

APPLICATION FILED OCT. 18, 1907.

4 SHEETS—SHEET 1.



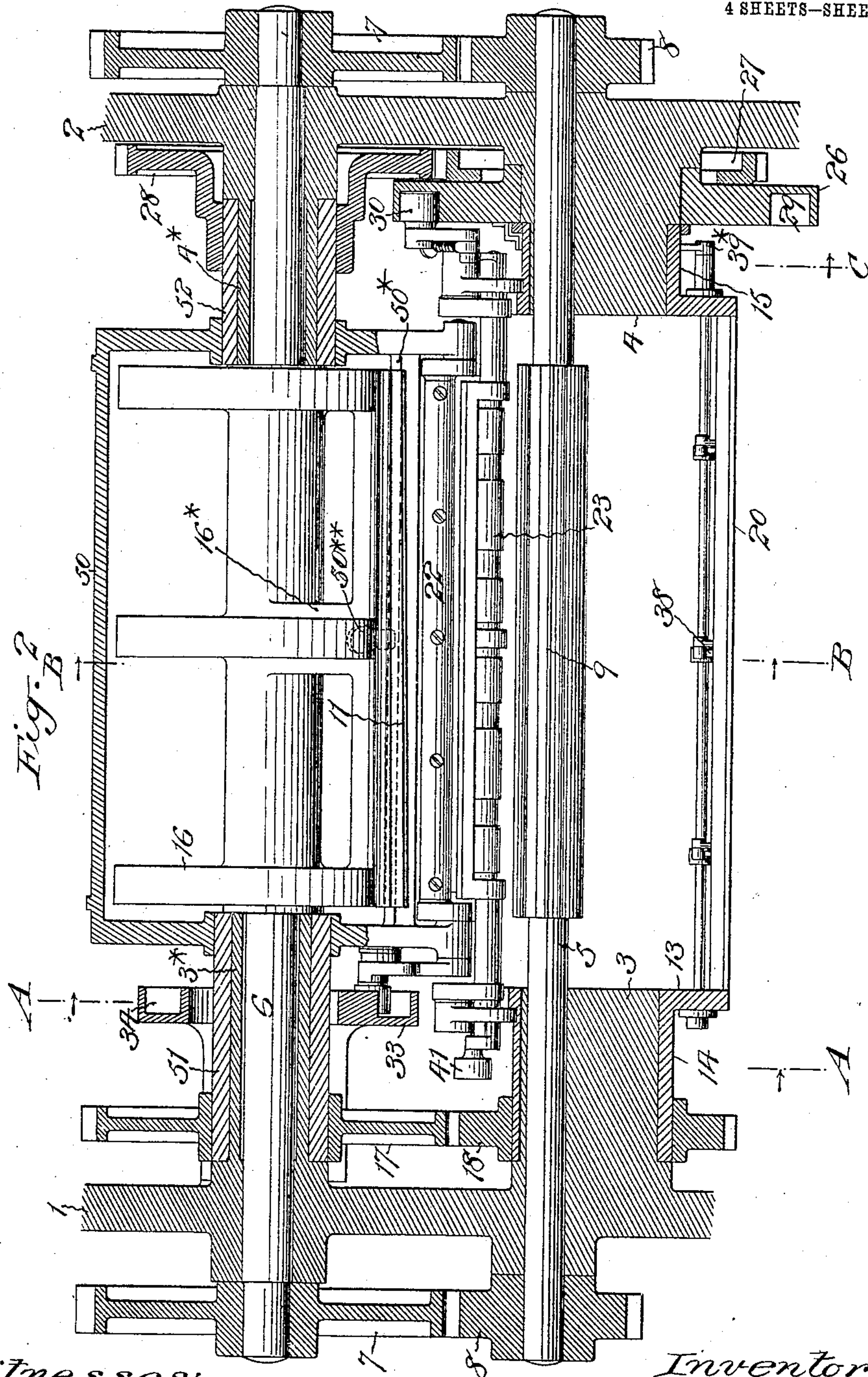
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Ralph L. Seymour
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R. C. SEYMOUR.
CUTTING AND FOLDING MACHINE.
APPLICATION FILED OCT. 18, 1907.

908,156.

Patented Dec. 29, 1908.

4 SHEETS—SHEET 2.



Witnesses:
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4 SHEETS—SHEET 3.

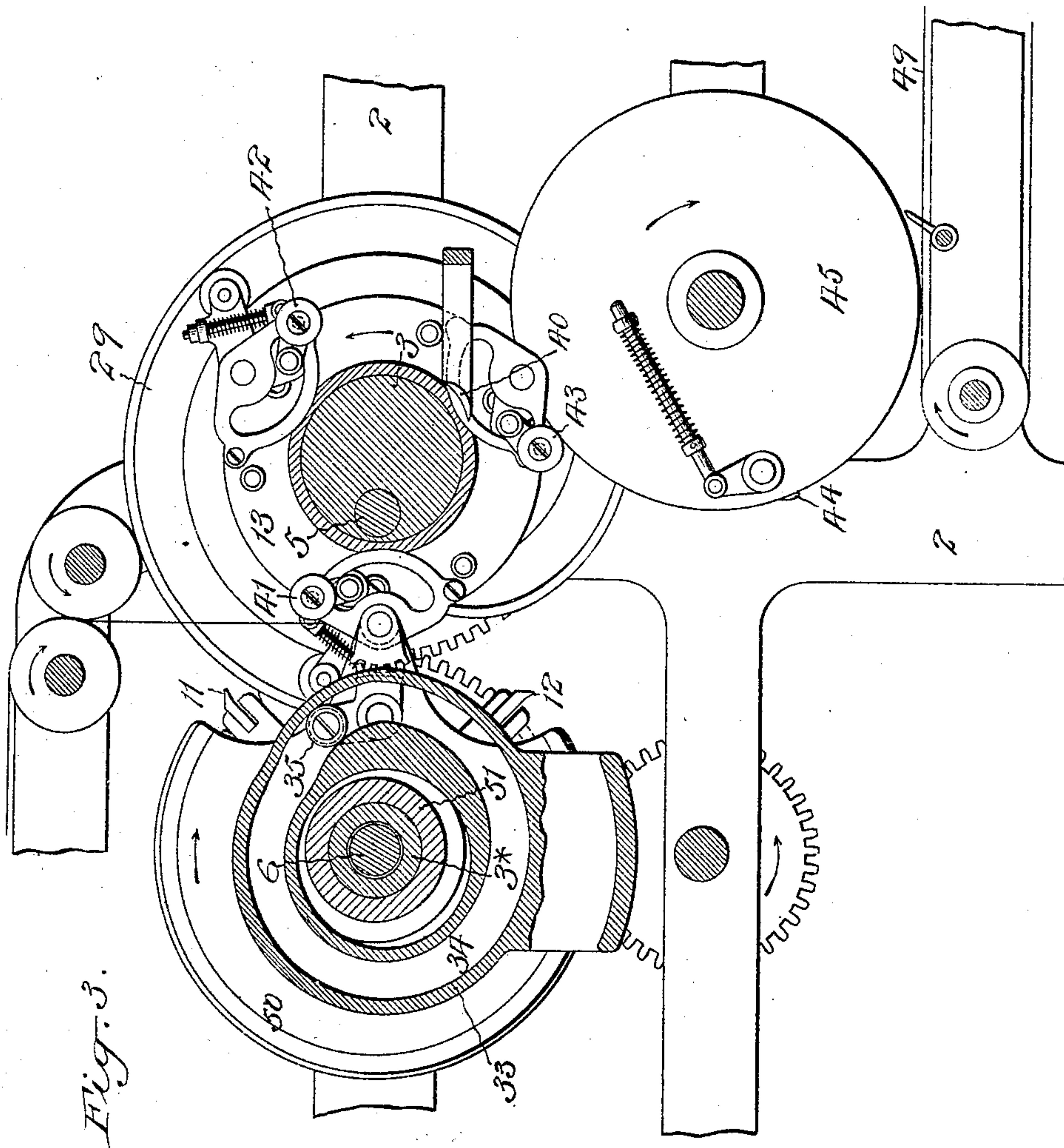


Fig. 3.

Witnesses:
J. George Barry,
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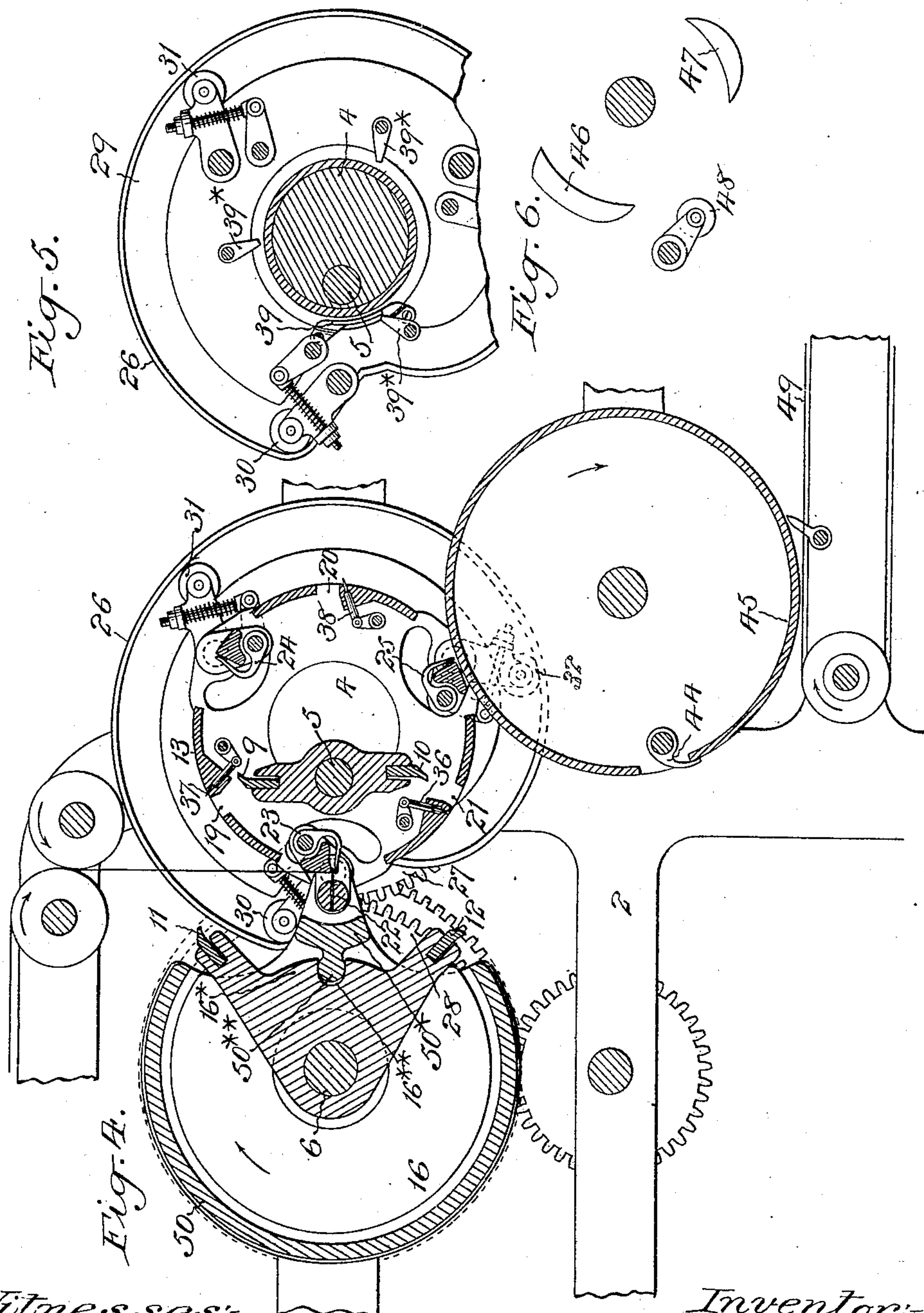
Inventor:
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4 SHEETS—SHEET 4.



Witnesses:
F. George Barry,
Henry Thiele.

Inventor:
Ralph C. Seymour
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Brown & Howard.

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. 908,156.

Specification of Letters Patent.

Patented Dec. 29, 1908.

Application filed October 18, 1907. Serial No. 397,982.

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 the other.

This invention is particularly directed to the means for cutting the web to form a collected group of sheets and comprises two rotary cylinders having coacting 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, the two cylinders being of unequal sizes.

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 it 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.

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 blade, the folding blade is brought into co-action 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 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 successively 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.

A 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 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 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 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 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 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 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 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 speeds of the several parts are such that the cutters and the folding devices are caused to coact every one and one-third revolution of the cylinder 13, the folding cylinder 50 being caused to rotate one revolution to every one and one-third revolution of the cylinder 13 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 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 another application filed by me October 16, 1907, entitled "Cutting and folding machines", its serial number being 397,623.

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 shown and described, but

What I claim is:

1. In a cutting and folding machine, two rotary cylinders of unequal sizes, rotary cutters and independent supports for mounting the cutters within said cylinders.

2. In a cutting and folding machine, two rotary cylinders, 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.

3. In a cutting and folding machine, two rotary cylinders of unequal sizes, 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.

4. In a cutting and folding machine, two rotary cylinders, 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.

5. In a cutting and folding machine, two rotary cylinders of unequal sizes, 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.

6. In a cutting and folding machine, two rotary cylinders, co-acting 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.

7. In a cutting and folding machine, two rotary cylinders of unequal sizes, co-acting 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.

8. In a cutting and folding machine, two rotary cylinders, co-acting rotary cutters mounted within said cylinders, and an independent support for mounting one of said cutters eccentrically within its cylinder, said cutter being fitted to rotate independently of the said cylinder.

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

10. In a cutting and folding machine, two rotary cylinders, co-acting rotary cutters, and an independent support for mounting one of said cutters eccentrically within its cylinder, said cutter being fitted to rotate independently of the said cylinder and the other of said cutters being fitted to rotate with its cylinder and mounted in position to coact with the eccentrically mounted cutter.

11. In a cutting and folding machine, two rotary cylinders of unequal sizes, co-acting rotary cutters, an independent support for mounting one of said cutters eccentrically within its cylinder, said cutter being fitted to rotate independently of the said cylinder and the other of said cutters being fitted to rotate with its cylinder and mounted in position to co-act with the eccentrically mounted cutter.

12. In a cutting and folding machine, two rotary cylinders of unequal sizes, co-acting rotary cutters mounted within said cylinders, means for driving the two cylinders at the same surface speed and means for causing the cutters to co-act every one and one third revolutions of the smaller cylinder.

13. In a cutting and folding machine, two rotary cylinders of unequal sizes 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, means for driving the two cylinders at the same surface speed, means for rotating the smaller cylinder one revolution to one and one-half revolutions of its cutters and means for causing the cutters of the two cylinders to co-act every one and one-third revolutions of the said smaller cylinder.

14. In a cutting and folding machine, two rotary cylinders of unequal sizes and co-acting rotary cutters, one of said cutters being mounted eccentrically within said cylinder and the other of said cutters being fitted to rotate with its cylinder and mounted in position to co-act with the eccentrically mounted cutter, means for driving the two cylinders at the same surface speed and means for causing the cutters of the two cylinders to co-act every one and one-third revolutions of the smaller cylinder.

15. In a cutting and folding machine, two rotary cylinders of unequal sizes and co-acting rotary cutters, one of its cutters being mounted eccentrically within its cylinder and the other of said cutters being fitted to rotate with its cylinder and mounted in position to co-act with the eccentrically mounted cutter, means for driving the two cylinders at the same surface speed, means for rotating the smaller cylinder one revolution to one and one-half revolutions of its cutter and means for causing the cutters of the two cylinders to co-act every one and one-third revolutions of the smaller 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.