

No. 805,636.

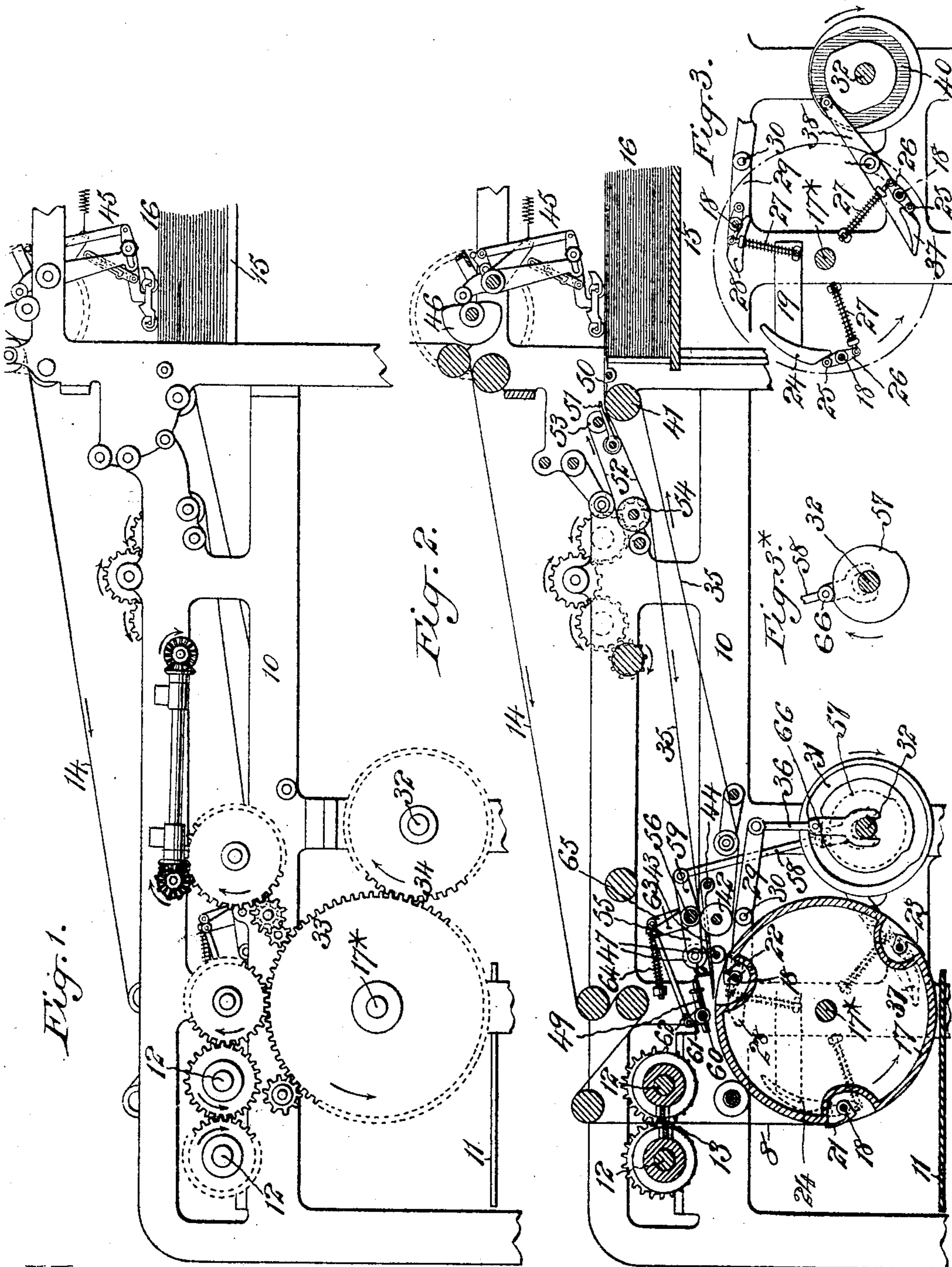
PATENTED NOV. 28, 1905.

E. H. COTTRELL.

SHEET ASSEMBLING DEVICE FOR FOLDING MACHINES.

APPLICATION FILED MAY 28, 1904.

3 SHEETS—SHEET 1.



Witnesses:
J. George Barry,
Henry Thieme

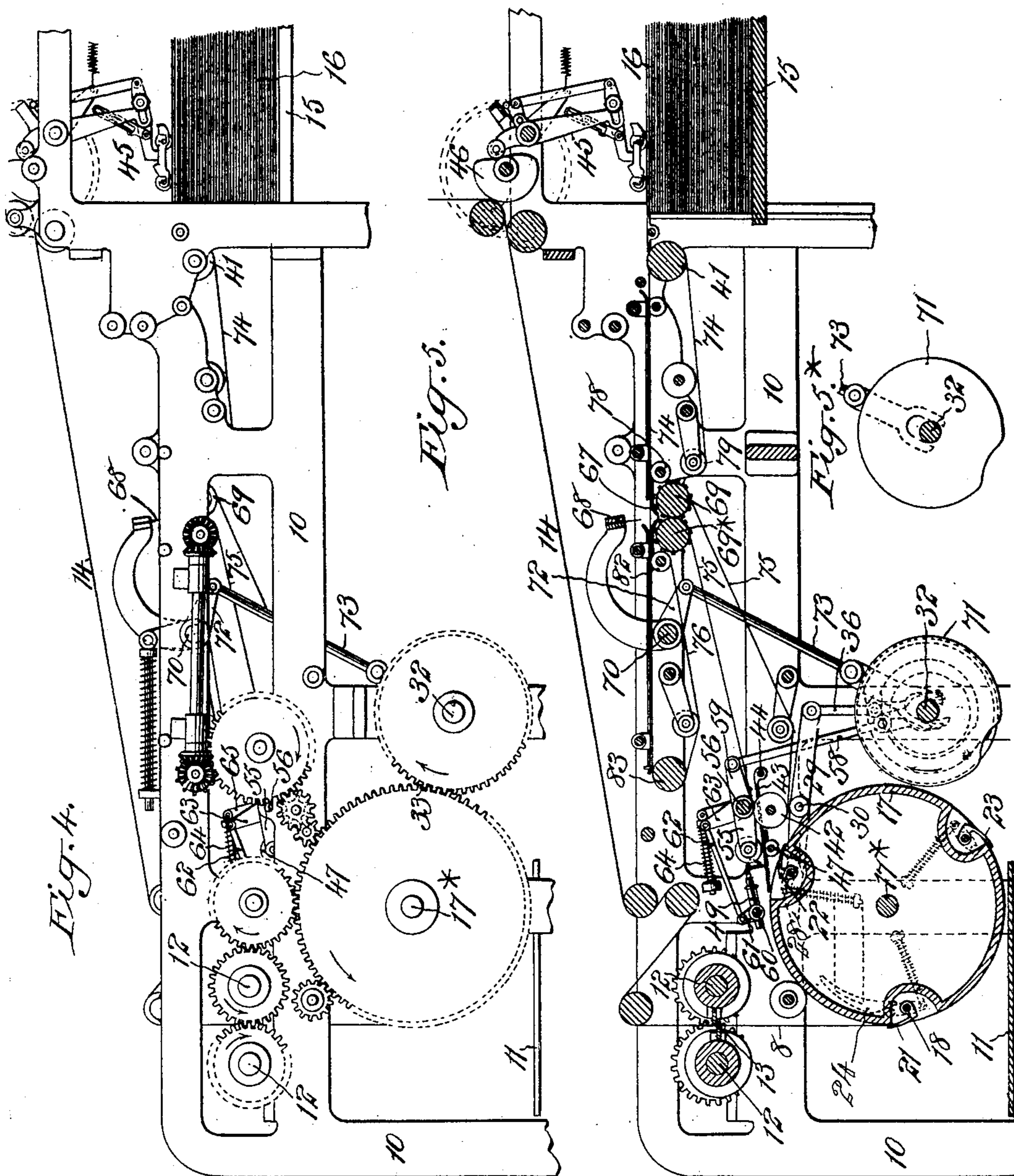
Inventor:
Edgar H. Cottrell
by attorneys
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3 SHEETS—SHEET 3.

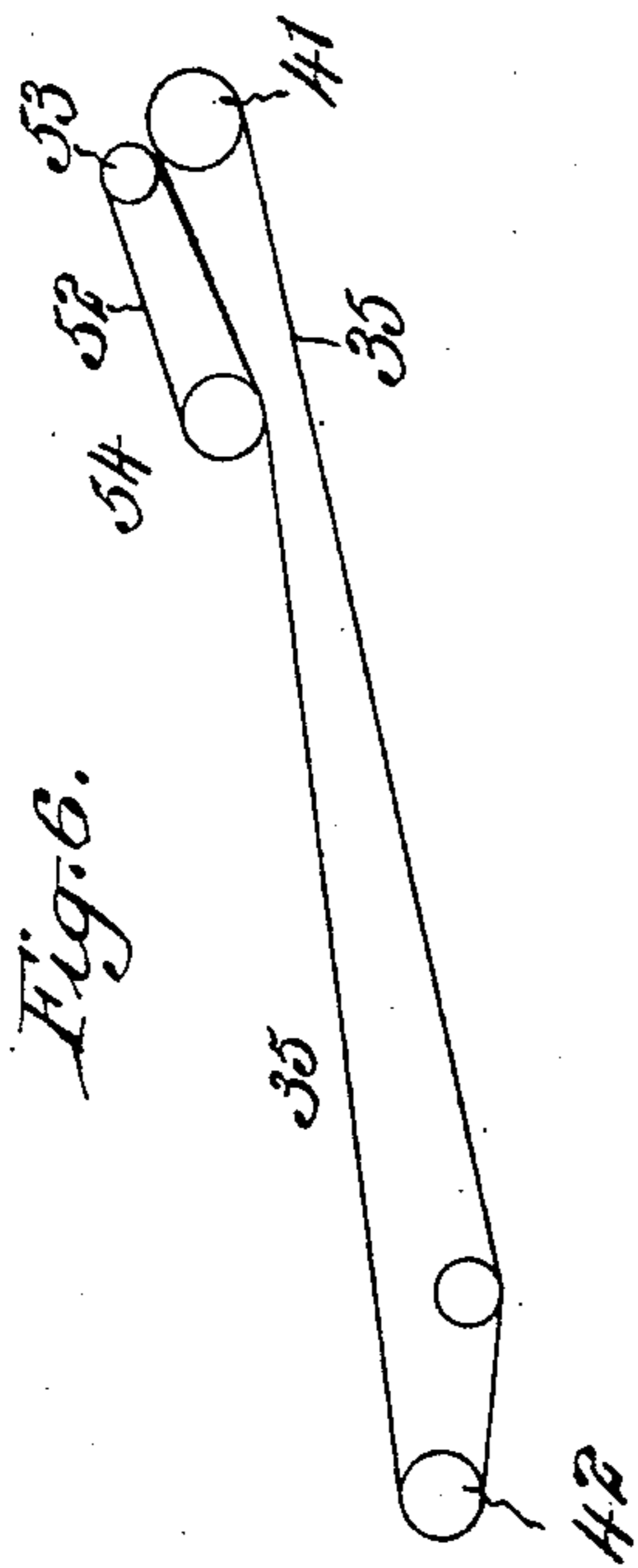
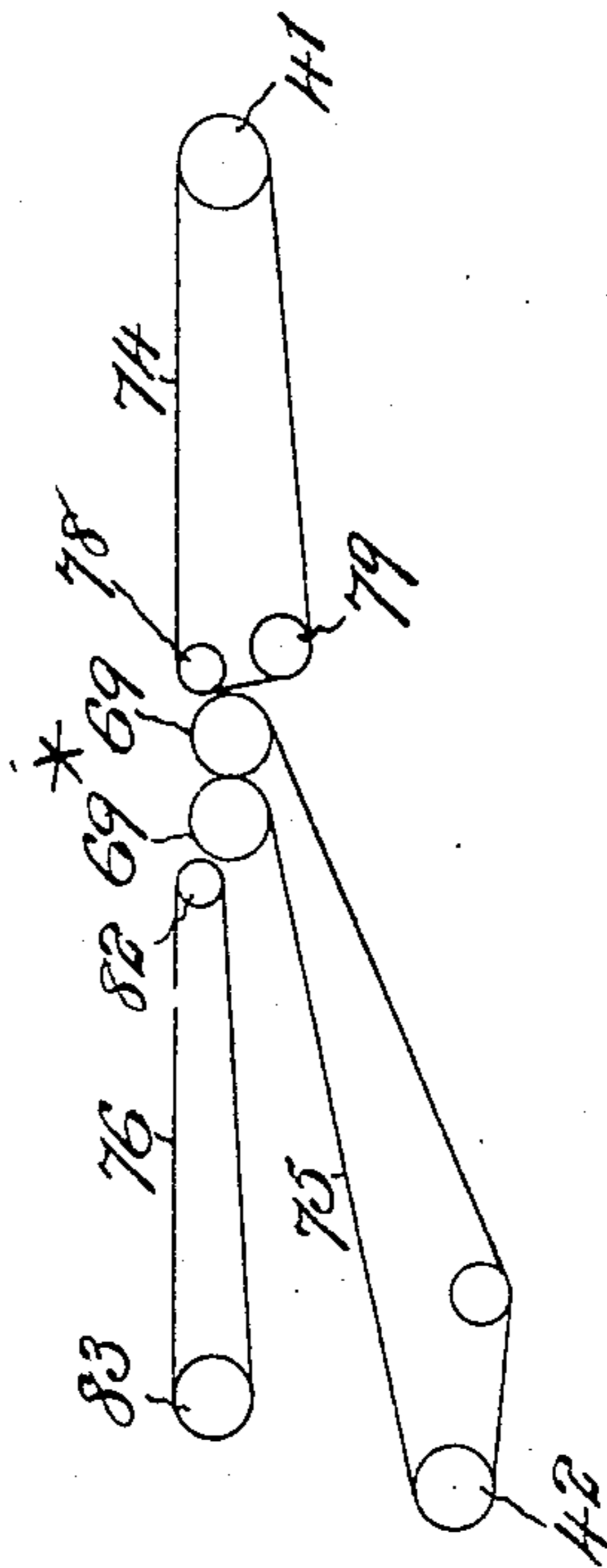


Fig. 7.



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UNITED STATES PATENT OFFICE.

EDGAR H. COTTRELL, OF STONINGTON, CONNECTICUT, ASSIGNOR TO
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SHEET-ASSEMBLING DEVICE FOR FOLDING-MACHINES.

No. 805,636.

Specification of Letters Patent.

Patented Nov. 28, 1905.

Application filed May 28, 1904. Serial No. 210,290.

To all whom it may concern:

Be it known that I, EDGAR H. COTTRELL, a citizen of the United States, and a resident of Stonington, in the county of New London and State of Connecticut, have invented a new and useful Improvement in Sheet-Assembling Devices for Folding-Machines, of which the following is a specification.

The principal object of this invention is to collect and assemble together for folding sheets from different sources—as, for example, from two printing-machines—in such manner that the assemblages consist each of a separate group composed of sheets from one of said sources having sheets from another of said sources between them; and the invention consists in the devices and combinations thereof herein described with reference to the accompanying drawings and hereinafter claimed for such collection and assemblage.

The drawings illustrate two examples of machinery embodying the invention, in both of which examples sheets cut from a running web and a ready-cut sheet taken from a pile are collected and assembled together in separate groups for folding together or for any other purpose.

In the example represented in Figures 1 and 2 there is no folding of the sheets before their collection and assemblage, as above mentioned; but in the example represented in Figs. 4 and 5 a preliminary folding of each sheet taken from the pile is performed before the collection and assemblage of such sheet into a group with the sheets from the web for folding together.

Fig. 1 of the drawings represents a side view of such parts of a cutting and folding machine as are necessary to illustrate the first example hereinabove referred to; Fig. 2, a vertical section of the same parallel with Fig. 1; Fig. 3, a vertical section parallel with Fig. 2, showing more plainly some details only imperfectly shown in that figure; Fig. 3*, a side view of one of the cams to be hereinafter described; Fig. 4, a side view illustrating the other example of the invention; Fig. 5, a vertical section of the latter example parallel with Fig. 4; Fig. 5*, a side view of another cam to be hereinafter described. Figs. 6 and 7 are side views of tape-carriers used, respectively, in two examples.

Similar numerals of reference designate corresponding parts in all the figures.

Referring first to Figs. 1 and 2, 10 designates the framing of the machine, and 11 a stationary table supported in said framing and onto which the collected and assembled groups of sheets are to be deposited. Near one end of the framing above the table 11 are the stationary bearings for the two shafts 12 of the rotary cutter 13 for cutting sheets from the running web 14, and near the other end of the framing is a table 15 for supporting the pile 16 of ready-cut sheets which are to be collected and assembled into groups with and between the sheets cut from the running web. Below the cutter the framing contains the stationary bearings for the shaft 17* of the cylinder or drum 17, hereinafter referred to as the "collecting-cylinder," upon which are collected into separate groups the sheets from the web 14 and the pile 16 to be thereby assembled and deposited upon the table 11.

The collecting-cylinder 17 is represented as of a circumference equal to a sufficient length of web to produce three of the sheets 8, which are to be cut therefrom by successive operations of the cutter 13, and said cylinder is furnished at equal distances apart on its circumference with three sets of grippers 21 22 23 for collecting upon it and imposing one upon another thereon sheets cut by the cutter 13 from the web and sheets taken from the pile 16 on the table 15. These grippers are like those commonly used upon the cylinders of printing and other machines carried by shafts 18, arranged lengthwise of the cylinder in suitable bearings therein. For the purpose of opening these grippers in their proper turn to receive the sheets cut from the web there is secured to the framing 10 at one end of the cylinder by a bracket 19 a stationary cam 24, (shown in dotted outline in Fig. 2 and in full outline in Fig. 3,) against which run rollers 25 on the ends of levers 26, provided on the gripper-shafts outside of the cylinder. The closing of the grippers is effected in a well-known way (illustrated in Fig. 3) by springs 27. The cylinder, grippers, and cam as thus far described resemble those which are described in my United States Patents Nos. 732,338 and 732,339.

For the purpose of opening the grippers in

their proper turn for receiving the sheets brought to them from the pile 16 by the endless-tape carrier 35, provided for the purpose and to be hereinafter fully described, there is provided a tripping-cam 28, (shown in dotted outline in Fig. 1 and in full outline in Fig. 2,) over which the gripper-shaft levers 26 pass in the revolution of the cylinder. This cam 28 consists of a lateral projection on a lever 29, which works on a fixed fulcrum 30 and which is actuated to move the said cam into and out of operative position by means of a rotary cam 31, Fig. 2, on a shaft 32, which is parallel with the shaft 17* of the collecting-cylinder and geared with said shaft, as shown in Fig. 1, by gears 33 34. This cam 31 is represented in Fig. 1 as acting upon the lever 29 through a yoke-rod 36, connected with said lever.

For the purpose of opening the grippers in their proper turn to release from the cylinder the sheets from the web and the pile which have been collected and assembled together thereon there is provided a tripping-cam 37, (shown in dotted outline in Fig. 1 and in full outline in Fig. 3,) under which the gripper-shaft levers pass in the revolution of the cylinder. This cam 37 consists of a lateral projection on a lever 38, which works on a fixed fulcrum 39 and which is actuated to move the said cam into and out of its operative position by means of a rotary cam 40, Fig. 3, on the shaft 32, before mentioned.

The endless-tape carrier 35, by which the sheets from the pile are carried to the collecting-cylinder, runs on a roller 41 and tape-pulleys 42, the shafts of which are journaled in fixed bearings in the framing. Between the several pulleys 42 are a series of supporting-prongs 43, carried by fixed cross-bars 44, the said prongs extending beyond the said pulleys and over the cylinder to support the heads of the sheets between the carrier and collecting-cylinder. For taking the sheets from the pile and feeding them to the carrier 35 any suitable sheet-feeding device may be used. The device represented in the drawings, which serves as well as any other for that purpose, (designated as a whole by the numeral 45,) is a well-known one which is the subject of Letters Patent No. 726,386, operated by a rotary cam 46. For taking the sheets from the supporting-prongs 43 and presenting them to the cylinder-grippers there are provided upper and lower feed-rollers 47, (see Fig. 2,) and the upper one of which is lifted to release the sheet while the latter is temporarily arrested by a rising and falling stop 49 in a position to be taken by the cylinder-grippers. Between the carrier-roller 41 and the front of the pile-table are supports 50, and over said carrier-roller 41 there are guards 51 to keep down the heads of the sheets as they pass onto the carrier. Above the rear portion of the carrier 35 are a set of endless tapes 52, carried by

rollers 53 54, for holding the sheets to the carrier as they enter thereon.

To provide for the lifting of the upper feed-rollers 47, they are carried by the arms 55 of a rock-shaft 56, which runs in fixed bearings, the said rock-shaft 56 being operated by a cam 57 on the shaft 32, said cam, which is shown dotted in Fig. 2 and of which Fig. 3* is a separate view, operating through a rod 58, connected with the arm 59 of the rock-shaft. The rising and falling stop 49 is carried by a rock-shaft 60, which is supported in fixed bearings and on which is an arm 61, connected by a rod 62 with an arm 63 of the rock-shaft 56, said connection being such that when the roller is raised from a shaft the stop is depressed thereonto. A spring 64, connected with an arm 65 of the rock-shaft 56, keeps the roller 66 on the rod 58 in such contact with the cam 57, which it will be understood serves to operate both the roller 47 and the stop 49.

The parts above described (numbered from 47 to 59) are all familiar to those skilled in sheet-feeding machinery, and their only novelty in this case is in combination with the collecting-cylinder 17 and the mechanism for producing and controlling the operation of the grippers on said cylinder.

The gears 33 34 between the collecting-cylinder shaft 17* and the cam-shaft 32 are so proportioned that the cams 31, 40, and 57 make one revolution for every two-thirds of a revolution of the collecting-cylinder, and hence it places the cams 28 and 37 in their operative positions three times during every two revolutions of the cylinder. Now as each set of grippers is open to receive a sheet 8, cut from the web, every time it passes the cam 24, but is only opened to receive a sheet 16 from the pile every other time it passes the cam 28 and only opened for the liberation of the sheets every other time it passes the cam 37, there are two sheets collected from the web for every one from the pile—viz., first, a sheet from the web; second, a sheet from the pile, and, third, a sheet from the web, making a group of three sheets, with the sheet from the pile between the two from the web. The three sheets thus forming the group are liberated together from the cylinder, and the group is deposited entire on the table 11. The continued operation of the parts produces a repetition of the production of the groups of three and the deposit of said groups in regular succession each by itself upon the table. In this operation it may be observed that of every two sheets taken successively from the pile one goes to one group and the other to another group.

The collection and assembling of the sheets on the cylinder takes place in the following manner: Every set of grippers as it is operated by the cam 24 takes a sheet 8 from the web at the position in which the set of grippers 21 are shown in Fig. 2. The operation

will be first described with reference to the set of grippers 21. After two-thirds of a revolution from the position just mentioned the grippers arrive with the sheet so taken from the web in a position to take a sheet which has arrived from the pile and the head of which has been properly presented over the supports 43 in register with the head of the first-taken sheet, the opening of grippers having been produced at the proper time by the cam 28, which has been temporarily placed in the proper position by the cam 57. The grippers, with the two sheets so taken, on arriving again at the position first mentioned are again opened by the cam 24 to take another sheet 8 from the web. Three sheets in all are now collected and assembled one upon another upon the cylinder, one sheet from the pile between two sheets from the web, and on the arrival of the grippers with said three sheets at the cam 37, which has been temporarily placed by the cam 40 in the proper position, they are opened to liberate these assembled sheets and deposit them upon the table 11. After the assembled sheets have been so released and deposited the same grippers pass the cam 28 without taking a sheet, the said cam having been depressed from its operative position by the cam 31; but when they arrive again in the position shown in Fig. 2 they take a new sheet to commence the repetition of the triple operation described. The same triple operation takes place with each set of grippers—that is to say, each set first taking a sheet from the web, next taking one coming from the pile, afterward again taking one from the web, and finally depositing the three sheets together on the table in a piled group of three, each set of grippers having taken a sheet from the web every time it passed the point at which the set 21 was presented, but having taken only one from the pile every other time it passed the point whence those from the pile were presented.

The movements of the cylinders and of the cam-shafts and other shafts described may be imparted to them at proper relative speeds in any suitable manner, not necessary to be here described.

In the example of the invention illustrated in Figs. 4 and 5, by which the sheets from the pile are folded once on their way to the collecting-cylinder, the essential difference from the described example (shown in Figs. 1, 2, and 3) consists in the interposition of folding devices between the pile-table 15 and the collecting-cylinder. This difference also involves a change in the organization of the tape-carrier, as will be understood by a comparison of Figs. 6 and 7. The folding device represented is of a well-known kind, consisting of a stationary slotted plate 67, a folding-blade 68, and folding-rollers 69 69*, the folding-blade being carried by a rock-shaft 70, which is operated by a cam 71 (represented

in Figs. 5 5*) on the shaft 32, said rock-shaft having an arm 72, from which is suspended a rod 73, actuated by said cam. The carrier in this example shown in Figs. 5 and 7 consists of three sets of endless tapes 74 75 76, the tapes 74 running on the roller 41, before described with reference to Fig. 5, on pulleys 78 79 80, the tapes 75 running over the folding-roller 69, under the folding-roller 69*, and on the pulleys 42, before described, and the tapes 76 running on pulleys 82 83. The tapes 74 receive the sheets one at a time from the feeding device 45 and carry them over the slotted plate 67 and folding-rollers. The tapes 76 receive the head and forward parts of the sheet which project beyond the folding-rollers until the folding of the sheet by the action of the folding-blade takes place, when the sheet being carried between the folding-rollers passes on therefrom along the tapes 75 to the collecting-cylinder in the same manner as the unfolded sheets before described with reference to Fig. 2, the fold of the sheet being taken by the grippers of said cylinder. Except that by the first-described example of my invention the sheets from the pile are unfolded and in the last-described example they are folded, the operation of collecting and assembling the sheets from the web and from the pile and depositing them so assembled on the table is the same, and therefore need not be again described. To enable this operation to be traced with reference to Fig. 5 by the description of Fig. 2, I have designated the corresponding parts of the two figures by the same numerals.

When the groups of sheets assembled upon the table 11, as above described, are to be folded, that may be done by any suitable folding devices to which they may be carried along the table 11—for example, by folding devices such as are described in my United States Letters Patent No. 732,338 and any suitable carrier.

What I claim as my invention is—

1. In a machine for collecting and assembling sheets, the combination of two sources of sheet-supply, a rotary collecting-cylinder, and means for presenting sheets from said two sources to said cylinder in greater number from one of said sources than from the other for assemblage on said cylinder in a group.

2. In a machine for collecting and assembling sheets, the combination of two sources of sheet-supply, a rotary collecting-cylinder and means for presenting to said cylinder in regular succession a sheet from one of said sources and a plurality of sheets from the other of said sources for assemblage thereon in a group.

3. In a machine for collecting and assembling sheets, the combination with a sheet collecting and assembling device, of means for presenting in regular succession to said device two sheets from one of two sources and one sheet from the other to be thereby assembled together in a group.

4. In a machine for collecting and assembling sheets, the combination of two sources of sheet-supply, a rotary collecting-cylinder and means for presenting sheets to said cylinder and assembling them thereon in a series of three consisting of, first a sheet from one source, second a sheet from the other source, and third a sheet from said one source, and means for liberating and delivering the series together in a group.
5. In a machine for collecting and assembling sheets, the combination of two sources of sheet-supply, a sheet collecting and assembling device, means for presenting alternately to said device a sheet from one of said sources and a plurality of sheets from the other of said sources, and a table arranged to receive the so collected and assembled sheets from the said sheet collecting and assembling device.
6. In a machine for collecting and assembling sheets, the combination of a table and a rotary collecting-cylinder for collecting a plurality of sheets and assembling them one upon another on its periphery and imposing the so assembled sheets on the table, and means for presenting to said cylinder sheets from one and another of two sources of sheet-supply in regular succession.
7. In a machine for collecting and assembling sheets, the combination of a web-supply, a different source of sheet-supply, a rotary collecting-cylinder and means for presenting sheets from the web-supply and from the different source of sheet-supply in regular succession to the said cylinder for assemblage thereon.
8. In a machine for collecting and assembling sheets, the combination of a cut-sheet supply, a different source of sheet-supply, a rotary collecting-cylinder and means for presenting sheets from the source of cut-sheet supply and from the different source of sheet-supply in regular succession to said cylinder for assemblage thereon.
9. In a machine for collecting and assembling sheets, the combination of a web-supply, a cut-sheet supply, a rotary collecting-cylinder and means for presenting sheets from the web-supply and cut-sheet supply in regular succession to said cylinder for assemblage thereon.
10. In a machine for collecting and assembling sheets, the combination of a web-supply, means for cutting sheets therefrom, a cut-sheet supply, a rotary collecting-cylinder and means for presenting sheets from the two supplies in regular succession to said cylinder for assemblage thereon.
11. In a machine for collecting and assembling sheets, the combination of different sources of sheet-supply, a sheet collecting and assembling device, means for presenting sheets from one and another of said sources in regular succession to said sheet collecting and assembling device, and a sheet-folding device interposed between one source of sheet-supply and the collecting and assembling device for folding the sheets from that source on their way to the collecting and assembling device.
12. In a machine for collecting and assembling sheets, the combination of different sources of sheet-supply, a rotary collecting-cylinder, means for presenting sheets from said sources in regular succession to said cylinder for assemblage thereon and a sheet-folding device interposed between one of said sources of sheet-supply and the cylinder.
13. In a machine for collecting and assembling sheets, the combination of a source of cut-sheet supply, a different source of sheet-supply, a sheet collecting and assembling device, means for presenting sheets from the said sources in regular succession to said sheet collecting and assembling device, and a folding device interposed between the source of cut-sheet supply and the sheet collecting and assembling device.
14. In a machine for collecting and assembling sheets, the combination of a source of web-sheet supply, a source of cut-sheet supply, a sheet collecting and assembling device, means for presenting sheets from said sources in regular succession to the sheet collecting and assembling device and a folding device interposed between the source of cut-sheet supply and the sheet collecting and assembling device.
15. In a machine for collecting and assembling sheets, the combination of a source of cut-sheet supply, a different source of sheet-supply, a rotary collecting-cylinder, means for presenting sheets from said sources in regular succession to said cylinder for assemblage thereon, and a folding device interposed between the source of cut-sheet supply and the cylinder.
16. In a machine for collecting and assembling sheets, the combination of a source of web-sheet supply, a source of cut-sheet supply, a rotary collecting-cylinder, means for presenting sheets from said sources in regular succession to the cylinder for assemblage thereon, and a folding device interposed between the source of cut-sheet supply and the cylinder.
17. In a machine for collecting and assembling sheets, the combination of a rotary collecting-cylinder, a gripper thereon, means for opening the gripper at predetermined intervals during the rotary movement of the cylinder, two sources of sheet-supply, and means for feeding sheets in regular succession one from one of said sources and a plurality from the other of said sources to the gripper for collection and assemblage on the cylinder.
18. In a machine for collecting and assembling sheets, the combination of a table, a rotary collecting-cylinder, a gripper thereon, two sources of sheet-supply, means for feed-

ing the sheets to the gripper from one and the other of said sources of supply in regular succession for assemblage on the cylinder, means for opening the gripper to receive the 5 sheets, and means for opening the gripper to impose the assembled sheets in a group on the table.

19. In a machine for collecting and assembling sheets, the combination of a table, a rotary collecting-cylinder, a plurality of grippers thereon, two sources of sheet-supply, means for feeding sheets from one and the other of said sources in regular succession to the grippers, means for opening each gripper 15 at predetermined intervals to receive the sheets from the sources of supply and means for opening each gripper after the sheets are assembled on the cylinder for imposing the so-assembled sheets in a group on the table.

20. In a machine for collecting and assembling sheets, the combination of a source of web-sheet supply, a source of cut-sheet supply, a sheet collecting and assembling device,

means for presenting sheets in regular succession from one and the other of said sources 25 to said sheet collecting and assembling device, and a cutting device interposed between the source of web-sheet supply and the sheet collecting and assembling device.

21. In a machine for collecting and assembling sheets, the combination of a source of web-sheet supply, a different source of sheet-supply, a rotary collecting-cylinder, means for presenting sheets in regular succession from one and the other of said sources to said 35 cylinder for assemblage thereon, and a cutting device interposed between the source of web-sheet supply and the cylinder.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 26th day of May, 1904. 40

EDGAR H. COTTRELL.

Witnesses:

ALIDA M. EGBERT,
FREDK. HAYNES.