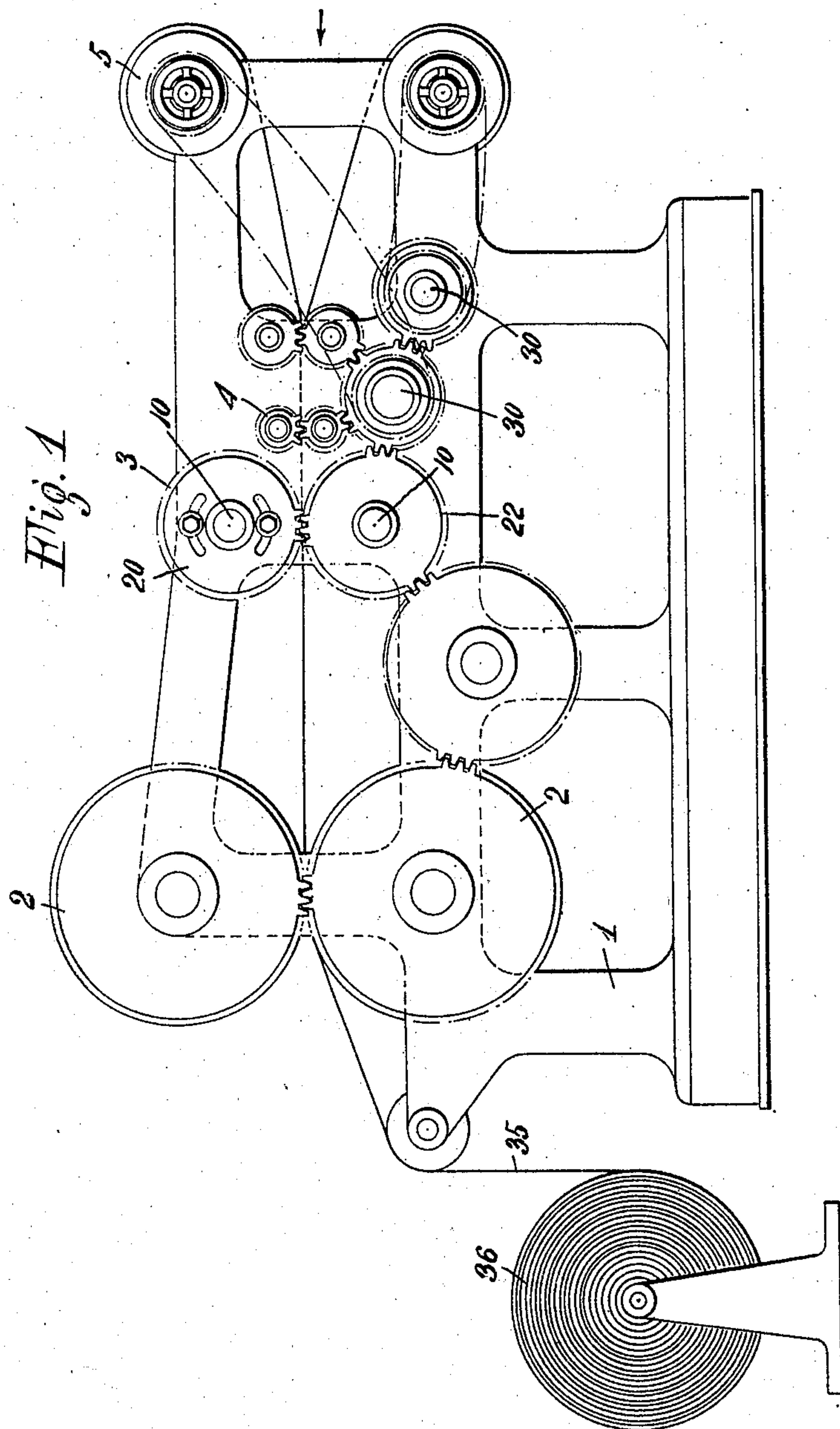


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W. T. BAILEY.  
ROTARY PUNCHING DEVICE.  
APPLICATION FILED DEC. 23, 1903.

4 SHEETS—SHEET 1.



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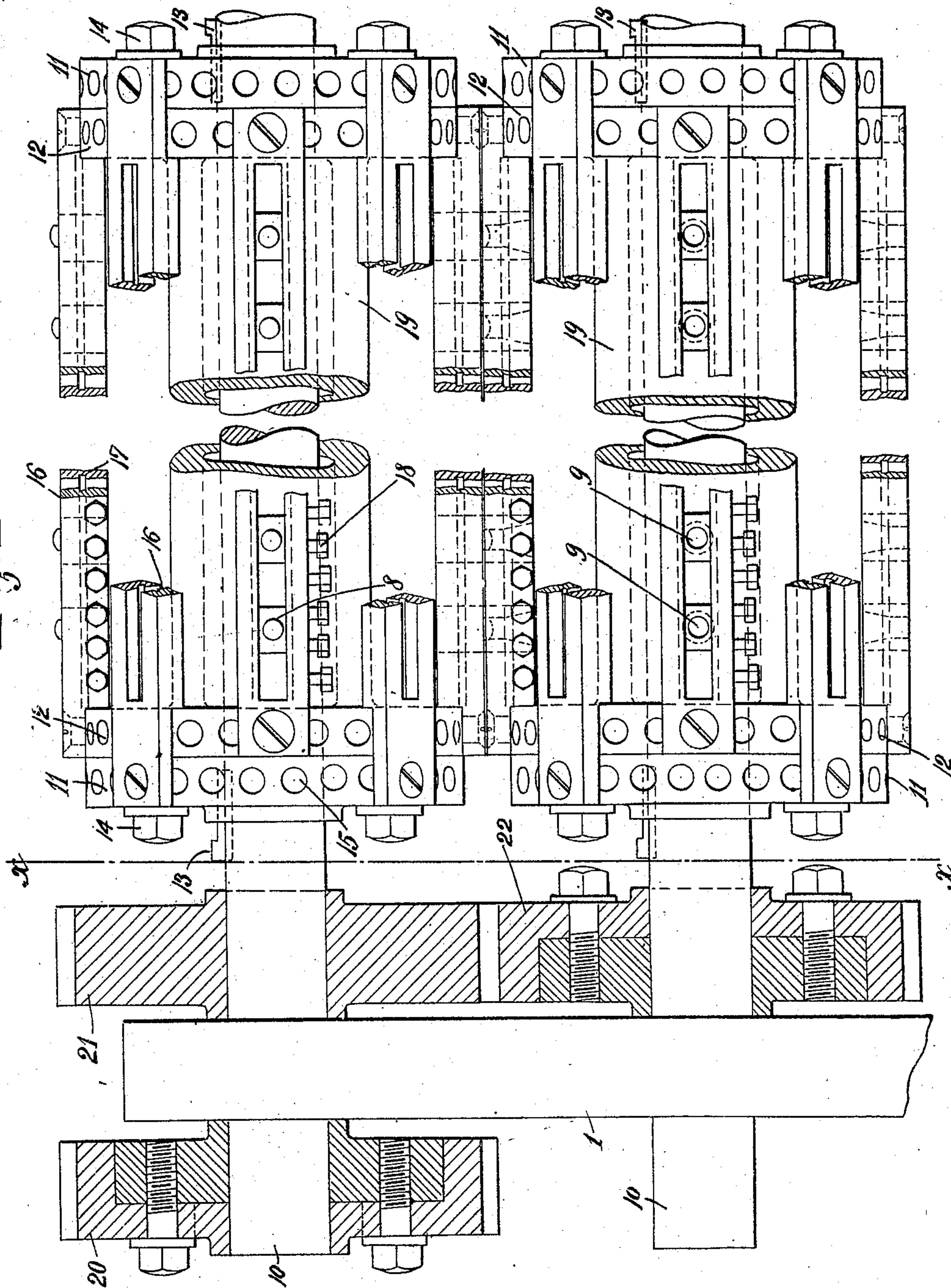
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4 SHEETS—SHEET 2.

Fig. 2



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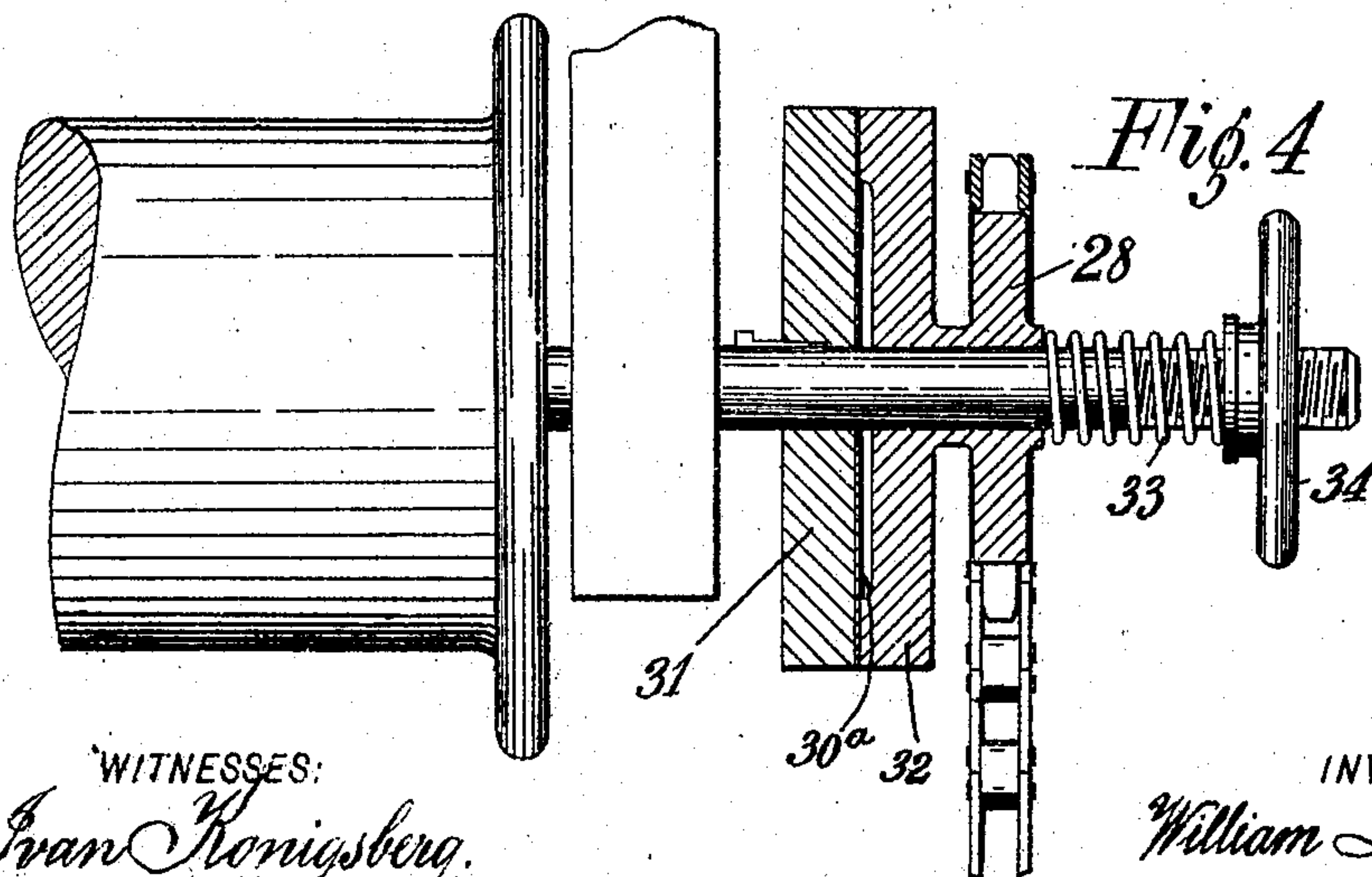
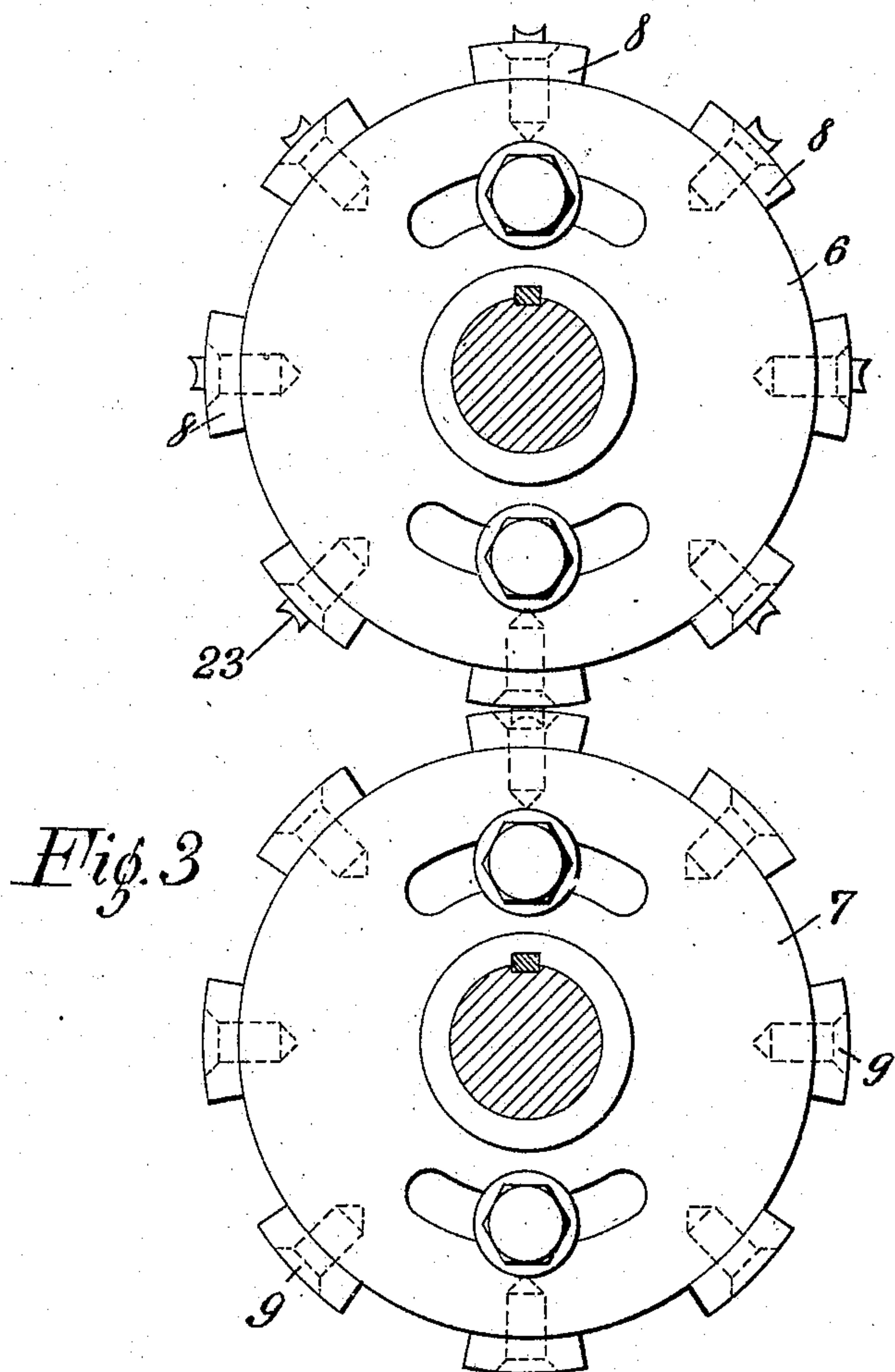


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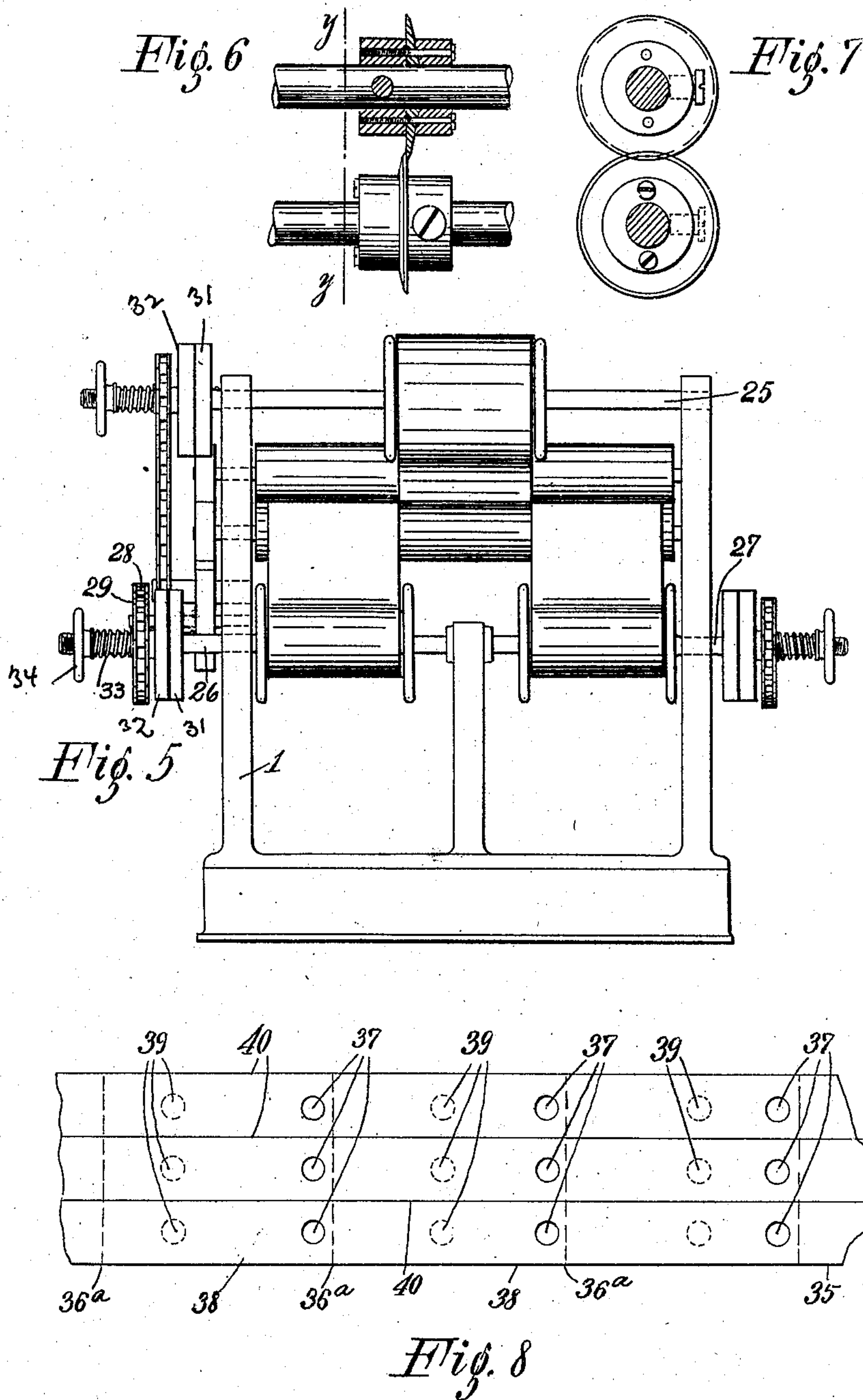
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# UNITED STATES PATENT OFFICE.

WILLIAM T. BAILEY, OF ELMIRA, NEW YORK.

## ROTARY PUNCHING DEVICE.

No. 806,449.

Specification of Letters Patent.

Patented Dec. 5, 1905.

Application filed December 23, 1903. Serial No. 186,289.

*To all whom it may concern:*

Be it known that I, WILLIAM T. BAILEY, a citizen of the United States of America, and a resident of Elmira, Chemung county, New York, have invented certain new and useful Improvements in Rotary Punching Devices, of which the following is a specification.

My invention relates generally to printing or other machines for acting upon a web of paper.

The object of this invention is to meet a demand created by the advance in a certain other industry, as will appear from the following: In wrapping articles of manufacture or commodities made up in large numbers—such as cakes of soap, for instance—machines have been developed in the art which enable the cakes of soap to be wrapped from a web of paper—that is, a web of paper is suitably inserted in the machine, severed, and wrapped around the cakes of soap in quick succession and automatically. In so doing an impaling-pin is generally used in carrying the sheets severed from this web during the process of wrapping the individual cakes of soap.

The object of my invention is accordingly to produce a mechanism whereby a web of paper can be printed provided with holes for the impaling-pin of a relatively large size and, if the article to be produced is small enough, to be slitted lengthwise and then to be rewound into one or more webs. In carrying out this object a great obstacle is encountered in devising means for cutting holes of a large size and of any desired shape into the flowing web. This obstacle is overcome by providing two opposed rotary supporting members or rollers with corresponding punch and die members adjustable both circumferentially and longitudinally.

Other features of construction will appear as the specification proceeds.

In the accompanying drawings I have embodied my invention in a suitable form, so as to facilitate the explanation of the same. It is obvious, however, that changes of construction can be made without departing from the spirit of my invention.

In the said drawings, Figure 1 is a side elevation, largely diagrammatic, showing a machine embodying my invention. Fig. 2 is an end view of the rotary punching device, the gears for operating the same being shown in section. Fig. 3 is a vertical sectional view of Fig. 2 on the line  $xx$ . Fig. 4 is a detail view,

partly in section, showing the driving means for one of the rolls for rewinding the web. Fig. 5 is an end view looking in the direction of the arrow in Fig. 1. Figs. 6 and 7 are detailed views of the slitting mechanism. Fig. 8 is a diagrammatic view of the appearance of the web after it has been acted upon by my machine.

Similar characters of reference denote corresponding parts in the different views.

1 denotes a framework of any suitable construction for properly supporting the parts composing the machine.

2 indicates an ordinary plate and impression-cylinder, while 3 indicates the rotary punching device.

4 is the slit, and 5 the rewinding means.

The printing mechanism and the slit are of the usual construction and need not be described in detail. The rotary punch, however, presents valuable and new features in itself and is constructed as follows: Two opposed rotary supporting members 6 and 7 are provided, one of which carries the punching members 8 and the other of which carries the die members 9. As each of these supporting members 6 and 7 is constructed alike, only one will be described.

Mounted upon the shaft 10 are four heads, two at each end and denoted by 11 and 12. The heads 11 are mounted fast on the shaft by means of the keys 13 or otherwise, while the heads 12 are secured to the heads 11 by means of the bolts 14. Each of these heads is provided with a number of holes or apertures 15, to which are attached the longitudinal bars 16 in such a manner that they alternate in being secured to the said heads, one being attached to the heads 12 and the next one to the heads 11, &c. These longitudinal bars are provided with longitudinal grooves 17, in which are located the die members or the punch members, as the case may be, 8 and 9, the said die and punch members being adjustable longitudinally in the said grooves and are secured in position by means of the set-screws 18. Circumferential adjustment of the punch and die members is obtained by securing the transverse bars 16 in the holes 15 on the heads 11 and 12. Then by loosening the bolts 14 the two heads 11 and 12 at each end may be adjusted with relation to each other so as to obtain the proper circumferential adjustment desired. The heads 12 are secured together by means of the sleeves 19,



which extend all the way across the machine and are cored out to admit of the shafts 10. The rotary punch is driven from the gears 20, 21, and 22. In this instance the gear 20 is made adjustable, so that the whole rotary supporting member can be adjusted with relation to the driving and printing means, so that proper alinement can be obtained, as will more fully hereinafter appear. The gear 22 is also adjustable like the gear 20 and is driven from the latter by means of the gear 21. In order that the action of the punching device may be effected in the proper manner, I provide the punches 8 with a knife whose tip is concave in cross-section, as shown in Fig. 3, so that the action will be more of a cutting or shearing rather than a punching or tearing action.

It will be observed that a variably predetermined number of dies and punches can of course be used of various sizes and shapes and that the distance between successive numbers of holes punched in the web can be regulated by using fewer or more of the longitudinal bars 16.

In the present instance the slitters will slit the web into three distinct sections, which are then rewound each on a separate roll, all of which, however, are driven in unison, though individually. These rolls, upon which the web acted upon are rewound, are mounted on the shafts 25, 26, and 27, each shaft being driven by means of the sprocket-wheel 28 and chain 29 from the shafts 30. As the diameter of the rewound web of paper increases it will of course be understood that the speed of the rewinding-rolls must be slowed up. Ordinarily these rolls are driven at a speed uniform with the web; but in order to allow the speed of the rolls to be slowed down I provide a friction-disk 30<sup>a</sup>, interposed between the fast and loose collars 31 and 32, respectively, on each of the shafts carrying the rewinding-rolls. The collar 32 is provided with the sprocket-wheel 28 and is pressed up against the friction-disk 30<sup>a</sup> by means of the spring 33, the tension of which can be adjusted by means of the hand-wheel 34. As the diameter of the rewound web increases the collar 31 will slip and move at a less speed than the collar 32, thereby automatically regulating the speed of the rewinding-rolls.

In practice the web of paper 35 passes from the roller 36 to the printing mechanism 2, where it is acted upon and printed, as indicated by the lines 36<sup>a</sup> in Fig. 8, each subdivision between the lines 36<sup>a</sup> indicating the complete wrapper for the article to be wrapped. As the web flows in between the rotary punching device the holes 37 are punched in the same. It is necessary that these holes should always be at the front end of each of the subdivisions of the web, (designated by 38 and as shown in Fig. 8.)

After adjusting the transverse bars of the rotary punching device to obtain the same

distance between successive rows of holes, so as to correspond with the length of the subdivisions of the web, it will sometimes be found that the said rows of holes would occupy the wrong position in regard to the subdivisions of the web—as shown, for instance, at 39 in Fig. 8. By adjusting the adjustable gears 20 and 22 it will be understood that the proper register of the punch and die can be obtained with regard to the printing on the subdivisions of the web. After passing through the rotary punch the web is passed to the slitter 4, which forms longitudinal sections, as indicated by the lines 40. Of course the number of longitudinal sections depend upon the size of the package desired to be wrapped and the width of the web. After passing from the slitter the longitudinal sections composing the web are rewound by the rewinding mechanism 5.

Means for perforating and severing a web of paper have of course been carried by opposed rotary supporting members heretofore. To my knowledge, however, it has never been attempted heretofore to construct a rotary punch and die mechanism capable of punching holes of a relatively large size and adjustable longitudinally and circumferentially.

Having thus described my invention, what I claim is—

1. In a machine of the character set forth, the combination of a rotary punching device, having a plurality of punches and dies adapted to punch holes in a web of paper at intervals corresponding to certain subdivisions of the web, means for adjusting the punches and dies circumferentially to regulate the distance between successive holes punched in the sheet, and means for adjusting the said rotary punching device to obtain proper register of the holes with relation to the subdivisions of the web of paper.

2. In a machine of the character set forth, the combination of a rotary punching device, having a plurality of punches and dies adapted to punch holes in a web of paper at intervals corresponding to certain subdivisions of the web, means for adjusting the punches and dies circumferentially to regulate the distance between successive holes punched in the sheet, and means for adjusting the said rotary punching device to obtain proper register of the holes with relation to the subdivisions of the web of paper, and means for rewinding the web after it has been acted upon by the elements described.

3. In a machine of the character set forth, the combination of a rotary punching device, having a plurality of punches and dies adapted to punch holes in a web of paper at intervals corresponding to certain subdivisions of the web, means for adjusting the punches and dies circumferentially to regulate the distance between successive holes punched in the web, and means for adjusting the said rotary punch-



ing device to obtain proper register of the holes with relation to the subdivisions of the web of paper.

4. In a machine of the character set forth, the combination of a rotary punching device, having a plurality of punches and dies adapted to punch holes in a web of paper at intervals corresponding to certain subdivisions of the web, means for adjusting the punches and dies circumferentially to regulate the distance between successive holes punched in the web, and means for adjusting the said rotary punching device to obtain proper register of the holes with relation to the subdivisions of the web of paper, and means for rewinding the web after it has been acted upon by the elements described.

5. In a machine of the character set forth, the combination of a rotary punching device, having a plurality of punches and dies adapted to punch holes in a web of paper at intervals corresponding to certain subdivisions of the web, and a slit for slitting the paper into sections, means for adjusting the punches and dies circumferentially to regulate the distance between successive holes punched in the web, and means for adjusting the said rotary punching device to obtain proper register of the holes with relation to the subdivisions of

the web of paper, and means for rewinding the web after it has been acted upon by the elements described.

6. The combination with two opposed rotary supporting members, of a plurality of dies mounted on one of said members, individually adjustable in a longitudinal direction, and a plurality of punches mounted on the other of said supporting members, also individually adjustable in a longitudinal direction, adapted to cooperate to punch holes in a flowing web.

7. The combination with two opposed rotary supporting members, of a plurality of dies mounted on one of said members, individually adjustable in a longitudinal direction, and adjustable in groups circumferentially, and a plurality of punches mounted on the other of said supporting members, also individually adjustable in a longitudinal direction, and adjustable in groups circumferentially, adapted to cooperate to punch holes in a flowing web.

Signed at Elmira, New York, this 19th day of December, 1903.

WILLIAM T. BAILEY.

Witnesses:

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ANNA M. FABIAN.