co-
105 acting folding devices comprising a plurality of folding grippers carried by one cylinder and a folding blade carried by the other cylinder and co-acting rotary cutters mounted within said cylinders.
110

4. In a cutting and folding machine, two rotary cylinders having co-acting folding devices, and rotary cutters, and an independent support for mounting one cutter eccentrically within its cylinder, the other
115 cutter being mounted within its cylinder in position to coact with the eccentrically mounted cutter.

5. In a cutting and folding machine, two rotary cylinders of unequal sizes having
120 co-acting folding devices, and rotary cutters, and an independent support for mounting one cutter eccentrically within its cylinder, the other cutter being mounted within its cylinder in position to coact with the eccentrically mounted cutter.
125

6. In a cutting and folding machine, two rotary cylinders having co-acting folding devices comprising a plurality of folding grippers carried by one cylinder and a fold-
130

ing blade carried by the other cylinder, and rotary cutters, one mounted eccentrically within its cylinder and the other mounted within its cylinder in position to coact with the eccentrically mounted cutter.

7. In a cutting and folding machine, two rotary cylinders of unequal sizes having co-acting folding devices comprising a plurality of folding grippers carried by one cylinder and a folding blade carried by the other cylinder, and rotary cutters, one mounted eccentrically within its cylinder and the other mounted within its cylinder in position to coact with the eccentrically mounted cutter.

8. In a cutting and folding machine, two rotary cylinders having co-acting folding devices and co-acting rotary cutters and independent supports for mounting the cutters within said cylinders, one of said cutters being fitted to rotate independently of its cylinder.

9. In a cutting and folding machine, two rotary cylinders of unequal sizes having co-acting folding devices and co-acting rotary cutters and independent supports for mounting the cutters within said cylinders, one of the said cutters being fitted to rotate independently of its cylinder.

10. In a cutting and folding machine, two rotary cylinders having co-acting folding devices and co-acting rotary cutters and independent supports for mounting the cutters within said cylinders, one of said cutters being fitted to rotate independently of its cylinder and the other of said cutters being fitted to rotate with its cylinder.

11. In a cutting and folding machine, two rotary cylinders of unequal sizes having co-acting folding devices and co-acting rotary cutters and independent supports for mounting the cutters within said cylinders, one of said cutters being fitted to rotate independently of its cylinder and the other of said cutters being fitted to rotate with its cylinder.

12. In a cutting and folding machine, two rotary cylinders having co-acting folding devices comprising a plurality of folding grippers carried by one cylinder and a folding blade carried by the other cylinder, and co-acting rotary cutters mounted within said cylinders, one of said cutters being fitted to rotate independently of its cylinder.

13. In a cutting and folding machine, two rotary cylinders of unequal sizes having co-acting folding devices comprising a plurality of folding grippers carried by one cylinder and a folding blade carried by the other cylinder, and co-acting rotary cutters mounted within said cylinders, one of said cutters being fitted to rotate independently of its cylinder.

14. In a cutting and folding machine, two rotary cylinders having co-acting folding de-

vices comprising a plurality of folding grippers carried by one cylinder and a folding blade carried by the other cylinder, and co-acting rotary cutters mounted within said cylinders one of said cutters being fitted to rotate independently of its cylinder and the other of said cutters being fitted to rotate with its cylinder.

15. In a cutting and folding machine, two rotary cylinders of unequal sizes having co-acting folding devices comprising a plurality of folding grippers carried by one cylinder and a folding blade carried by the other cylinder, and co-acting rotary cutters mounted within said cylinders, one of said cutters being fitted to rotate independently of its cylinder and the other of said cutters being fitted to rotate with its cylinder.

16. In a cutting and folding machine, two rotary cylinders of unequal sizes having co-acting folding devices, rotary cutters, independent supports for mounting the cutters within said cylinders and means for operating the folding devices at predetermined intervals in the rotation of the cylinders.

17. In a cutting and folding machine, two rotary cylinders of unequal sizes having co-acting folding devices, rotary cutters, independent supports for mounting the cutters 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 the peripheral speed of one of the said cylinders.

18. In a cutting and folding machine, two rotary cylinders of unequal sizes having co-acting folding devices, rotary cutters, an independent support for mounting one cutter eccentrically within its cylinder, the other cutter being mounted within its cylinder in position to coact with the eccentrically mounted cutter, means for operating the folding devices at predetermined intervals and means for rotating the cutters at the peripheral speed of one of the cylinders.

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

20. In a cutting and folding machine, two rotary cylinders of unequal sizes, one having a folding blade and the other a plurality of folding grippers, rotary cutters mounted within said cylinders, a rotary cam for floating the grippers at predetermined intervals and a stationary cam for operating the folding blade at predetermined intervals.

21. In a cutting and folding machine, two rotary cylinders, one having a folding blade and the other a plurality of folding grippers, rotary cutters mounted within said cylinders,

one of said cutters being fitted to rotate independently of its cylinder and the other of the said cutters being fitted to rotate with its cylinder, a rotary cam for floating the grippers at predetermined intervals and a stationary cam for operating the folding blade at predetermined intervals.

22. In a cutting and folding machine, two rotary cylinders of unequal sizes, one having a folding blade and the other a plurality of folding grippers, rotary cutters mounted within said cylinders, one of said cutters being fitted to rotate independently of its cylinder and the other of the said cutters being fitted to rotate with its cylinder, a rotary cam for floating the grippers at predetermined intervals and a stationary cam for operating the folding blade at predetermined intervals.

23. In a cutting and folding machine, two rotary cylinders, rotary cutters mounted within said cylinders, a plurality of sheet carriers and a plurality of folding grippers carried by one cylinder, and a folding blade carried by the other cylinder arranged to co-act with said folding grippers at predetermined intervals.

24. In a cutting and folding machine, two rotary cylinders of unequal sizes, rotary cutters mounted within said cylinders, a plurality of sheet carriers and a plurality of folding grippers carried by one cylinder, and a folding blade carried by the other cylinder arranged to co-act with said folding grippers at predetermined intervals.

25. In a cutting and folding machine, two rotary cylinders, rotary cutters mounted within said cylinders, one of said cutters being fitted to rotate independently of its cylinder and the other of the said cutters being fitted to rotate with its cylinder, a plurality of sheet carriers and a plurality of folding grippers carried by one cylinder, and a folding blade carried by the other cylinder arranged to co-act with said folding grippers at predetermined intervals.

26. In a cutting and folding machine, two

rotary cylinders of unequal sizes, rotary cutters mounted within said cylinders, one of said cutters being fitted to rotate independently of its cylinder and the other of the said cutters being fitted to rotate with its cylinder, a plurality of sheet carriers and a plurality of folding grippers carried by one cylinder, and a folding blade carried by the other cylinder arranged to co-act with said folding grippers at predetermined intervals.

27. In a cutting and folding machine, two rotary cylinders having co-acting folding devices comprising a plurality of folding grippers carried by one cylinder and a folding blade carried by the other cylinder, rotary cutters mounted within said cylinders and means for causing the folding blade to co-act with one of the folding grippers every one and one-third revolutions of the folding gripper carrying cylinder.

28. In a cutting and folding machine two rotary cylinders of unequal sizes having co-acting folding devices comprising three folding grippers carried by one cylinder and a folding blade carried by the other cylinder, rotary cutters mounted within said cylinders and means for causing the folding blade to co-act with successive folding grippers every revolution of the folding blade cylinder.

29. In a cutting and folding machine, two rotary cylinders of unequal sizes having co-acting folding devices comprising three folding grippers carried by one cylinder and a folding blade carried by the other cylinder, co-acting rotary cutters, one mounted to rotate independently within its cylinder and the other mounted to rotate with its cylinder and means for causing the cutters to co-act every revolution of the folding blade cylinder.

In testimony, that I claim the foregoing as my invention, I have signed my name in presence of two witnesses, this 8th day of October 1907.

RALPH C. SEYMOUR.

Witnesses:

F. GEORGE BARRY,
HENRY THIEME.