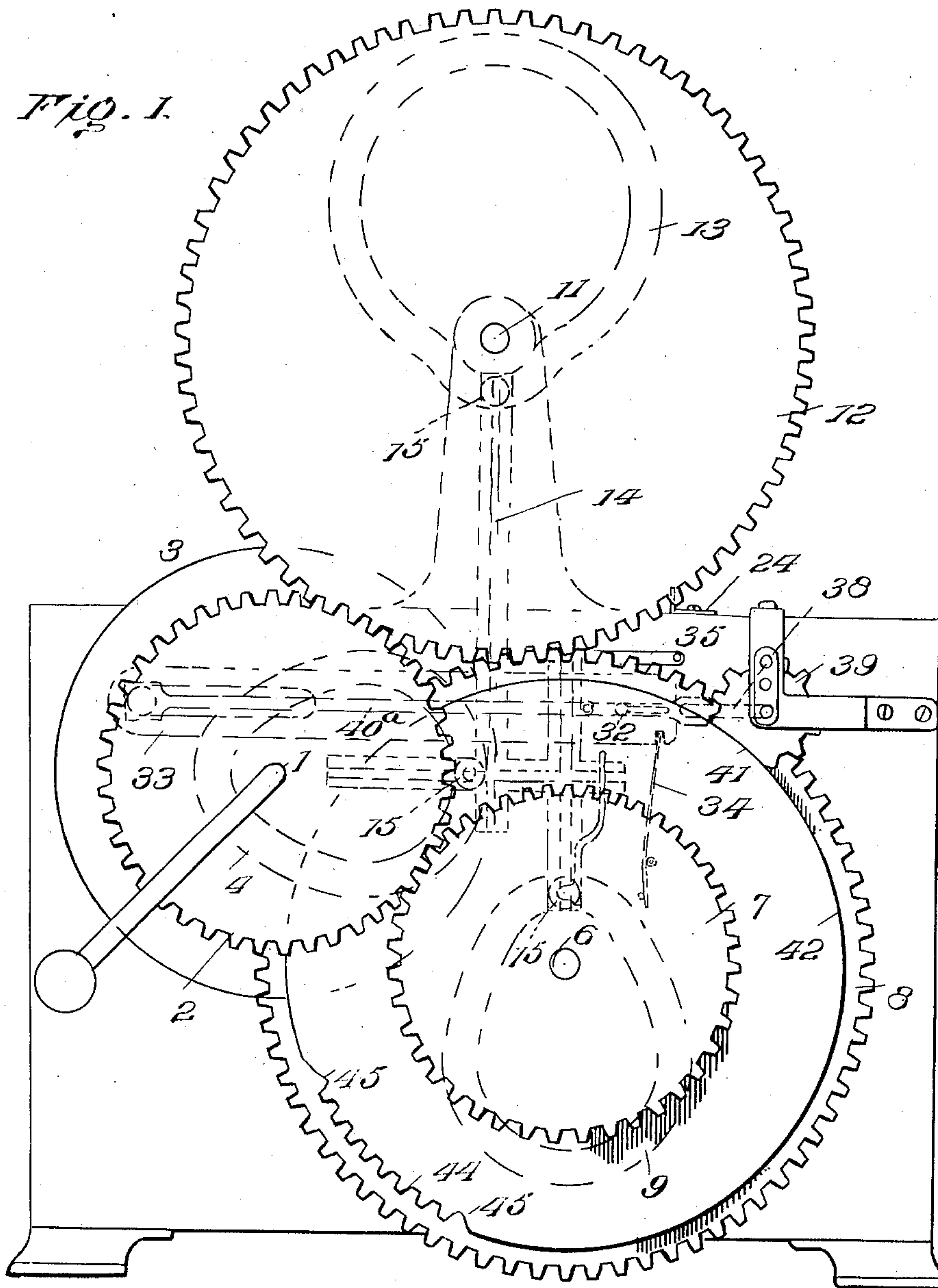


No. 826,544.

PATENTED JULY 24, 1906.

C. H. & W. D. COOLEY.  
PAPER FOLDING MACHINE.  
APPLICATION FILED SEPT. 23, 1905.

5 SHEETS—SHEET 1.



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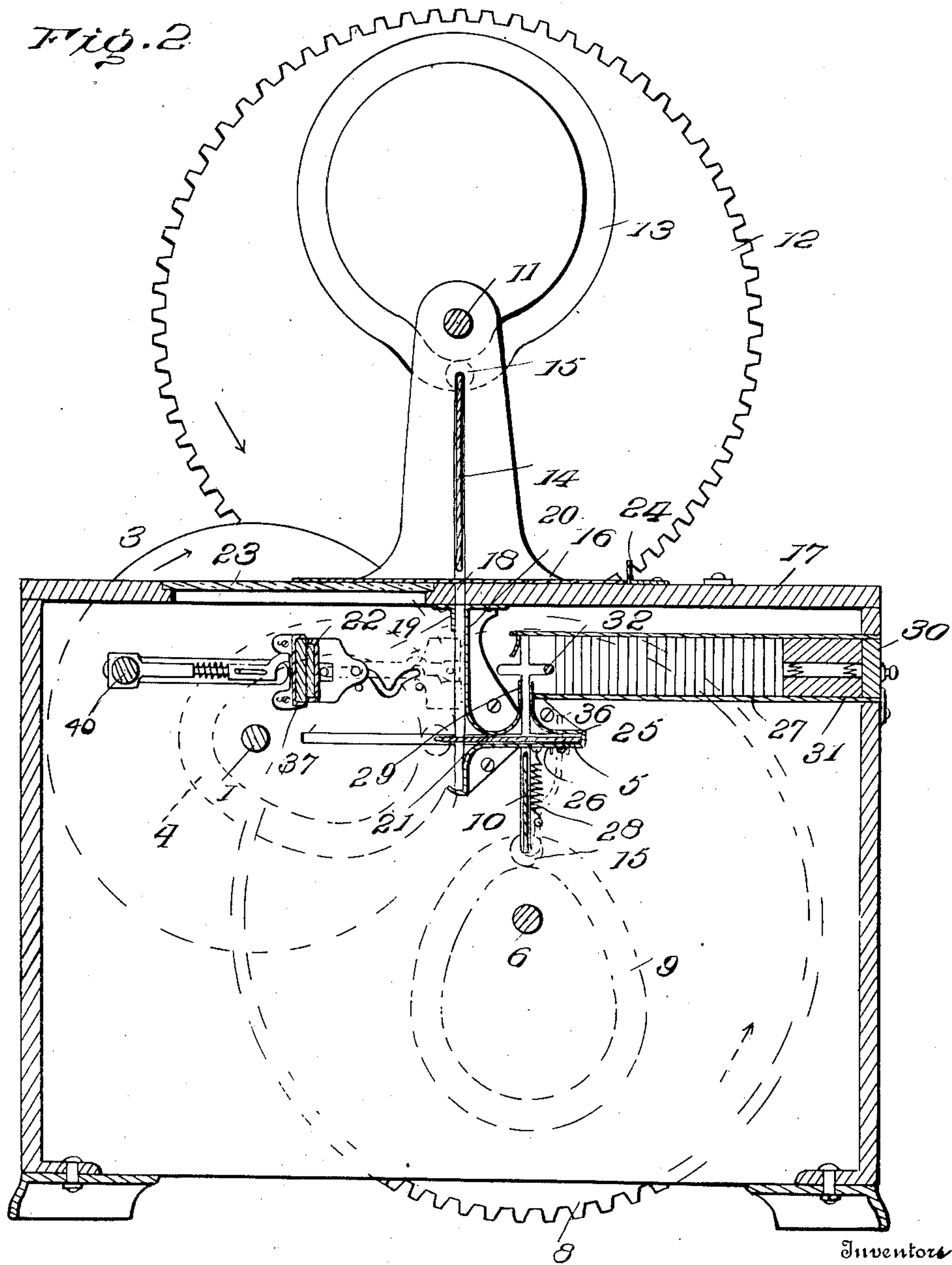
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5 SHEETS—SHEET 2.



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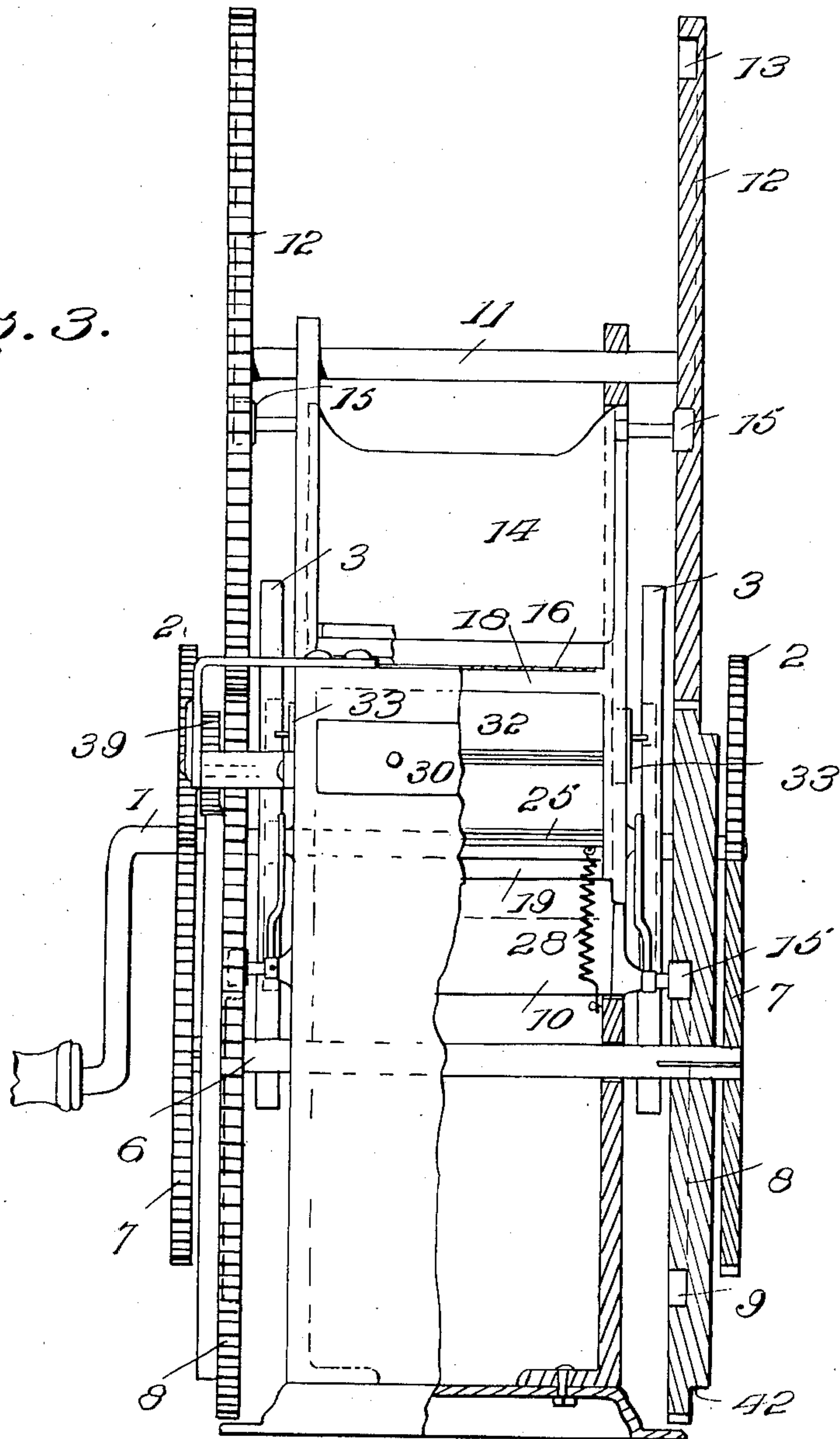
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5 SHEETS—SHEET 3.

Fig. 3.



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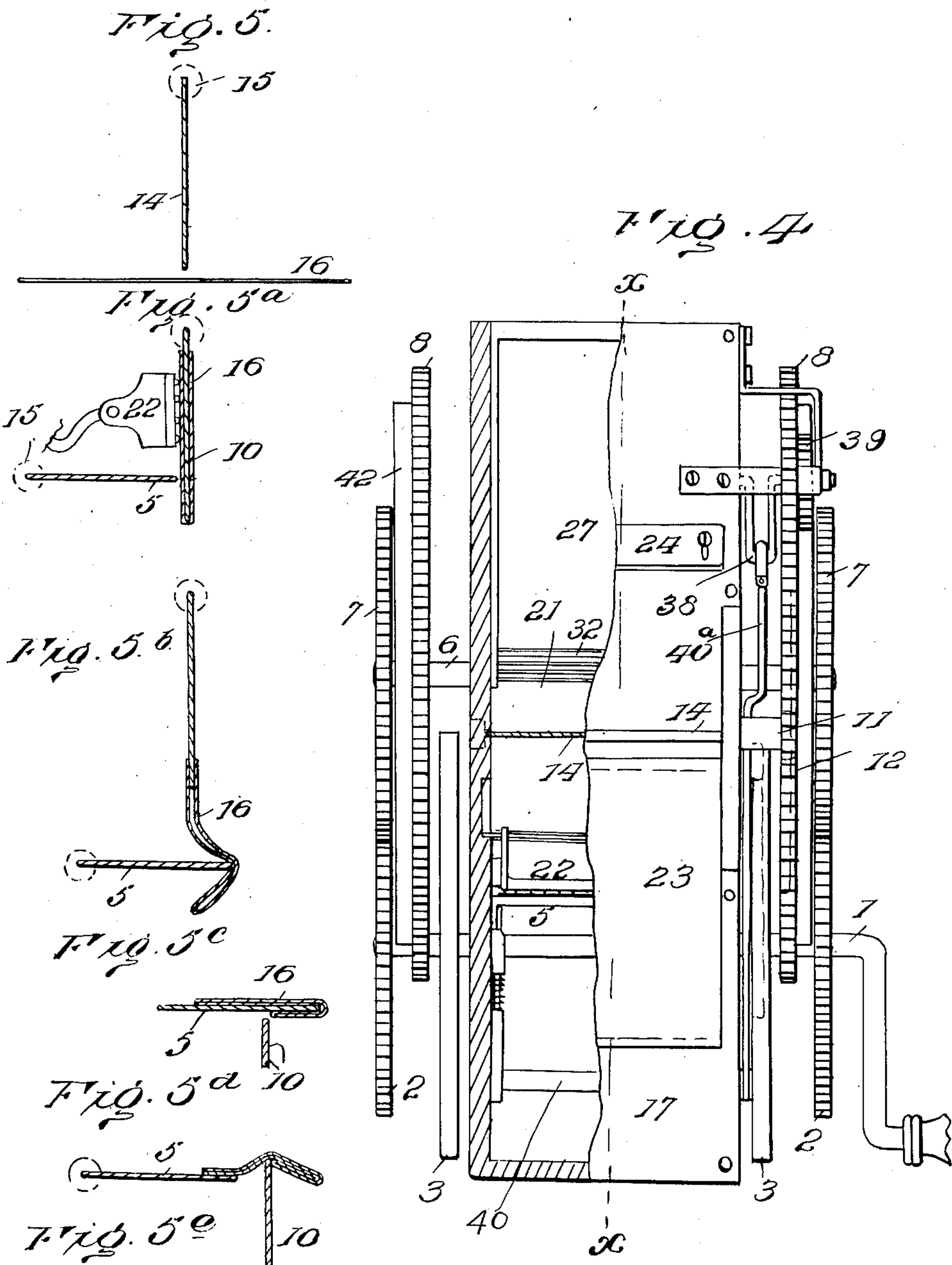
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5 SHEETS—SHEET 4.



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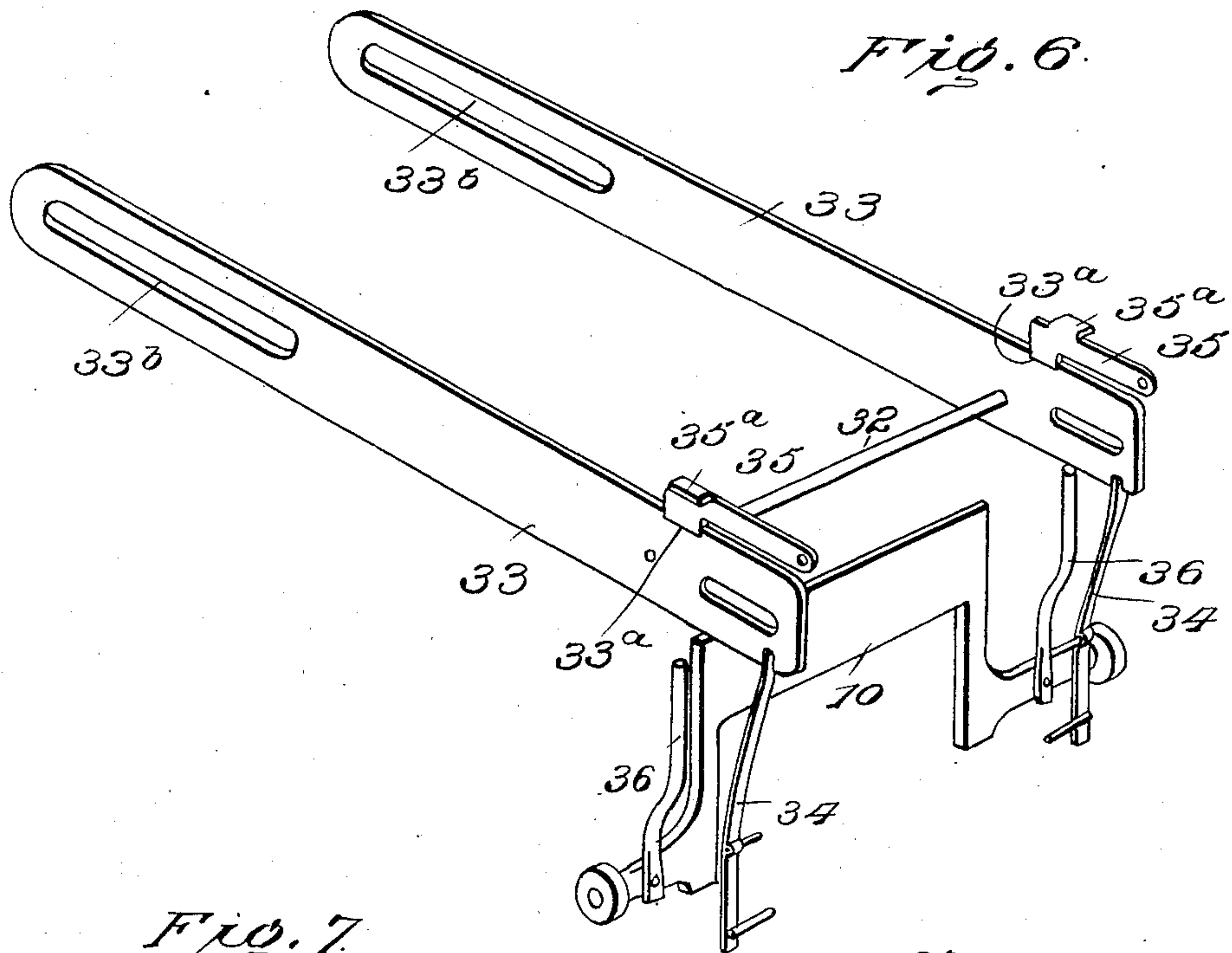
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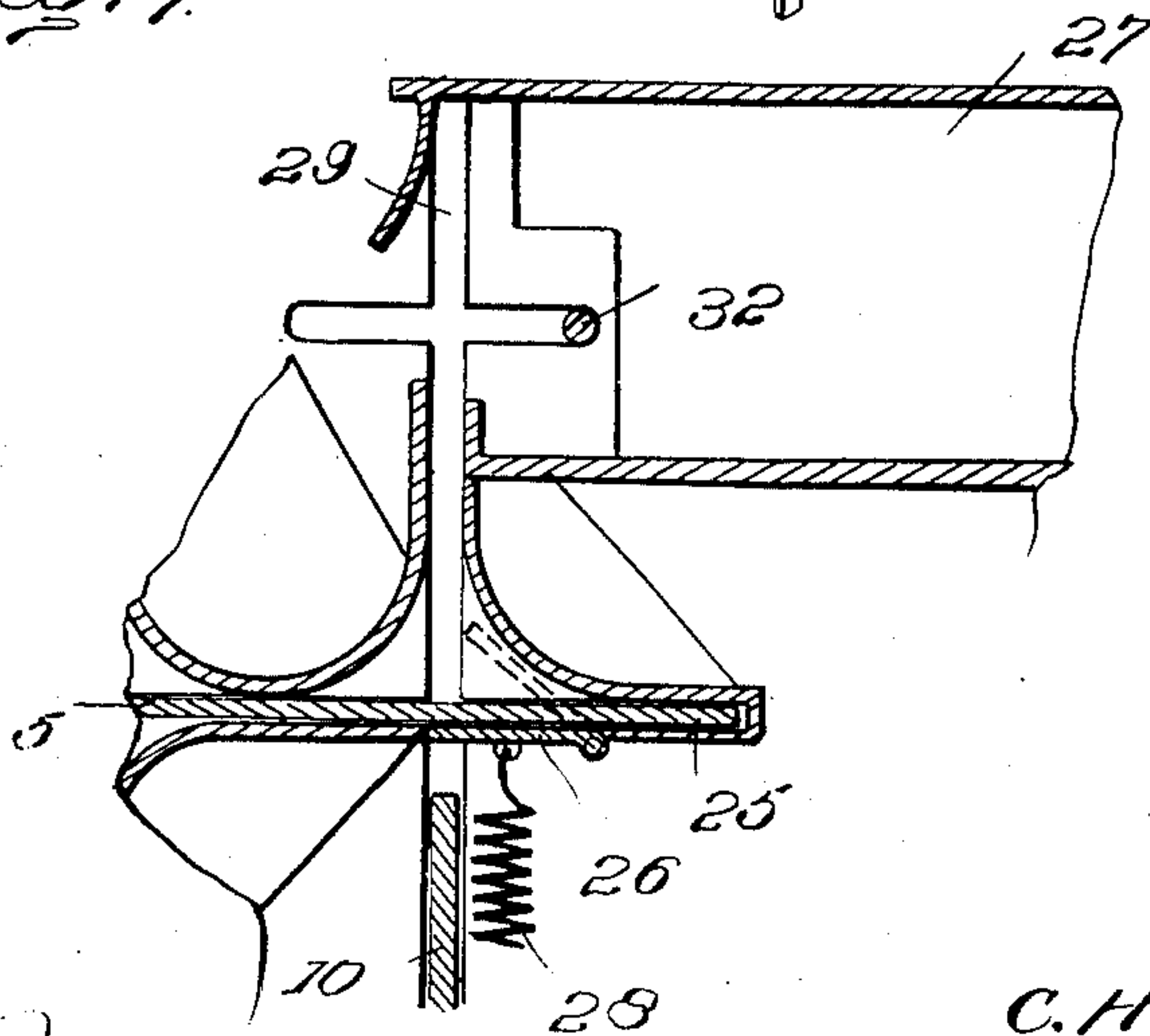
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PAPER FOLDING MACHINE.

APPLICATION FILED SEPT. 23, 1905.

5 SHEETS—SHEET 5.



*Fig. 7.*



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# UNITED STATES PATENT OFFICE.

CHARLES H. COOLEY AND WALTER D. COOLEY, OF WICHITA, KANSAS.

## PAPER-FOLDING MACHINE.

No. 826,544.

Specification of Letters Patent.

Patented July 24, 1906.

Application filed September 23, 1905. Serial No. 279,818.

*To all whom it may concern:*

Be it known that we, CHARLES H. COOLEY and WALTER D. COOLEY, citizens of the United States, residing at Wichita, in the county of Sedgwick and State of Kansas, have invented certain new and useful Improvements in Paper-Folding Machines, of which the following is a specification.

This invention relates to machines for folding newspapers, pamphlets, circulars, and like articles required to be reduced to a small package for convenience of handling.

The improvement resides in the novel structural features, which hereinafter will be more particularly set forth, illustrated, and claimed.

For a full description of the invention and the merits thereof and also to acquire a knowledge of the details of construction of the means for effecting the result reference is to be had to the following description and accompanying drawings, in which—

Figure 1 is a side view of a paper-folding machine embodying the invention. Fig. 2 is a longitudinal section thereof on the line X-X of Fig. 4. Fig. 3 is an end view of the machine, parts being broken away to show more clearly the relative arrangement of the cooperating elements. Fig. 4 is a top plan view of the machine, parts being broken away. Figs. 5 to 5<sup>e</sup>, inclusive, illustrate the different steps in the operation of folding. Fig. 6 is a perspective view of the sliding bars which operate the packer and parts adjacent thereto and cooperating with said bars. Fig. 7 is a detail enlarged sectional view showing clearly the arrangement of the packer and the yieldable portion of the guide of one of the folders.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

The machine comprises a suitable framework, upon which the working elements are mounted according to the capacity and design of the complete mechanism. The drive-shaft 1 is provided with spur-gears 2 and disks 3, fast thereto, the disks 3 being formed with cam-grooves 4 for operating the folder 5. A shaft 6, paralleling the shaft 1, is provided with spur-gears 7 and 8, fast thereto, the spur-gear 7 intermeshing with the spur-gears 2 and receiving motion therefrom. The spur-gears 8 are of larger diameter than the spur-gears 7 and are formed with cam-

grooves 9 for actuation of the folder 10. A third shaft 11 has fast thereon spur-gears 12, which are in mesh with the spur-gears 8 and in which are formed cam-grooves 13 for operation of the folder 14. The several folders 5, 10, and 14 are preferably of similar construction and consist of blades provided at opposite ends with rollers 15 for cooperation with the respective cam-grooves, whereby the frictional contact is reduced to the smallest amount possible. The blade 14 gives the initial fold, the blade 5 the second fold, and the blade 10 the final fold. The blades 10 and 14 operate in parallel planes, which are relatively disposed in perpendicular position, whereas the blade 5 operates in a plane at a right angle to the plane of movements of the blades 10 and 14 or in a relative horizontal plane. The sheet, pamphlet, or the like to be folded is pressed between suitable guides in the folding operations. The working parts are so proportioned as to perform several steps in the folding operation in successive order.

The sheet 16 or like article to be folded is supported upon a table or bed 17, having a slot 18, positioned to receive the folder 14, guides 19 and 20 being attached to the under side of said table and arranged upon opposite sides of the slot 18. The guide 19 is comparatively short, whereas the guide 20 reaches to the plane of the folder 5 and is curved, as shown at 21. The space below the guide 19 is necessary to admit of labeling or otherwise impressing matter upon the article to be folded, said addressing or labeling being effected by means of a suitable stamp 22, which preferably is of the reversible type, so as to receive ink upon its outstroke and impress the required matter upon the part 16 upon its instroke. A glass plate 23 is set in the table, bed, or support 17, so as to come flush with the top side thereof and is located to admit of the working parts being at all times under observation. A gage 24 is adjustably secured to the support 17 and preferably positions the sheet or article 16 when the same is fed to the machine either by hand or otherwise to be folded.

The folder 5 operates in a guide 25, of which the lower curved end 21 of the guide member 20 forms a part. A part 26 of the lowermost wall of the guide 25 is movable, being pivoted at one end and adapted to yield at its opposite end, so as to move with the folder 10 when giving the final fold to the



sheet or article 16, said folder 10 engaging the part 26 to carry it upward, thereby confining said article and preventing unfolding thereof throughout the length of movement incident to the operation of the folder 10 and the delivery of the folded article into the receiver 27. A spring 28 coöperates with the part 26 to restore it to its normal position as the folder 10 moves downwardly. The receiving end of the guide 29 has its wall flared in opposite directions to facilitate the entrance of the paper 16 or the like in the folding operation.

The folder 10 is arranged to operate across the guide 25, so as to give the final fold to the sheet or kindred article 16. The guide 29 is in line with the opening formed in the guide 25, through which the folder 10 operates, and consists of spaced walls, between which the folder 10 and article 16 have movement.

The receiver 27 consists of a trough or receptacle into which the folded articles are delivered and which is provided at its outer end with a handle 30. A follower 31 is arranged within the receiver 27 and consists of blocks pressed apart by means of one or more springs whereby said follower offers sufficient resistance to insure proper compression of the articles when folded, so as to insure their lying close together. The receiving end of the receiver 27 is in communication with the guide 29, so as to receive the sheets when folded.

A packer 32 is arranged to operate across the path of the guide 29, so as to force the folded sheets thereover into the receiver 27. In the preferable construction and as illustrated this packer consists of a rod or bar extending entirely across the machine with both ends projected to make connection with bars or plates 33, slidable longitudinally on the opposite sides of the machine and which are adapted to receive a reciprocating movement so as to move the packer backward and forward. The bars 33 are spring-actuated and are normally held projected, or with the packer against the material in receiver 27, against the tension of springs 34, by means of dogs 35. The dogs 35 are pivoted to the upper portions of the sides of the framework of the machine, and said dogs are arranged to engage in notches 33<sup>a</sup> in the adjacent ends of the plates or bars 33. Lateral extensions 35<sup>a</sup> project from the dogs 35 and are adapted to be engaged by trips to be hereinafter described, which trips are carried by the folder 10, release of the bars 33 to permit the latter to rebound under the action of the springs 34 being effected by means of the above-mentioned trip mechanism. Arms 36 project from the folder 10 and are movable therewith, constituting trips, and are arranged to come into contact with the extensions 35<sup>a</sup> of the dogs 35 upon the upward movement of the folder, so as to release the packer and

permit it to automatically assume a position in the rear of the folded paper, so that upon the return stroke of the folder 10 the packer may advance and force the last paper into the receiver 27.

The stamp 22 for printing the address or other data upon the paper may be of any type or design and is arranged to be inked by a suitable appliance, such as a pad 37. The stamp 22 is operated by means of a crank 38, journaled in suitable bearings and provided with a spur-wheel 39, fast to one end or jaw of said crank. A rod or bar 40 connects the crank 38 with the stamp 22.

The bars 33, as before premised, are connected together by the packer or rod 32, and said bars are provided with slots 33<sup>b</sup> at the ends remote from the packer 32. The bar 40, connected with the crank 38 by the rod or pitman 40<sup>a</sup>, passes through the slots 33<sup>b</sup> of the bars 33 and is adapted to actuate said bars in order to operate the packer 32 in the manner above described. As the stamping mechanism moves toward the folder 10 the bar 40 is carried toward the packer until it strikes corresponding ends of the slots 33<sup>b</sup>, whereupon it imparts movement to said bars 33, carrying the packer 32 across the guide 29 and transferring a folded article or sheet from said guide to the receiver 27. The dogs 35 automatically engage with the bars 33 when the packer enters the receiver, and thus hold said packer in such a position that it compresses the folded material. As the folder 10 moves upwardly, however, the arms or trips 36 engage the extensions 35<sup>a</sup> of dogs 35 and disengage said dogs from the bars 33, permitting the bars to rebound and carry the packer 32 into a position to the left of the guide 29 initial to engagement with the paper or article which is being carried upwardly by the folder 10. As the folder 10 descends after reaching the limit of its upward movement the stamping mechanism is moving toward the folder 10, and the packer 32 will again be actuated in the manner above described to carry the folded article to the receiver 27, moving the bars 33 against the tension of the springs 34. By reason of the length of the slots 33<sup>b</sup> the packer 32 may remain in the receiver 27 temporarily, though the stamping mechanism is returning to its more remote position to perform its functions as a printing device.

The spur-gear 39 has a portion 41 made plain and slightly curved to conform to the smooth surface of a rim 42, projected laterally from a side of the adjacent spur-gear 8, so as to hold the spur-gear 39 and crank 38 in given positions and prevent any possible movement thereof during the intervals between the positive operation of the address mechanism. A portion of the rim or lateral flange 42 is toothed, as shown at 44, to permit positive engagement with the teeth of



the element 39, so as to drive the crank 38 and positively actuate the address mechanism. The rim or flange 42 is indented at each end of the toothed portion 44, as indicated at 45, to admit of the teeth 44 entering and leaving the toothed portion of the spur-gear 39 when meshing and unmeshing. The indentations 45 are necessary to provide clearance for the end portions of the smooth part 41 in the operation of the machine.

In the initial operation of the machine the paper 16 or analogous article is placed in position upon the table or support 17, being limited in its advance by means of the gage 24. An instant later the folder 14 descends and doubles the paper upon itself, as indicated most clearly in Fig. 5<sup>a</sup>, and when the folder 14 reaches the limit of its downward movement the address mechanism or stamp 22 is moved forward and impresses the desired matter upon the folded end portion of the sheet, the folder or blade 14 constituting a support to sustain the pressure of the stamp during its final movement. After the parts 14 and 22 have performed their office the folder 5 is shot forward and folds an end portion of the sheet previously doubled, as indicated in Fig. 5<sup>b</sup>. The folder 10 next in turn comes into play and folds the opposite end portion of the sheet, as indicated in Figs. 5<sup>c</sup> and 5<sup>d</sup>, thereby completing the folding operation. As the folder 10 moves upward the folded sheet is advanced to the stacker and is forced into the latter by means of the packer 32 in the manner specified.

Having thus described the invention, what is claimed as new is—

1. In a folding-machine, the combination of folding mechanism including a folder, wheels arranged for actuation of said folder, printing mechanism, and a wheel connected with the printing mechanism and arranged for intermittent connection with the wheel operating the folder, whereby the printing mechanism is intermittently operated.

2. In a folding-machine, the combination of folding mechanism including a folder, wheels operably connected with the folder for actuation thereof, printing mechanism, a spur-wheel connected with said printing mechanism for operating the same, one of the wheels operating the folding mechanism having gear-teeth adapted for intermittent engagement with the spur-wheel, whereby intermittent movement is transmitted from the folding mechanism to the printing mechanism.

3. In a folding-machine, the combination of folding mechanism including a folder, gear-wheels operably connected with said folder for actuating the same, reciprocally-mounted printing mechanism, a crank-shaft connected with said printing mechanism to impart movement thereto, a spur-wheel secured to said crank-shaft, and a toothed surface on

one of the gear-wheels aforesaid arranged to mesh with the teeth of the spur-wheel to intermittently actuate the latter, whereby the printing mechanism is intermittently operated.

4. In a folding-machine, the combination of a plurality of folders, superposed sets of gears in mesh with one another, each set of the superposed gears being connected with a respective one of the folders to actuate the same, another set of gears located at one side of the first-mentioned sets of gears and operably connected with another folder for actuation thereof, the last-mentioned set of gears being in mesh with teeth upon one of the superposed sets to operate simultaneously therewith.

5. In a folding-machine, the combination of a folder, a guide for the folded material, a receiver, a packer, means for actuating the packer to effect removal of the folded material from the guide to the receiver, and detent means for temporarily holding the packer in engagement with the material in the receiver.

6. In a folding-machine, the combination of a folder, a guide for the folded material, a receiver, a packer, means for actuating the packer to effect removal of the folded material from the guide to the receiver, detent means for temporarily holding the packer in engagement with the material in the receiver, and automatic means for tripping the detent means aforesaid to release the packer.

7. In a folding-machine, the combination of a folder, a guide for the folded material, a receiver, a packer, means for actuating the packer to effect removal of the folded material from the guide to the receiver, detent means for temporarily holding the packer in engagement with the material in the receiver, and means carried by said folder for releasing the packer from the detent means aforesaid to permit said packer to assume a position initial to conveying a folded article to the receiver.

8. In a folding-machine, the combination of a folder, a guide for the folded material, a receiver, a packer, printing mechanism for actuating the packer to effect removal of the folded material from the guide to the receiver, detent means for temporarily holding the packer in engagement with the material in the receiver, and automatic means for tripping the detent means aforesaid to release the packer.

9. In a folding-machine, the combination of a receiver for folded material, a packer adapted to move into the receiver, detent means for holding the packer in the receiver temporarily, spring means for forcing the packer from the receiver and a folder coacting with the detent means above mentioned.

10. In a folding-machine, the combination of a receiver for folded material, a packer for



said receiver, sliding bars connected with the packer for actuation thereof, pivoted detents coacting with said bars to hold the packer in a position compressing the material in the receiver, spring means coacting with the bars to force the packer out of its normal position, and a folder embodying trip means for the detents aforesaid.

11. In a folding-machine, the combination of a receiver for folded material, a packer for said receiver, sliding bars connected with the packer for actuation thereof, pivoted detents coacting with said bars to hold the packer in a position compressing the material in the receiver, spring means coacting with the bars to force the packer out of its normal position, a folder embodying trip means for the detents aforesaid, and printing mechanism operably connected with the sliding bars of the packer for actuation thereof.

12. In a folding-machine, the combination of a receiver for folded material, a packer for said receiver, sliding bars connected with the packer for actuation thereof, pivoted detents coacting with said bars to hold the packer in a position compressing the material in the receiver, spring means coacting with the bars to force the packer out of its normal position, a folder embodying trip means for the detents aforesaid, printing mechanism operably connected with the sliding bars of the packer for actuation thereof, means admitting of movement of the printing mechanism independently of the packer, and means for transmitting movement to the printing mechanism from the folding mechanism.

13. In a folding-machine, the combination of folding mechanism, printing mechanism for printing the folded material in the folding operation, means for transmitting motion from the folding mechanism to the printing mechanism, a receiver for folded material, a packer, and means connecting the printing mechanism with the packer for intermittent operation of the latter.

14. In a folding-machine, the combination of folding mechanism, printing mechanism

for printing the folded material in the folding operation, means for transmitting motion from the folding mechanism to the printing mechanism, a receiver for folded material, a packer, means connecting the printing mechanism with the packer for intermittent operation of the latter, detent means for the packer for holding the same in a predetermined position temporarily, and trip mechanism operable by the folding mechanism for releasing the detent means aforesaid.

15. In a paper-folding machine, the combination of folding mechanism, a receiver, a spring-actuated packer normally holding the folded sheets compressed in the receiver, a detent mechanism for holding the packer in normal position, and a release mechanism tripped by the folding mechanism for liberating the packer preliminary to the final operation of the folding mechanism and adapted to effect a return of the packer to normal position.

16. In combination, folding mechanism, a receiver for reception of the folded sheets or kindred article, a packer, means for normally holding the packer projected to hold the folded sheets under compression, and a trip adapted to be actuated by the folding mechanism for effecting release of the packer.

17. In a machine of the character specified, and in combination with the folding mechanism, an address mechanism, an actuating means for transmitting motion from a moving part of the folding mechanism to the address mechanism, the same comprising a drive member having a plain and a toothed portion, and a companion member having an extending plain and toothed portion, the parts coöperating substantially as specified.

In testimony whereof we affix our signatures in presence of two witnesses.

CHARLES H. COOLEY. [L. S.]  
WALTER D. COOLEY. [L. S.]

Witnesses:

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