

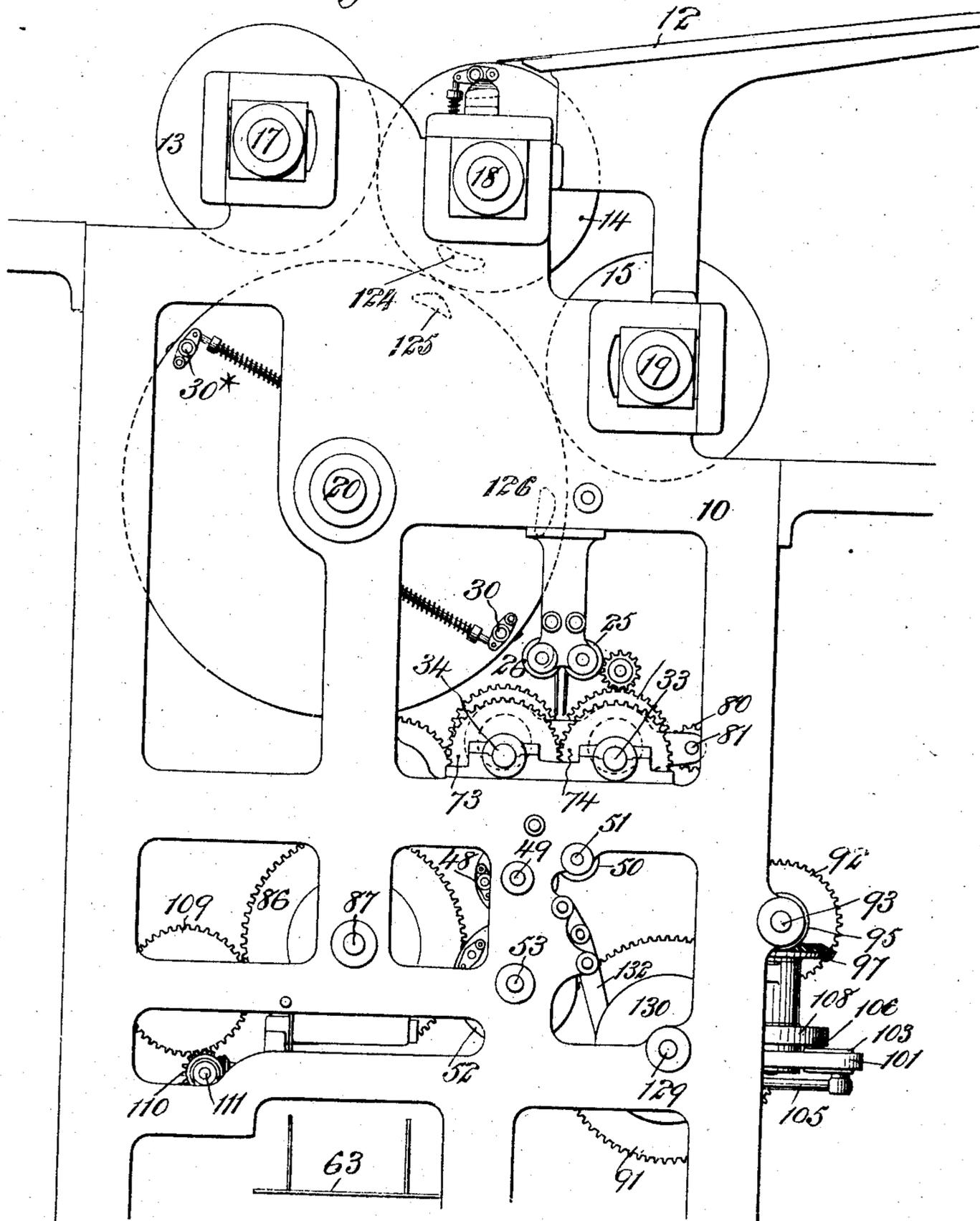
No. 873,979.

PATENTED DEC. 17, 1907.

H. M. BARBER.  
ROTARY PRINTING PRESS.  
APPLICATION FILED NOV. 24, 1906.

7 SHEETS—SHEET 1.

Fig. 1.

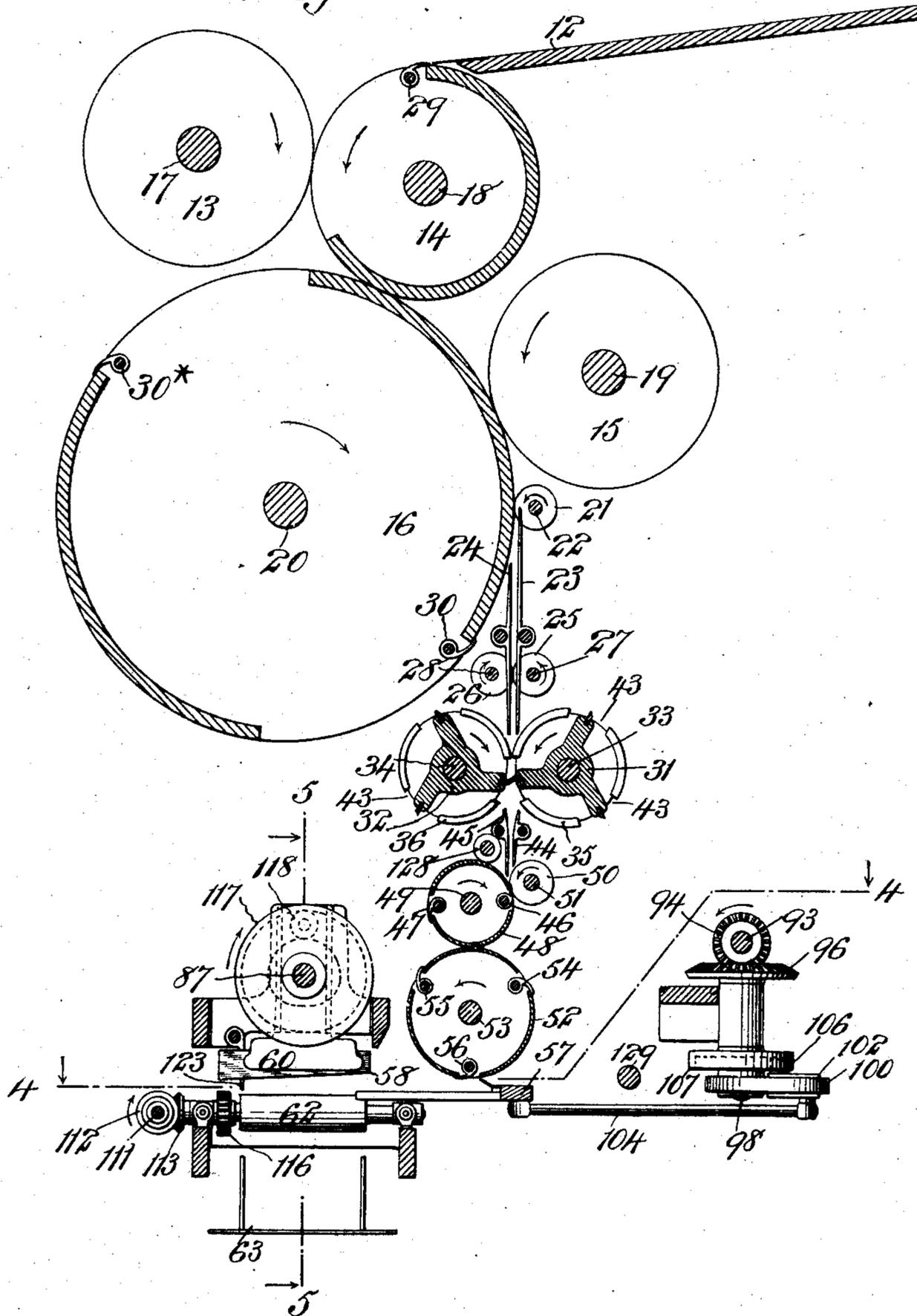


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Fig. 2.

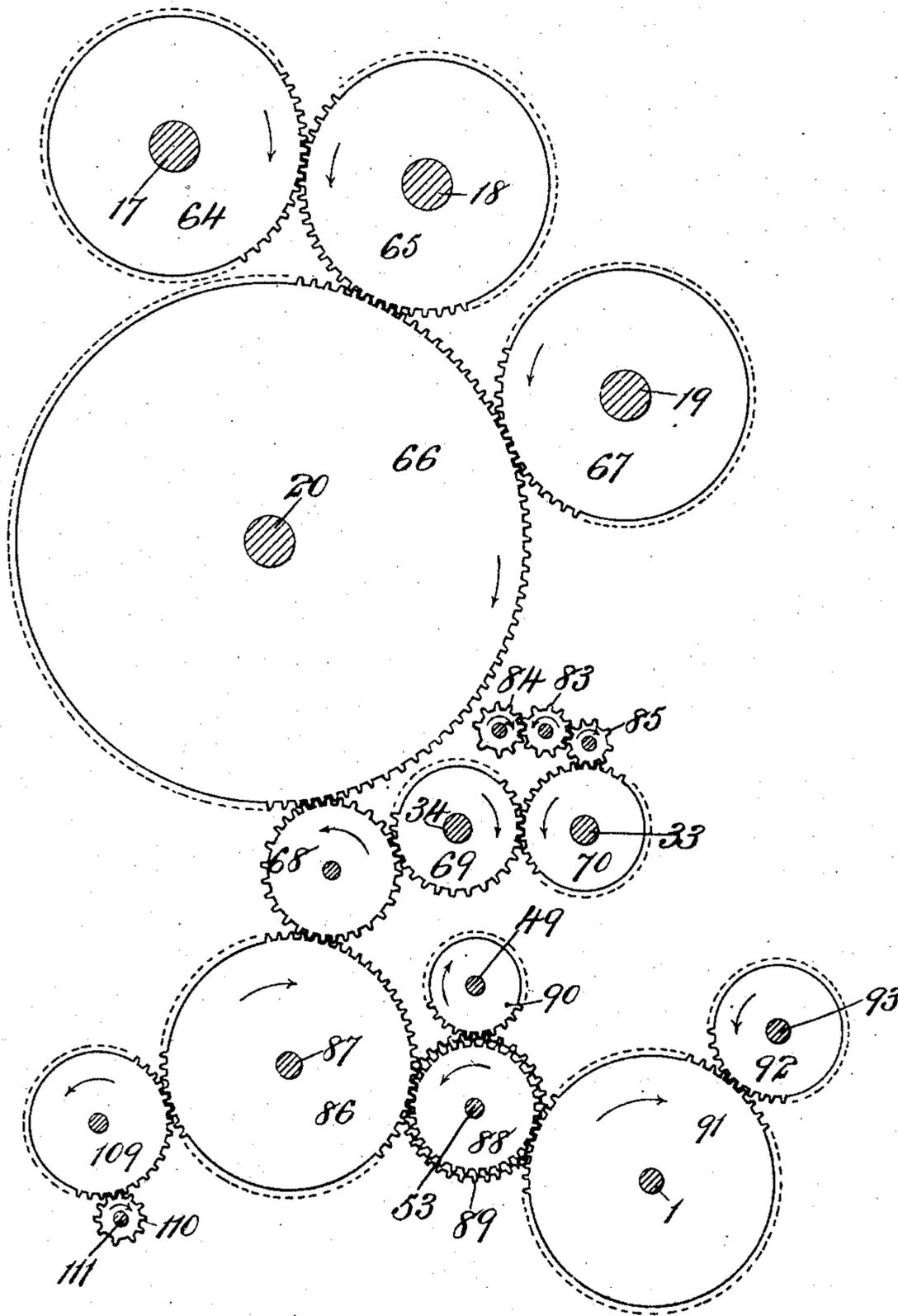


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*Fig. 3.*



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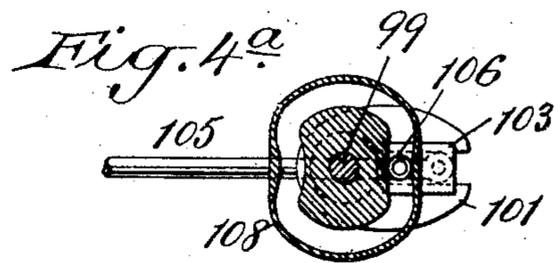
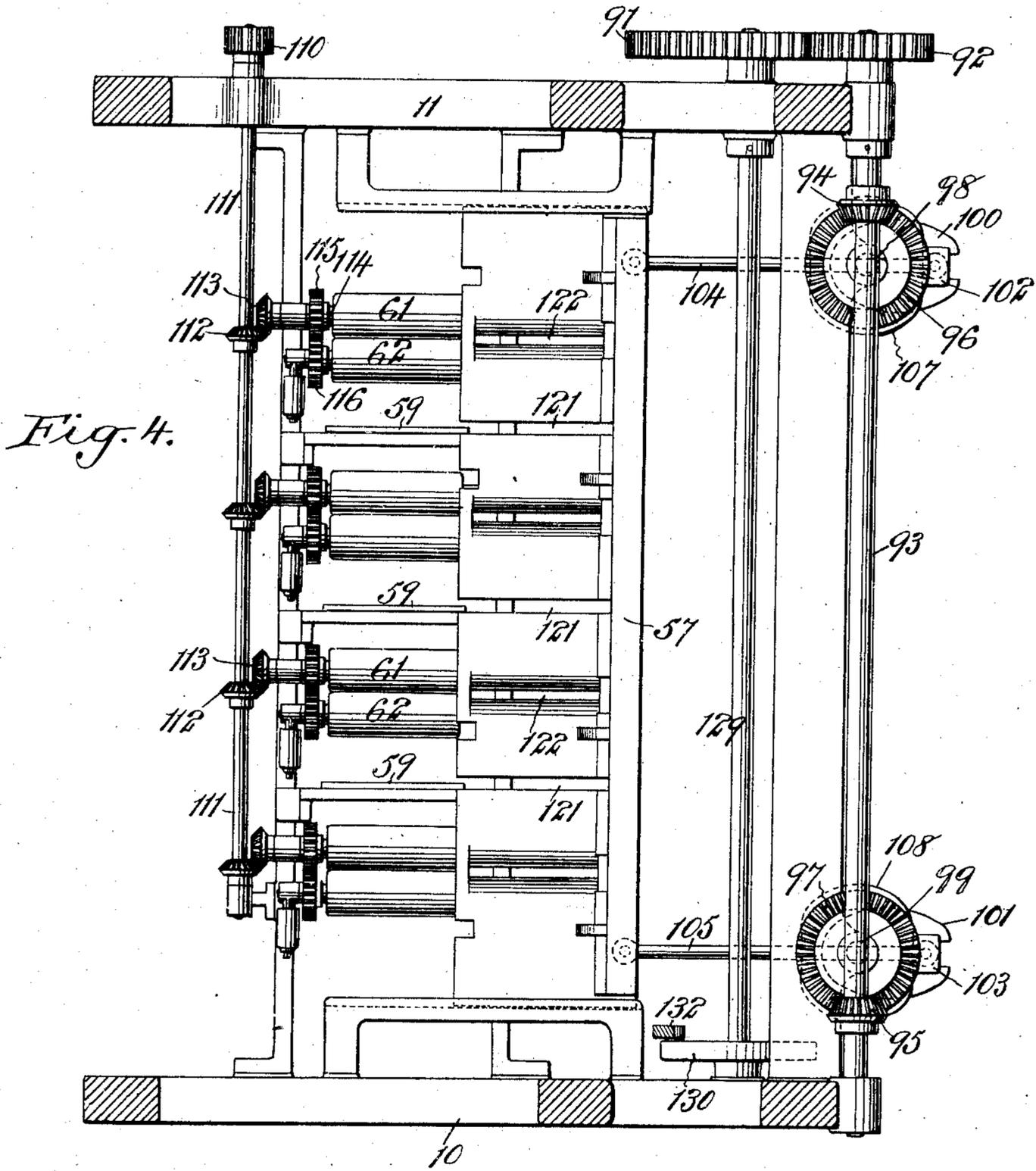
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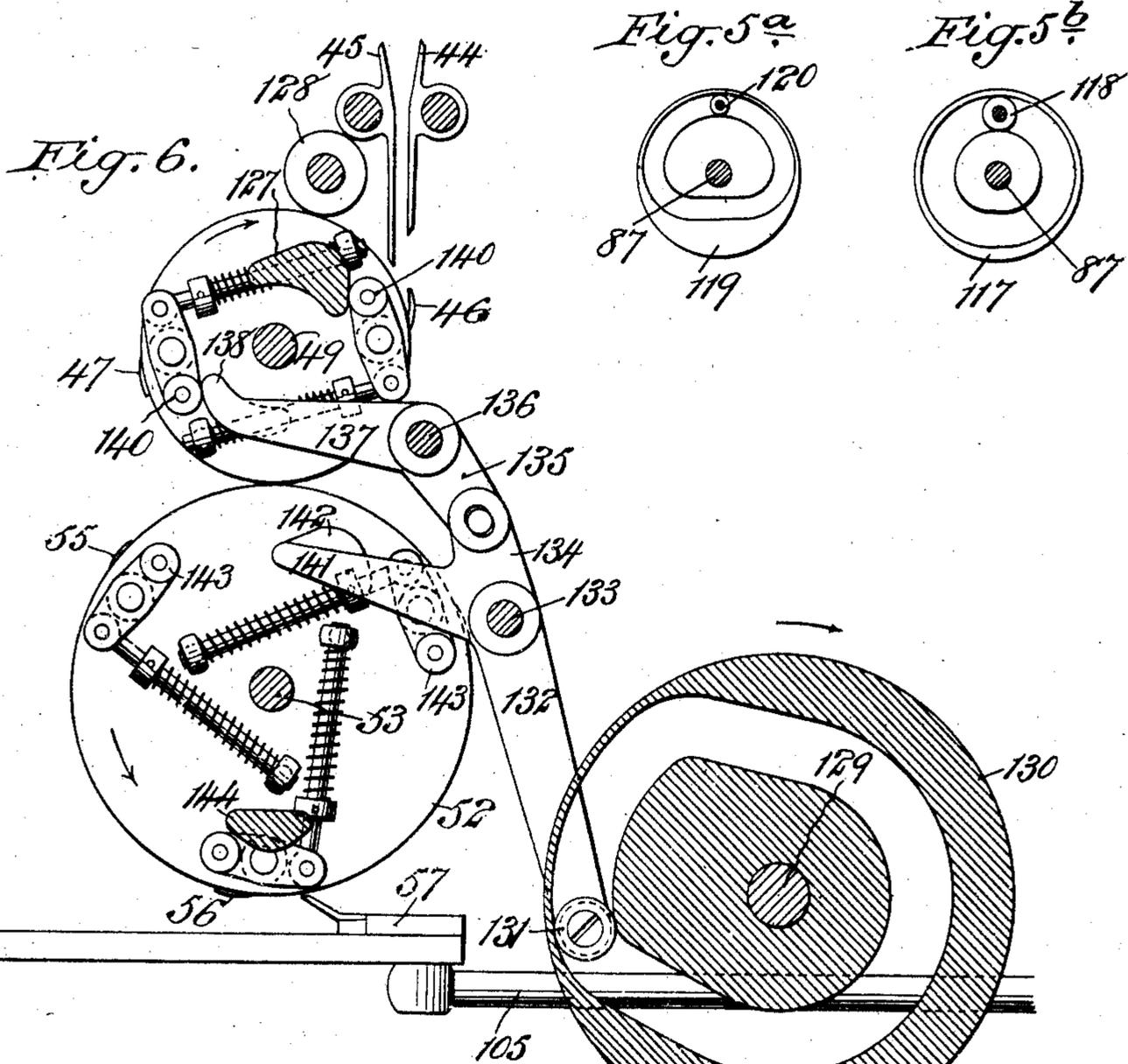
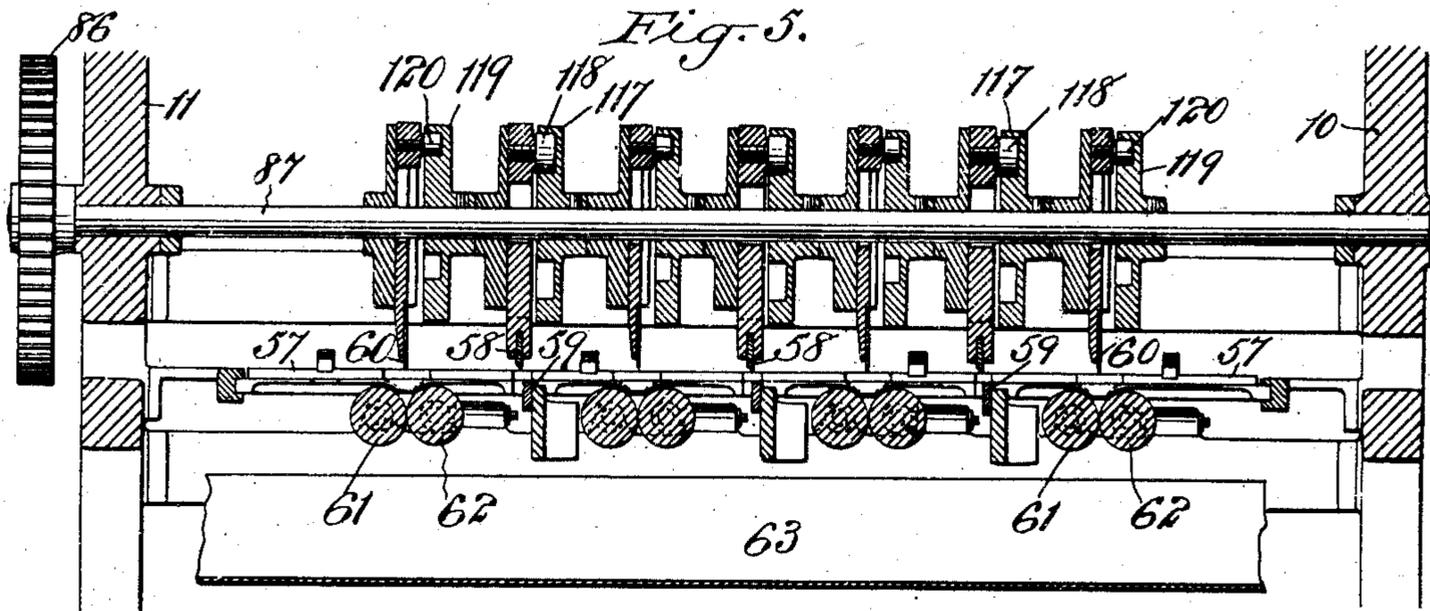
7 SHEETS—SHEET 4.



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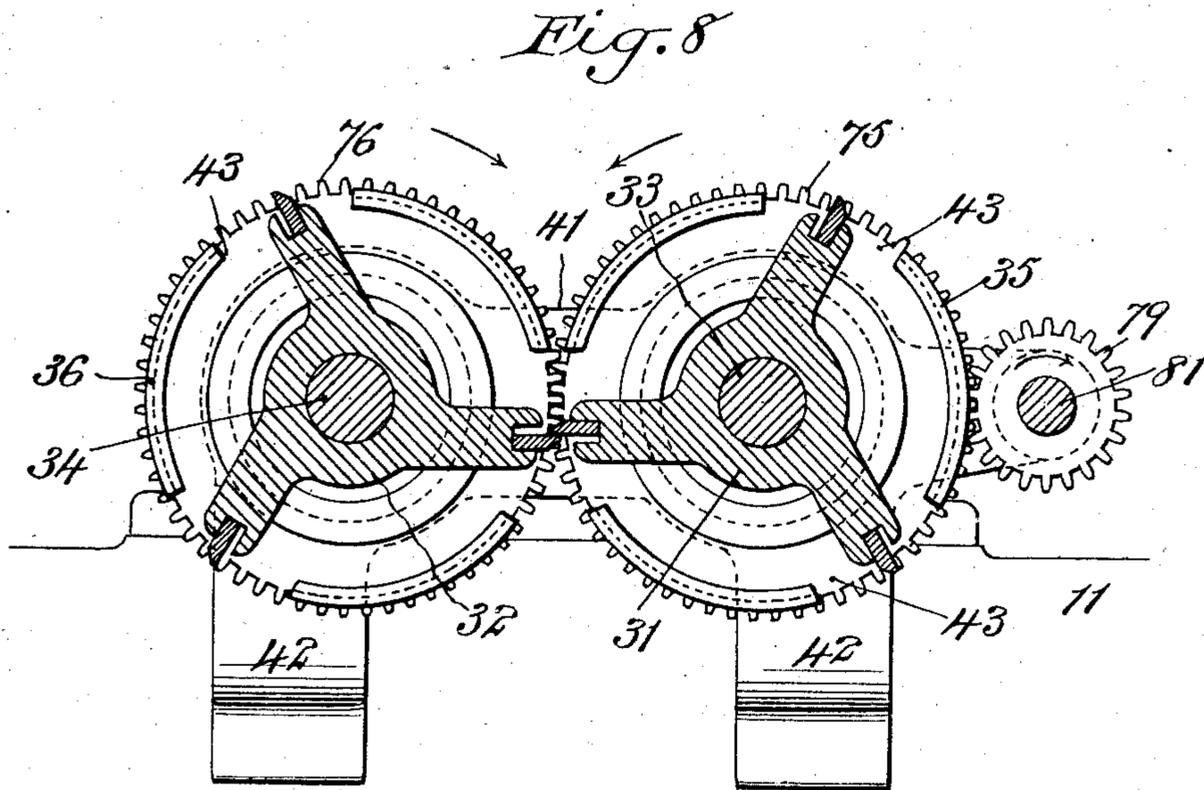
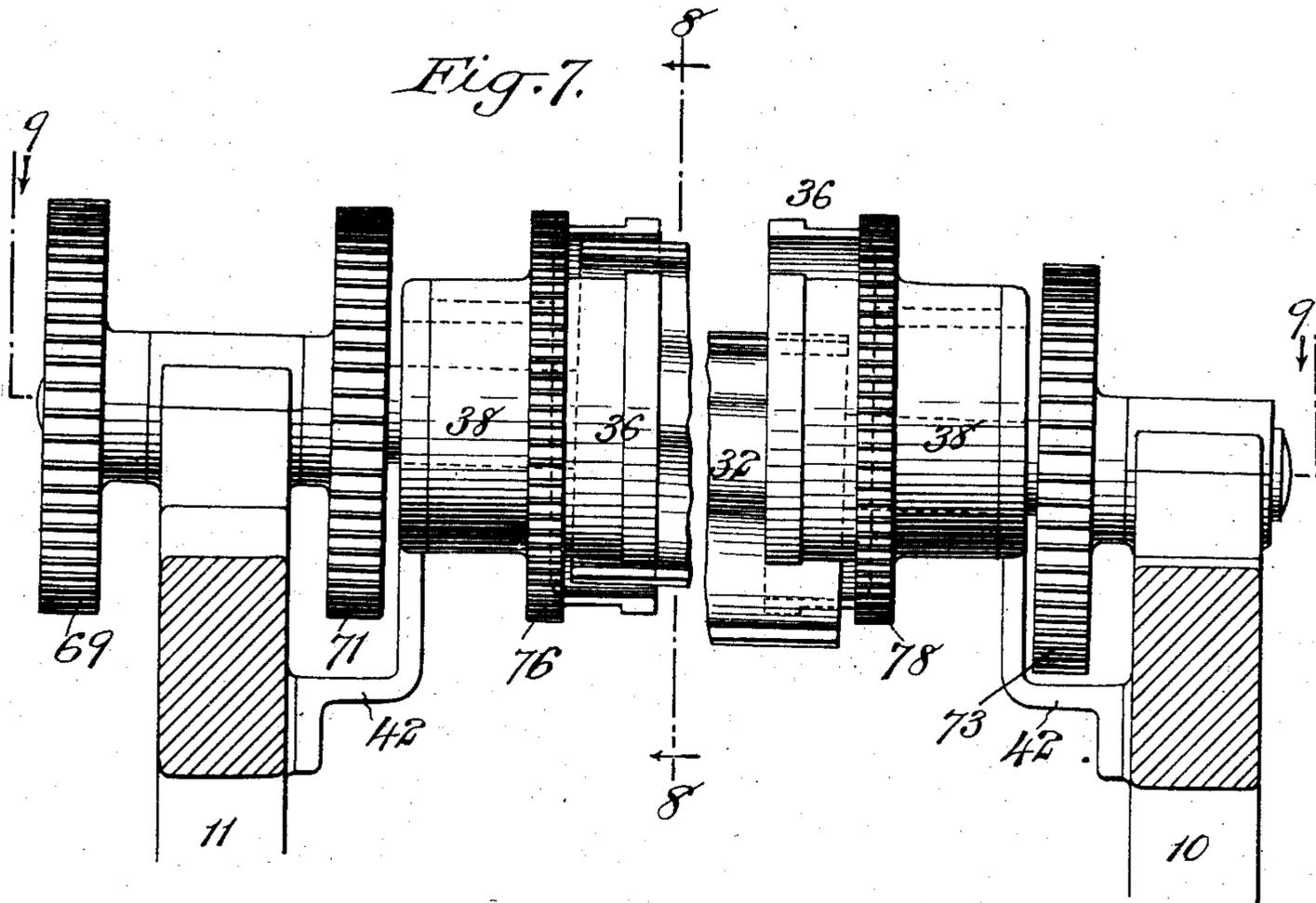
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7 SHEETS—SHEET 6.



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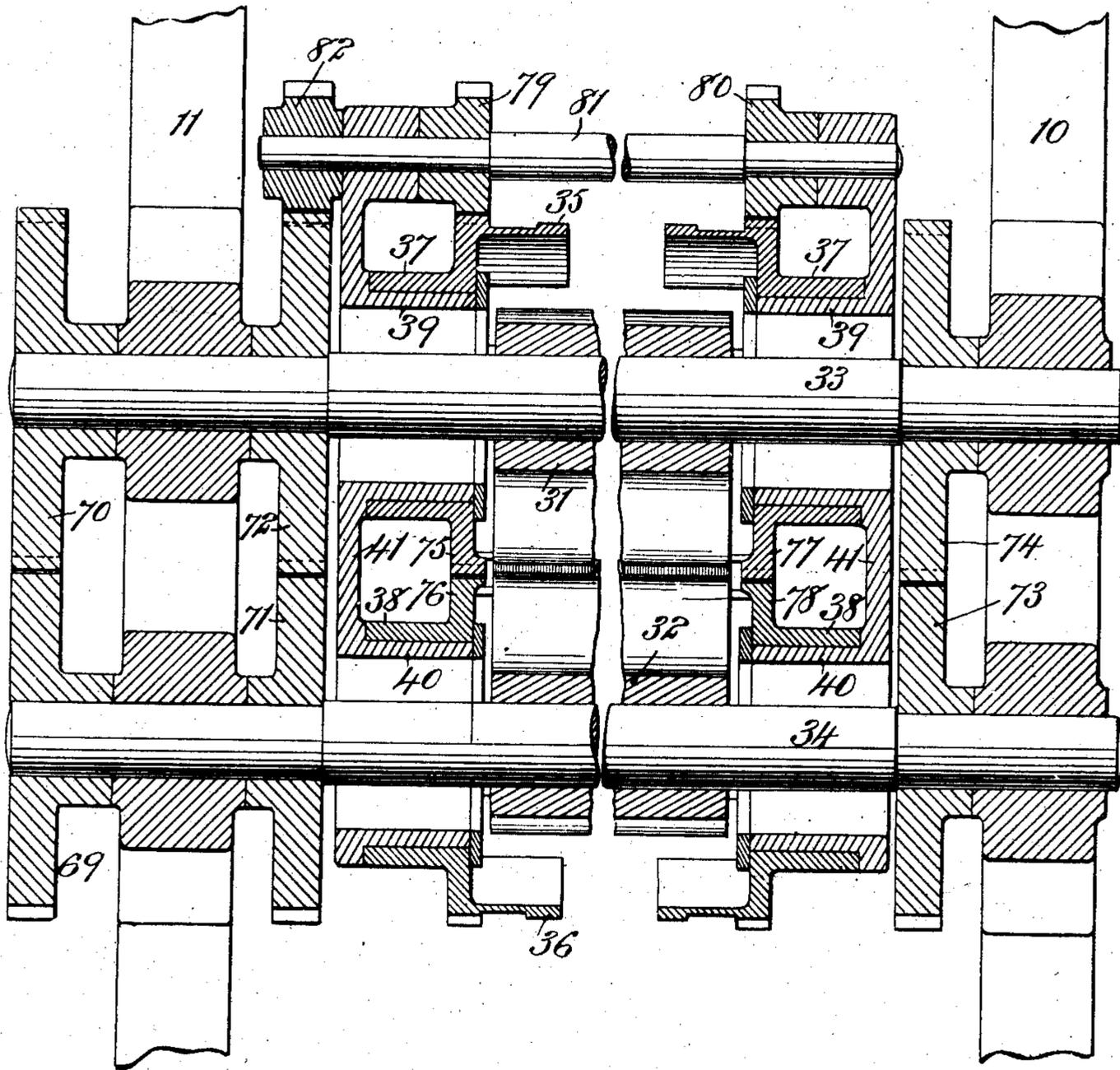
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7 SHEETS—SHEET 7.

*Fig. 9.*



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# UNITED STATES PATENT OFFICE.

HOWARD M. BARBER, OF STONINGTON, CONNECTICUT, ASSIGNOR TO C. B. COTTRELL & SONS COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

## ROTARY PRINTING-PRESS.

No. 873,979.

Specification of Letters Patent.

Patented Dec. 17, 1907.

Application filed November 24, 1906. Serial No. 344,929.

*To all whom it may concern:*

Be it known that I, HOWARD M. BARBER, a citizen of the United States, and resident of Stonington, in the county of New London and State of Connecticut, have invented a new and useful Improvement in Rotary Printing-Presses, of which the following is a specification.

This invention relates to improvements in rotary printing presses and has more particularly for its object to provide certain improvements in the construction, form and operation of the several parts of a sheet feed rotary printing press in which means are provided for feeding the sheets from a feeding board through the printing cylinders, from thence through cutters for severing each sheet into a plurality of smaller sheets, from thence feeding the subdivided sheets to a collecting cylinder where a plurality of sheets are collected together; transferring the collected sheets successively to a delivery cylinder; delivering a plurality of collections of sheets on to a folding table; and finally feeding the assembled groups of sheets to a cutting and folding device where the assembled groups of sheets are again subdivided, folded and delivered in the proper sized signatures into a box or other predetermined receptacle.

In the present instance the parts are shown as being arranged to sever each sheet fed from the press into four smaller sheets, collecting these sheets in groups of two sheets each, assembling two groups of two sheets each on the folding table and again severing each of these assembled groups of sheets into four smaller assembled groups of sheets and folding the same into four sixteen-page signatures.

In the accompanying drawings, Figure 1 represents in side elevation so much of a sheet feed rotary printing press as will give a clear understanding of my invention, Fig. 2 is a detail vertical section taken from front to rear through the same, Fig. 3 is a diagrammatic view in section showing the geared connections between the several parts, Fig. 4 is a horizontal section taken in the plane of the line 4, 4, of Fig. 2, looking in the direction of the arrows, Fig. 4<sup>a</sup> is a detail section of one of the cams for controlling the movement of the folding table, Fig. 5 is a section taken in the plane of the line 5, 5, of Fig. 2, looking in the direction of the arrows, Fig. 5<sup>a</sup> is a detail

section showing the cam for controlling the movements of the tucking blades, Fig. 5<sup>b</sup> is a detail section showing the cam for controlling the movements of the cutting blades, Fig. 6 is an enlarged detail section showing the means for controlling the operations of the grippers on the collecting and delivery cylinders, Fig. 7 is an enlarged detail view partially broken away, in side elevation of the rotary cutters, Fig. 8 is a transverse section taken in the line 8, 8, of Fig. 7, looking in the direction of the arrows, and Fig. 9 is a horizontal section taken in the plane of the line 9, 9, of Fig. 7, looking in the direction of the arrows.

The side frames of the machines are denoted by 10 and 11. A feeding board 12 is provided in position to feed sheets therefrom between the first plate and impression cylinders 13, 14 of the rotary printing press. The second plate and impression cylinders of the press are denoted by 15, 16. The respective shafts of these four cylinders are denoted by 17, 18, 19, 20 and are suitably mounted in the side frames 10, 11. Feeding pulleys 21 are fixed to a shaft 22 and located in position to feed the sheets downwardly between fixed guides 23, 24, into engagement with the feeding pulleys 25, 26 carried by the shafts 27, 28.

The set of grippers on the first impression cylinder 14 are denoted by 29 and they are arranged to receive the sheets from the feeding board 12 and transfer them one at a time to the set of grippers 30 or 30\* on the second impression cylinder 16. The set of grippers 30 or 30\* is arranged to release the advance edge of each sheet as it reaches the feeding pulleys 21 for permitting the sheet to be fed down between the guides 23, 24. A pair of rotary cutters 31, 32 of the three-bladed type are arranged in position to divide each sheet transversely as it is fed from the pulleys 25, 26, into four smaller sheets. These rotary cutters are of the well known Cottrell type having their shafts 33, 34, at a slight inclination off a plane at right angles to the plane of travel of the sheet, whereby a shearing cut is imparted to the sheet at exactly right angles to its travel.

Coacting feeding pulleys 35, 36 surround the cutters 31, 32, the hubs 37, 38 of which pulleys are loosely mounted on hollow bosses 39, 40 of stationary spiders 41, supported from the side frames 10, 11, by brackets 42. There are two of the pulleys 35 and two of

the pulleys 36 shown herein, one pair being at each end of the rotary cutters in position to engage the opposite edges of the sheet as it passes between the cutters. The shafts 33, 34, of the cutters pass through the hollow bosses 39, 40 of the spiders 41, thus permitting the axes of the feeding pulleys to be exactly at right angles to the travel of the sheet irrespective of the angular deflection of the said cutter shafts 33, 34. All of the pulleys 35, 36 are cut away as shown at 43, in line with the blades of the cutters so as to permit the cutters to engage the sheets from edge to edge thereof.

The sheets as they pass from between the rotary cutters are fed between stationary guides 44, 45, down into position to be engaged successively by the sets of grippers 46, 47 of the collecting cylinder 48, the shaft of which is denoted by 49. Rollers 50 mounted on a shaft 51 are arranged in position to cause the advance edges of the sheets to be engaged by their respective sets of grippers.

A delivery cylinder 52 is mounted on a shaft 53 and is provided with three sets of grippers 54, 55, 56, arranged to successively receive a collected group of sheets from the two sets of grippers 46, 47 on the collecting cylinder 48. A laterally movable folding table 57 is arranged to receive assembled groups of sheets from the delivery cylinder 52 and feed the same into position to be engaged by the final cutting and folding mechanism. A plurality of coacting cutting blades 58, 59, in the present instance three sets of these cutting blades, are provided for severing the assembled groups of sheets longitudinally on the folding table into four smaller assembled groups. There are also provided a plurality of tucking blades 60 each arranged to coact with a pair of tucking rolls 61, 62, for folding each severed assembled group of sheets into a signature of a predetermined number of pages. In the present instance I have shown four of these folding devices. A box 63 or other suitable receptacle is shown for receiving the cut and folded signatures.

The driving connections and the mechanisms for operating the several parts hereinabove described are constructed and arranged as follows. The first plate cylinder is provided with a spur gear 64 which meshes with the gear 65 of the first impression cylinder. This gear 65 meshes with the gear 66 of the second impression cylinder and the gear 67 of the second plate cylinder also meshes with the gear 66 of the second impression cylinder. The said spur gear 66 meshes with a spur gear 68 which in turn meshes with a spur gear 69 on the rotary cutter shaft 34. This spur gear 69 meshes with a spur gear 70 on the rotary cutter shaft 33. These cutter shafts are also provided with intermeshing gears 71, 72, 73, 74. The sheet feeding pul-

leys of the rotary cutting mechanism are provided with intermeshing gears 75, 76, 77, 78 and the gears 75, 77 are driven from gears 79, 80 fixed to a shaft 81 mounted in the spiders 41. This shaft 81 is further provided with a gear 82 which meshes with a gear 72 of the rotary cutter shaft 33, whereby the said feeding pulleys are driven at the same surface speed as the cutters.

The sets of sheet feeding pulleys 25, 26 are driven by providing their shafts with intermeshing gears 83, 84, the gear 83 meshing with a gear 85 which in turn meshes with the gear 70 on the rotary cutter shaft 33. The gear 68 meshes with a gear 86 on the rotary cam shaft 87 of the final cutting and folding mechanism. The shaft 53 is provided with two spur gears 88, 89, the spur gear 88 meshing with the spur gear 86 and the spur gear 89 meshing with a spur gear 90 on the shaft 49 of the collecting cylinder 48.

The geared connection for reciprocating the folding table is as follows. A spur gear 91 meshes with the gear 88 and also meshes with a gear 92 on the cross-shaft 93. This cross shaft 93 is provided with two bevel gears 94, 95, meshing respectively with bevel gears 96, 97 on short upright crank shafts 98, 99. The cranks 100, 101 of these crank shafts have a slotted engagement with slides 102, 103 to which are pivoted the rods 104, 105 which are connected to the folding table. These slides 102, 103 are provided with truck rollers 106 arranged to travel in the grooves in the stationary box cams 107, 108 for controlling and timing the movements of the folding table.

The geared connection for the final cutting and folding mechanism is as follows. The gear 86 on the cam shaft 87 meshes with a gear 109 which in turn meshes with a gear 110 on the cross shaft 111. This cross shaft 111 is provided with a bevel gear connection 112, 113 with one shaft 114 of each pair of folding rolls 61, 62, the two rolls being geared together by gears 115, 116. The cam shaft 87 is provided with three box cams 117 arranged to engage the truck rollers 118 of the movable cutting blade members 58. This cam shaft is further provided with four box cams 119 arranged to engage the truck rollers 120 of the tucking blades 60.

The folding table 57 is provided with a series of slots 121 therethrough for permitting the cutting devices to operate when the table is beneath the same. This table is further provided with a series of slots 122 therethrough for permitting the tucking blades to pass through the table to cause the piles of sheets to be folded between their respective rollers 61, 62. A sheet stop 123 is provided for engaging the edges of the piles of sheets as the folding table 57 is advanced into position between the cutting and folding devices.

A stationary cam 124 is arranged in position to open the set of grippers 29 for transferring the sheet from the first impression cylinder to the second impression cylinder, a stationary cam 125 being provided for opening the set of grippers 30 or 30\* on the second impression cylinder at the proper time to receive the advance edge of each sheet from the set of grippers 29 on the first impression cylinder. A stationary cam 126 is arranged in position to open the set of grippers 30 or 30\* on the second impression cylinder in time to permit the advance edge of the sheet to pass down between the guides 23, 24, said cam being so arranged that it will not release the sheet until the feeding rollers 21 have been brought into engagement therewith.

A stationary cam 127 is arranged in position to engage the stud rollers 140 for opening the sets of grippers 46, 47, at the proper times to receive the advance edges of successive sheets as they are fed from the guides 44, 45. Pressure rollers 128 are arranged in position to hold the sheets on the periphery of the collecting cylinder as each sheet approaches the guides 44, 45, to permit the grippers to open to receive a second sheet.

The means which I have shown for causing each set of grippers 46, 47, to open every second revolution of the collecting cylinders to deliver two collected sheets to one of the three sets of grippers 54, 55, 56 on the delivery cylinder is as follows. The shaft 129 which carries the spur gear 91 also carries a rotary box cam 130, which cam engages the truck roller 131 on the depending arm 132 of a rock lever pivoted at 133, the uprising arm 134 of which lever engages one arm of a rock lever 135 pivoted at 136, the other arm 137 of which lever is provided with a cam 138 arranged to be moved into and out of position to engage the stud rollers 140 of the levers which control the opening of the sets of grippers 46, 47. A third arm 141 pivoted at 133 is provided with a cam 142 arranged to be brought into and out of position to engage the stud rollers 143 of the three sets of grippers 54, 55, 56 on the delivery cylinder so that a collected group of two sheets may be delivered from one of the sets of grippers 46, 47 on the collecting cylinder to one of the sets of grippers 54, 55, 56 on the delivery cylinder when two sets of grippers come into correlation at the proper time for the transfer of two collected sheets from the collecting cylinders to the delivery cylinder.

A stationary cam 144 is arranged in position to engage the stud rollers 143 of the sets of grippers 54, 55, 56 at the proper time for causing the grippers to open and deliver the collected groups of sheets on to the folding table 57.

In operation, the sheets are fed one at a time from the feeding-board 12 into position

to have their advance edges engaged by the grippers 29 on the first impression cylinder. The sheet is then passed between the first impression cylinder and the first plate cylinder where it is printed upon one side. The grippers 29 then transfer the advance edge of the sheet to one of the two sets of grippers 30, 30\* on the second impression cylinder. The sheet is then passed between the second impression cylinder and the second plate cylinder and thus printed on its opposite side. The grippers 30 or 30\* then release the advance edge of the sheet after the sheet has been engaged by the feeding rollers 21, which feeding rollers will feed the sheet down between the guides 23, 24, into engagement with the feeding rollers 25, 26. These last named feeding rollers will feed the sheet into position to be engaged by the feeding pulleys 35, 36 of the cutting mechanism. The rotary cutters will then sever each sheet transversely into four smaller sheets, the feeding pulleys 35, 36 serving to insure the positive feed of the sheets at the predetermined speed of the cutters. The arrangement of the parts is such that one of the sets of grippers 46, 47 of the collecting cylinder 48 will engage the advance edge of the sheet before the first cut of the cutters is accomplished. The arrangement of cams is such that each of the sets of grippers 46, 47 will collect two subdivided sheets fed from the cutting mechanism and will then transfer such collected group of sheets to one of the sets of grippers 54, 55, 56 of the delivery cylinder. Two of these sets of grippers 54, 55, 56 on the delivery cylinder will deposit two collections of sheets one upon the other in a pile upon the folding table 57. The folding table is then advanced into position between the members of the final cutting and folding mechanism. The cutters will then be operated to sever the assembled two groups of two sheets, viz: a pile of four sheets, longitudinally into four smaller groups. The tucking blades 60 will then feed each of these smaller groups of sheets between the pairs of folding rollers 61, 62, from whence the signatures thus formed are deposited in the box 63. The product thus comprises four sixteen-page signatures. It is understood that the folding table 57 is moved back to a point beneath the delivery cylinder in sufficient time to receive thereon a succeeding assemblage of two groups of two sheets each from the said delivery cylinder.

The parts shown and described but not claimed herein form the subject-matter of my copending application filed Jan. 19, 1907, Serial No. 353,027 entitled Rotary printing presses, which application is a division of the present application.

What I claim is:

1. A sheet feeding and cutting mechanism arranged to cut a sheet transversely into a

plurality of smaller sheets, means for collecting the sheets into groups, a table, means for assembling a plurality of groups into a pile thereon, a cutting mechanism and means for  
5 advancing the table with its pile of sheets into engagement with the cutting mechanism.

2. A sheet feeding and cutting mechanism arranged to cut a sheet transversely into a  
10 plurality of smaller sheets, means for collecting the sheets into groups, a table, means for assembling a plurality of groups into a pile thereon, a cutting and folding mechanism and means for advancing the table with its  
15 pile of sheets into engagement with the cutting and folding mechanism.

3. A sheet feeding and cutting mechanism, a sheet collecting and assembling mechanism, a sheet cutting and folding mechanism  
20 and a folding table arranged to feed a pile of sheets from the sheet collecting and assembling mechanism to the sheet cutting and folding mechanism.

4. A sheet feeding and cutting mechanism  
25 arranged to cut a sheet transversely into a plurality of smaller sheets, sheet collecting and assembling mechanism, a sheet cutting mechanism arranged to cut the sheets longitudinally and a table arranged to feed a pile  
30 of sheets from the sheet collecting and assembling mechanism to the sheet cutting mechanism.

5. A sheet feeding and cutting mechanism arranged to cut a sheet transversely into a  
35 plurality of smaller sheets, a sheet collecting and assembling mechanism, a sheet cutting and folding mechanism arranged to cut and fold the sheets longitudinally and a table arranged to feed a pile of sheets from the sheet  
40 collecting and assembling mechanism to the sheet cutting and folding mechanism.

6. A sheet feeding and cutting mechanism, a collecting cylinder, a delivery cylinder, a sheet cutting mechanism and a table ar-  
45 ranged to feed a pile of sheets from the delivery cylinder to the cutting mechanism.

7. A sheet feeding and cutting mechanism, a collecting cylinder, a delivery cylinder, a sheet cutting mechanism arranged to cut the  
50 sheets longitudinally and a table arranged to feed a pile of sheets from the delivery cylinder to the cutting mechanism.

8. A sheet feeding and cutting mechanism, a collecting cylinder, a delivery cylinder, a  
55 sheet cutting and folding mechanism arranged to cut and fold the sheets longitudinally and a folding table arranged to feed a pile of sheets from the delivery cylinder to the cutting and folding mechanism.

60 9. A sheet feeding and cutting mechanism

arranged to cut a sheet transversely into a plurality of smaller sheets, a cylinder arranged to receive the severed sheets one at a time therefrom and collect them in groups, a  
65 folding table, a delivery cylinder arranged to receive the groups of sheets from the collecting cylinder and deposit a plurality of groups in a pile on said table, a cutting and folding mechanism and means for advancing the  
70 table with its pile of sheets into position to be engaged by the said cutting and folding mechanism.

10. A sheet feeding and cutting mechanism arranged to cut a sheet transversely into  
75 a plurality of smaller sheets, a cylinder arranged to receive the severed sheets one at a time therefrom and collect them in groups of two sheets each, a folding table, a delivery cylinder arranged to receive the groups of  
80 two sheets each from the collecting cylinder and deposit a plurality of such groups in a pile on said table, cutting and folding mechanism and means for advancing the table with its pile of sheets into position to be en-  
85 gaged by said cutting and folding mechanism.

11. A sheet feeding and cutting mechanism arranged to cut a sheet transversely into  
90 a plurality of smaller sheets, a cylinder arranged to receive the severed sheets one at a time therefrom and collect them in groups, a folding table, a delivery cylinder arranged to receive the groups of sheets from the collect-  
95 ing cylinder and deposit two groups of sheets in a pile on said table, a cutting and folding mechanism and means for advancing the table with its pile of sheets into position to be engaged by the cutting and folding mechanism.

12. A sheet feeding and cutting mechanism  
100 arranged to cut a sheet transversely into a plurality of smaller sheets, a cylinder arranged to receive the severed sheets one at a time therefrom and collect them into groups of two sheets each, a folding table, a delivery  
105 cylinder arranged to receive the groups of two sheets each from the collecting cylinder and deposit two of such groups in a pile on said table, a cutting and folding mechanism and means for advancing the table with its  
110 pile of sheets into position to be engaged by the cutting and folding mechanism.

In testimony, that I claim the foregoing as my invention, I have signed my name in presence of two witnesses, this 23rd day of No-  
115 vember 1906.

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Witnesses:

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HENRY THIEME.