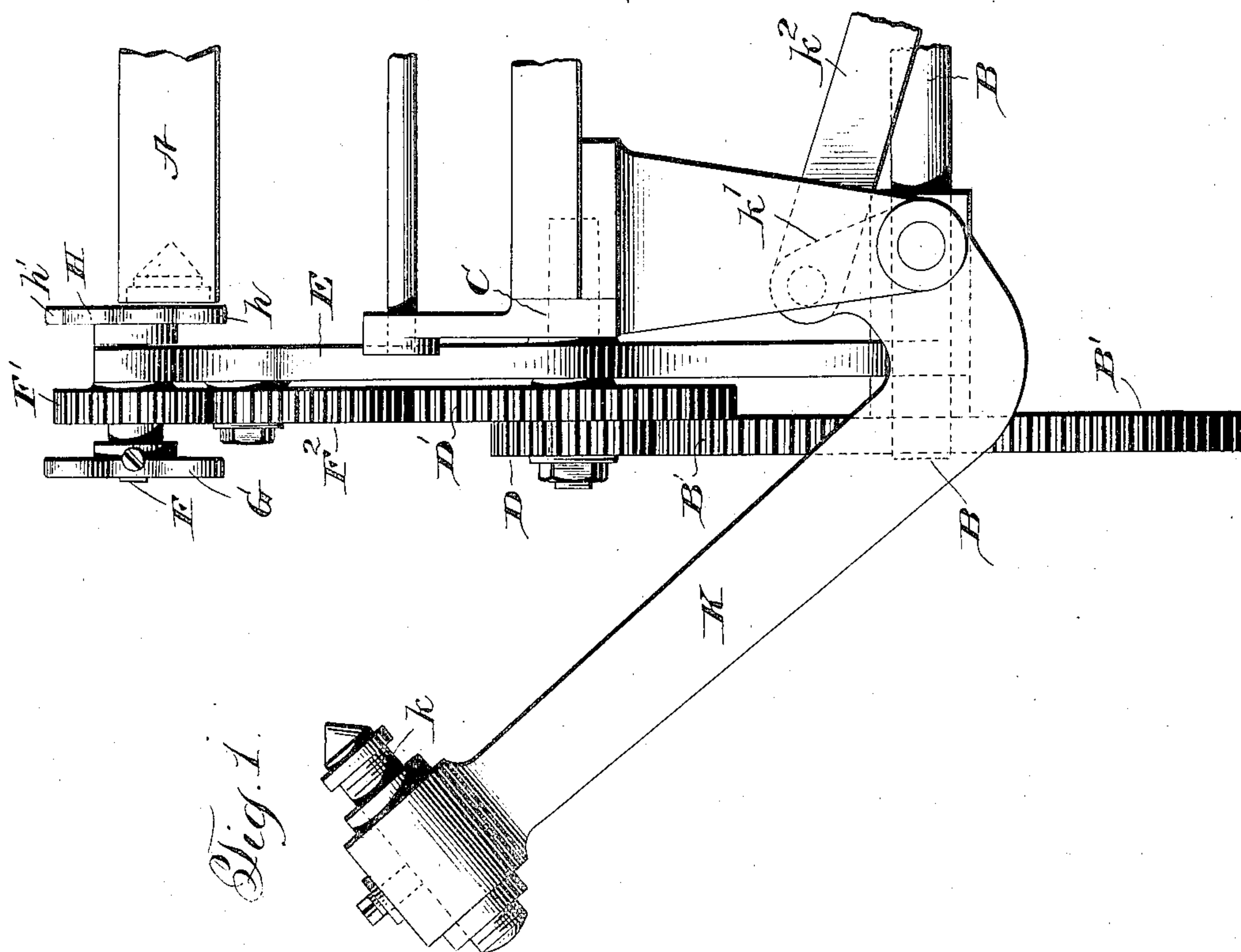
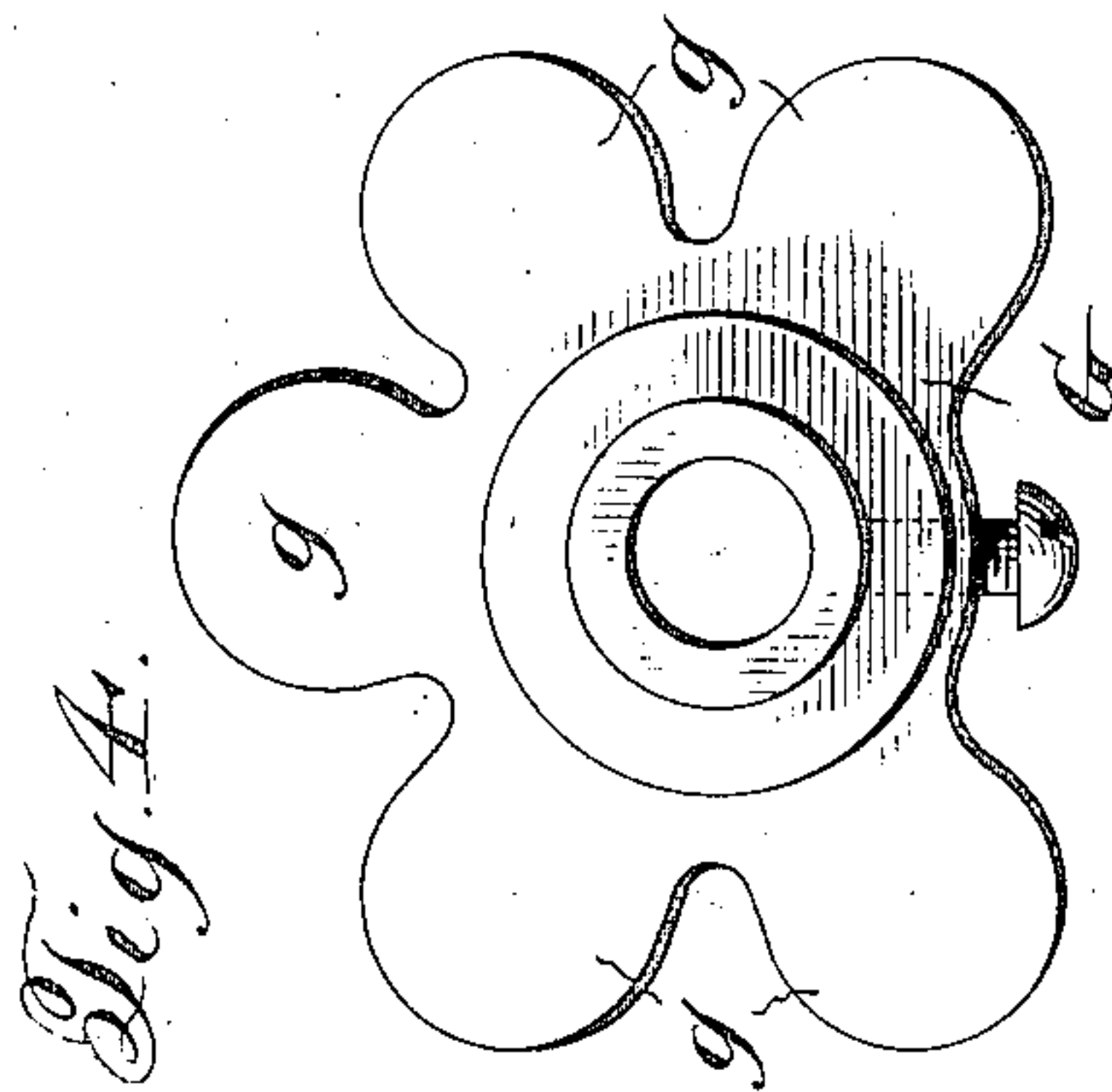
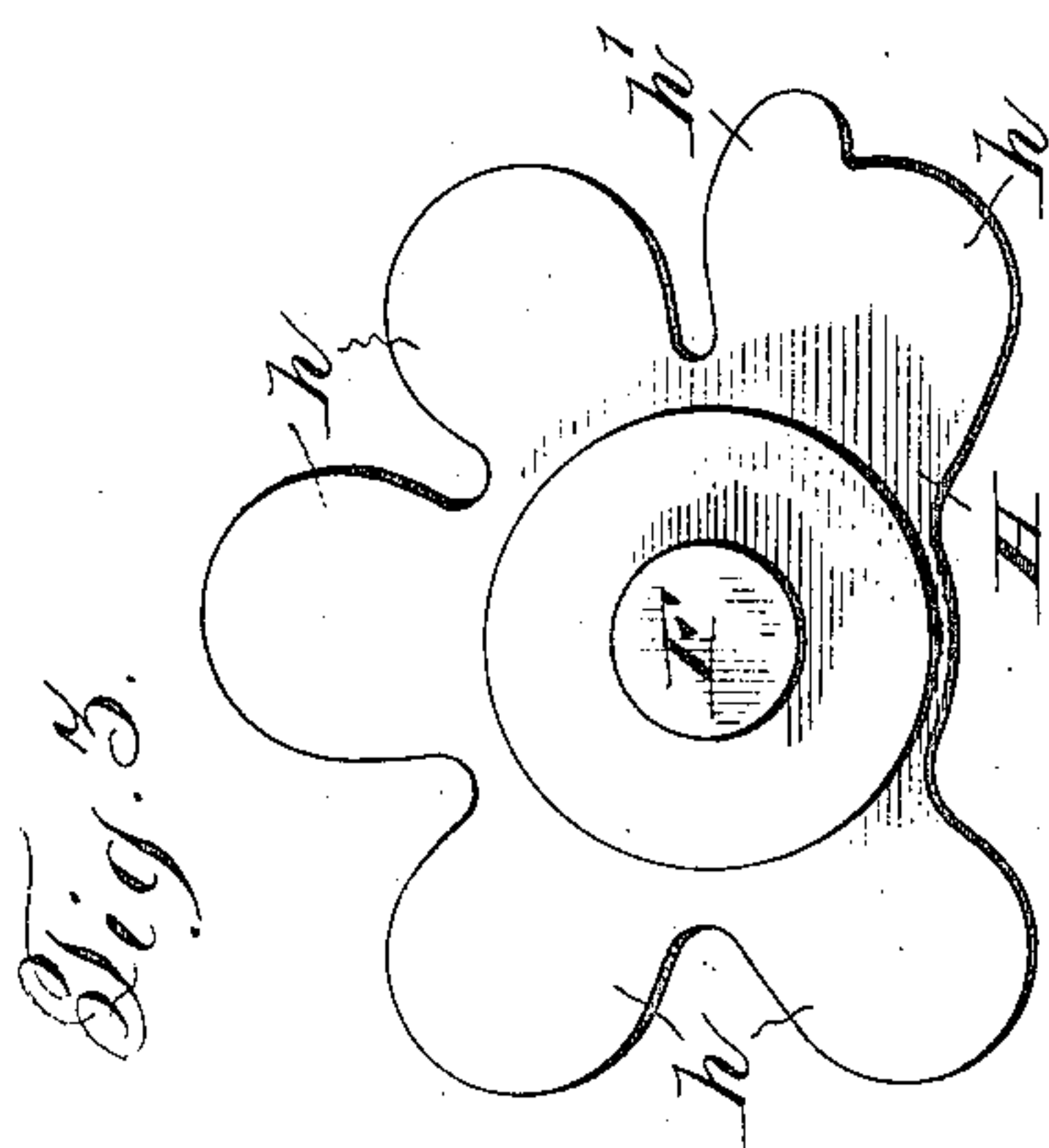


J. A. JOHNSTON.  
FOLDER FOR DYNAMITE SHELL MACHINES.  
APPLICATION FILED NOV. 19, 1907.

914,578.

Patented Mar. 9, 1909.

2 SHEETS—SHEET 1.



Witnesses:

James Hutchinson,  
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Inventor:

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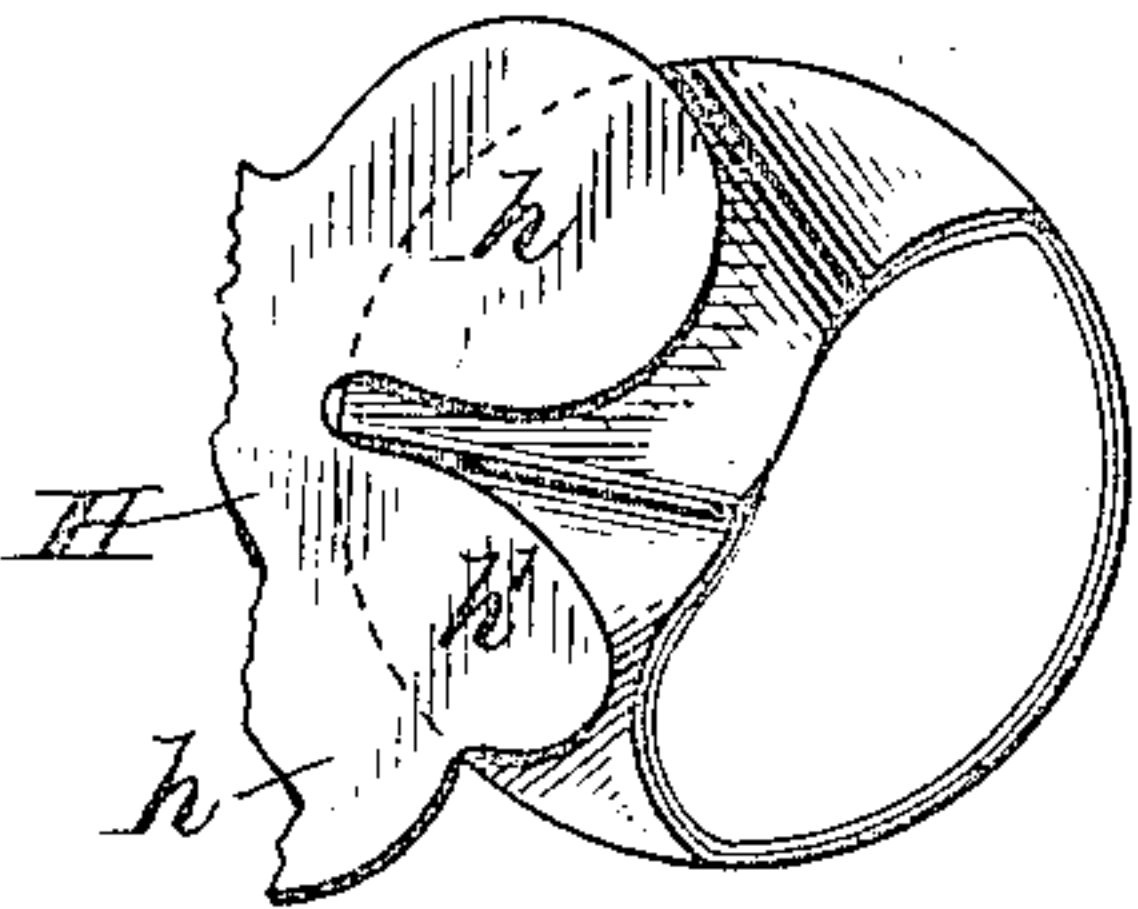
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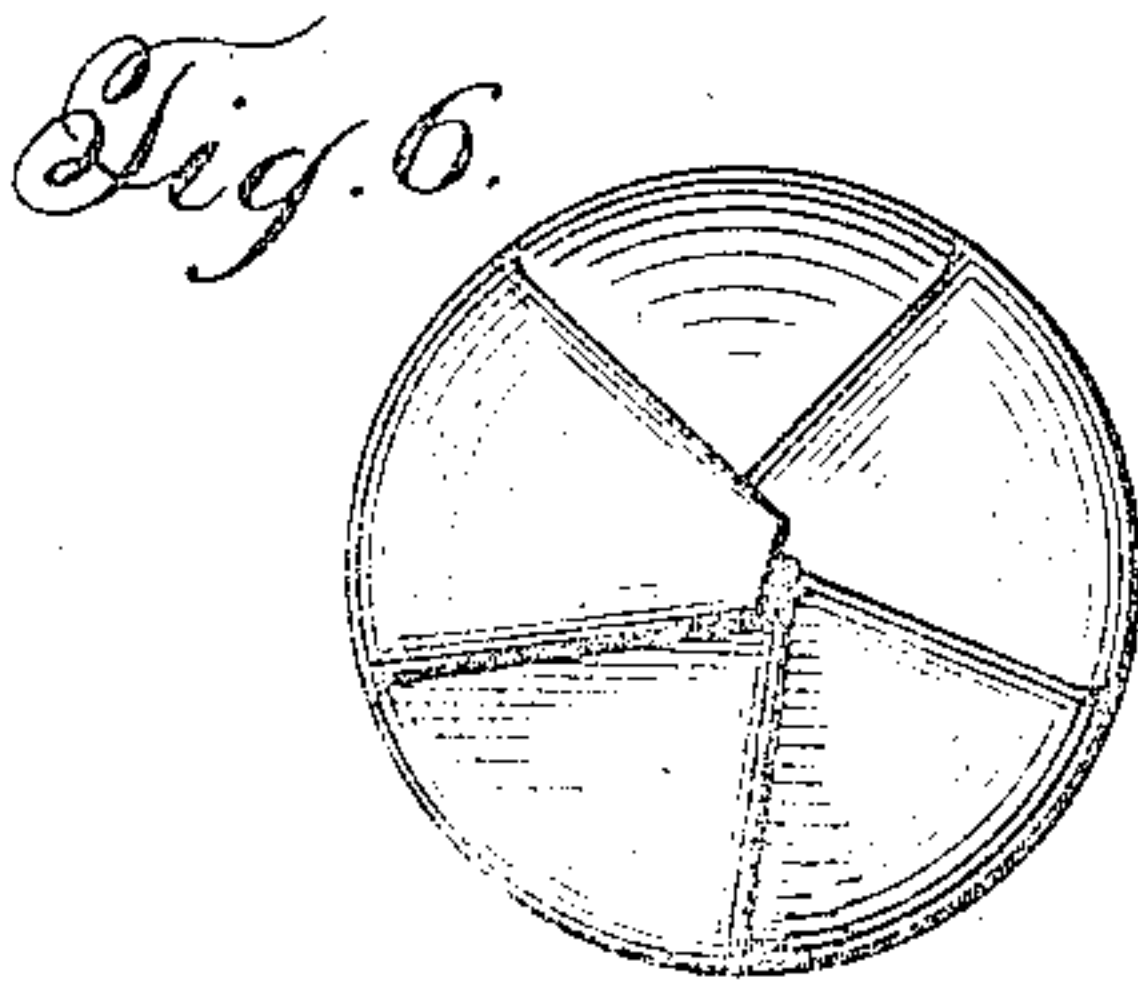
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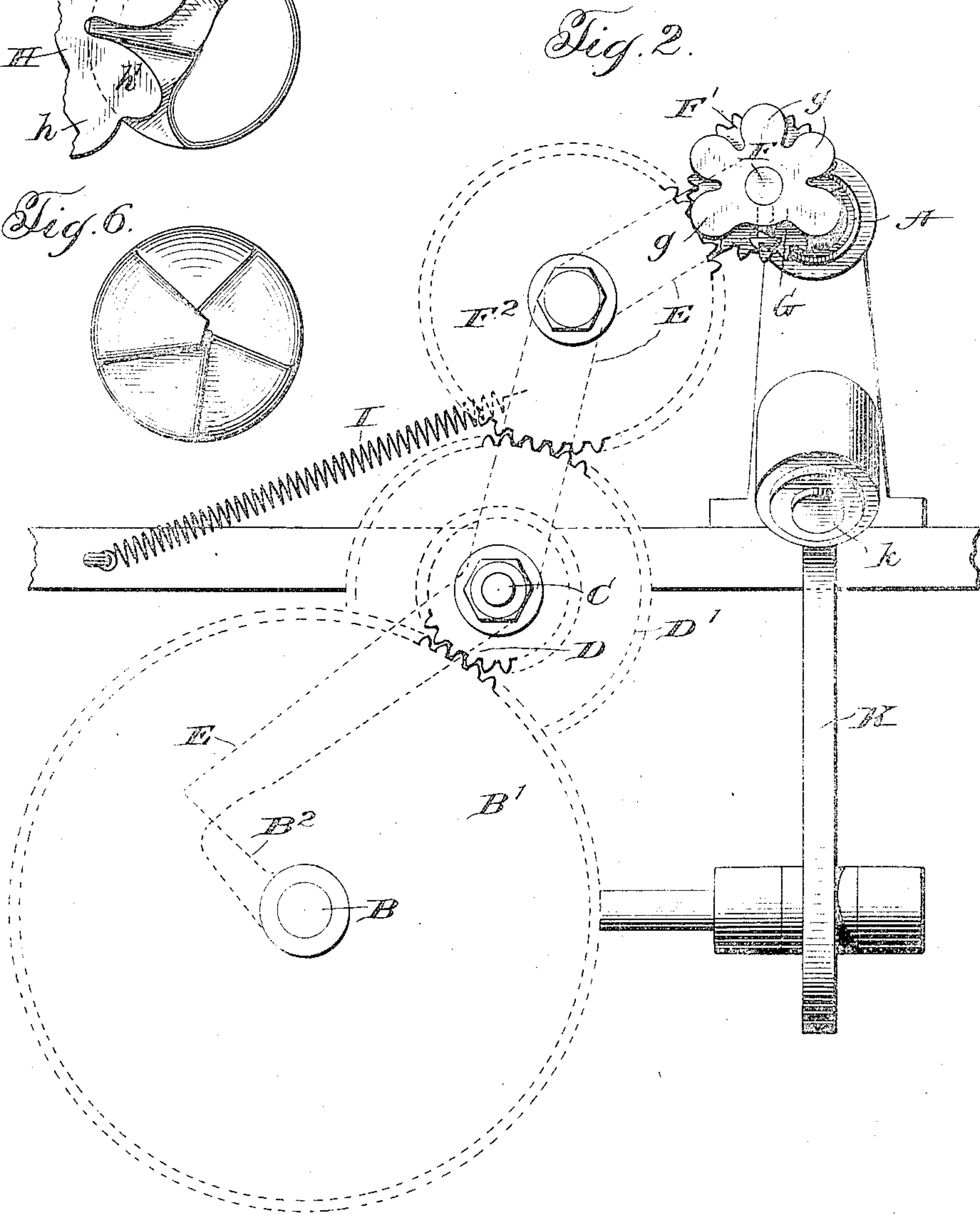
2 SHEETS--SHEET 2.



*Fig. 5.*



*Fig. 6.*



*Fig. 2.*

Inventor:

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# UNITED STATES PATENT OFFICE.

JOHN A. JOHNSTON, OF EMPORIUM, PENNSYLVANIA.

FOLDER FOR DYNAMITE-SHELL MACHINES.

No. 914,578.

Specification of Letters Patent.

Patented March 9, 1909.

Application filed November 19, 1907. Serial No. 402,930.

*To all whom it may concern:*

Be it known that I, JOHN A. JOHNSTON, a citizen of the United States, residing at Emporium, in the county of Cameron and State of Pennsylvania, have invented certain new and useful Improvements in Folders for Dynamite-Shell Machines, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to an improvement in the art of machines for forming paper shells or cartridges used for packing dynamite, and the invention consists more specifically in an attachment for folding or tucking in the ends of the shells or cartridges after the same have been wound or formed in the usual manner, said attachment being designed for use in connection with any of the well known machines used to wind or roll the shells or cartridges.

The object of the present invention is the provision of a folder of this character which is of a simple construction and which is wholly automatic in operation.

A further object of the invention is the provision of a folder of this character employing a plurality of folding members, either of which may be brought into position to operate upon the end of the tube to be folded, whereby said device may be used with equal success upon tubes of various sizes.

Other objects of the invention will be apparent from the detailed description hereinafter, when read in connection with the accompanying drawings forming a part hereof, wherein a preferable embodiment of my invention is shown, and wherein like characters of reference refer to similar parts in the several views.

Referring now more particularly to the drawings, Figure 1 is a side elevation of a machine for forming shells for packing dynamite, with my improved attachment secured thereto. Fig. 2 is a fragmentary front elevation of a machine for forming dynamite shells, with my attachment secured thereto. Figs. 3 and 4 are detail views illustrating two different forms of folder wheels. Fig. 5 is a detail fragmentary view showing the folder wheel disclosed in Fig. 3 as making the fold on the end of the tube, and Fig. 6 is an end view of a tube after the same has been folded but before the folds have been tucked in.

In the drawings, A designates a mandrel of a machine for forming paper shells used for packing dynamite which is designed to be

driven in any suitable manner and upon which the tube may be wound or formed by any of the well known methods. Secured in the lower part of the frame of the machine and positioned at one side of the mandrel A and extending parallel therewith, is a shaft B upon which is secured a large gear wheel B'. The shaft B is adapted to be driven by the driving means which actuates the mandrel A and is connected thereto by gearing which may be of any suitable construction and which, as it forms no part of the present invention, has for the sake of clearness been omitted from the drawings.

C designates a fixed shaft which is supported in any suitable manner from the frame of the machine and which is positioned above the shaft B and extends parallel thereto. Mounted upon the shaft C so as to rotate freely thereon is a small gear wheel D which meshes with the gear wheel B' secured to the shaft B, and a somewhat larger gear wheel D' which is also loosely mounted on the shaft C and is connected in any suitable manner with the small gear wheel D so as to rotate therewith. Loosely fulcrumed on the shaft C at one side of the gear wheel D' mounted thereon is a lever E, the lower end of which extends into proximity to the shaft B and the upper end of which is adapted to be swung in a path across the outer end of the mandrel A. Journaled in the end of the lever E is a shaft F to which is secured a gear wheel F', which is geared to the gear wheel B' mounted upon the fixed shaft C, through the medium of an idle gear wheel F<sup>2</sup>, journaled on the lever E and meshing with the gear wheel D', from which construction it will be apparent that the shaft F will be constantly rotated regardless of the position to which the lever E may be moved on its fulcrum. Rigidly connected in any suitable manner to the end of the shaft F adjacent the outer end of the mandrel A is a folder wheel G, which is adapted when the lever E is thrown to its operative position to tuck in the portion of the tube or shell which projects beyond the outer end of the mandrel and which has been previously formed thereon. The folder G consists of a wheel having a plurality of fingers *g* extending radially therefrom and partially therearound, the outer ends of which are rounded or curved, the number of such fingers being governed by the number of folds or tucks which are desired to be made in the end of the shell or



tube. In the form of the invention disclosed in the accompanying drawings, the folder is shown as provided with five fingers, as this number has been found to work successfully with tubes of all sizes, but it is obvious that the number of fingers may be varied, if desired, without departing from the spirit of the invention. In using the folder in connection with shells of a very small diameter, it has been found that if the form of folder heretofore described is used, the first fold or tuck is apt to spring out before the shell is engaged by the next succeeding finger to make the second tuck or fold, and hence it has been found necessary to provide a folder wheel of a special form for tubes of such a size. H designates a folder wheel designed for this purpose. The wheel G is removably secured in any suitable manner to one end of the shaft F so that it may be readily removed and the position of the shaft reversed according as it is desired to use either the wheel G or the wheel H, the wheel G being used upon the larger and the wheel H upon the smaller tubes. It is obvious that the same result may be obtained by removably securing the wheel H or both the wheels G and H to the shaft. The wheel H is provided with five fingers *h*, which are similar in construction and location to the fingers *g* of the folder wheel G heretofore described, with the exception of the first finger, which is provided adjacent the rear portion of the outer edge thereof with a supplemental finger *h'*, which projects outwardly beyond the outer edge of the finger of which it forms a part. In the operation of the device, when this form of folder wheel is employed, the supplemental finger *h'* will engage the projecting end of the paper shell or cartridge and form a supplemental fold therein which will prevent the fold formed by the first finger *h* from pushing out before the second finger of the folder engages the projecting end of the shell to form the second fold, the remaining folds being formed successively by the remaining fingers *h*.

The folder wheels G and H are each provided with collars on the inner faces thereof, which serve to space the same respectively from the gear wheel F' and the side of the lever E. The collar on the inner face of the folder wheel G is however, considerably wider than the collar on the folder wheel H, which throws the folder wheel G in nearer the end of the mandrel when the same is used than the position occupied by the folder wheel H when that wheel is used. This construction is essential as deeper folds must be made on the ends of the large tubes in connection with which the folder G is employed, than on the ends of the smaller tubes in connection with which the folder H is employed.

The gearing between the driving means for the mandrel A and the folder wheels G and H

is of such a construction that the relative speeds of rotation of the mandrel and folder wheel are such that by the time the mandrel has made one complete revolution after the proper folder wheel has been thrown into operative position, all of the fingers of the folder wheel will have engaged the projecting end of the shell on the mandrel and formed the proper number of folds therein, after which the folder wheel will be thrown to inoperative position and the folds tucked in, as will be hereinafter more particularly set forth.

The desired folder wheel is normally held in an inoperative position by means of a spring I which connects the lever E above the fulcrum thereof with a suitable portion of the frame of the machine, but is adapted to be periodically thrown into operative position by an arm or cam B<sup>2</sup>, which is carried by the shaft B and is adapted during the rotation of said shaft to engage the lower end of the lever E and move the same outwardly. From this construction, obviously, as long as the cam or arm B<sup>2</sup> remains in engagement with the lower end of the lever, it is apparent that the folder wheel will be held in operative position and that as soon as the cam or arm rides off the end of the lever the folder wheel will be withdrawn from operative position by means of the spring I. The gearing which connects the driving means of the mandrel A and the shaft B is adapted to be of such a construction that the folder wheel will not be thrown into operative position until the shell or cartridge has been completed upon the mandrel and the construction of the lower end of the lever E and the cam or arm B<sup>2</sup> is such that the folder will be held in operative position just long enough to form all of the folds in the end of the shell.

Pivotally mounted in the forward part of the machine is an arm K which carries at its upper end a pin *k* which is provided with a conical head which is adapted when the arm K is actuated to engage the folds previously made by the folder wheel and tuck the same into the end of the shell or tube, after which the arm is lowered and the shell or tube removed from the mandrel by any suitable means. Any suitable means may be provided for operating the arm K, but I prefer to provide the same adjacent its fulcrum with an offset *k'*, from which pivotally extends a link *k*<sup>2</sup> which may be actuated in any suitable manner by the same means which imparts rotation to the mandrel A. If the arm K is actuated in this manner, it will be obvious that the construction employed must be of such a nature that the movement of the arm K must be so timed as to occur immediately after the folder has been moved to an inoperative position. The pin *k* is preferably adjustably secured in the upper end of the arm K, a preferred construction being



shown in the accompanying drawing, in which, the pin is threaded and is held in any desired position by a nut positioned on opposite sides of the arm.

5 I do not desire to limit myself to the precise form and construction shown in the drawings, as it is obvious that many minor changes may be made thereto without departing from the spirit of the invention as defined in the appended claims.

Having thus described the invention, what is claimed is:—

1. In a device of the character described, the combination with a rotatable mandrel, of a member movable in a plane parallel to the plane of the outer end of said mandrel and a rotatable folder carried by said member.

2. In a device of the character described, the combination with a rotatable mandrel, of an arm adapted to swing in a plane parallel to the plane of the end of the mandrel, a folder carried by said arm, and means for rotating said folder.

3. In a device of the character described, the combination with a rotatable mandrel, of a rotatable folder adapted to swing in a plane parallel to the plane of the outer end of said mandrel, means for rotating said folder in unison with said mandrel and means for automatically and periodically swinging said folder to an operative position.

4. In a device of the character described, the combination with a rotatable mandrel, of a member movable in a plane parallel to the plane of the end of the mandrel, a rotatable folder carried by said member, and means for automatically and periodically shifting said member to move said folder to an operative position.

5. In a device of the character described, the combination with a rotatable mandrel, of a folder adapted to move in a plane parallel to the plane of the outer end of said mandrel, means for continuously rotating said folder, and means for automatically and periodically swinging said folder to an operative position.

6. In a device of the character described, the combination with a rotatable mandrel, of a folder wheel provided with a plurality of spaced fingers projecting radially therefrom and extending only partially therearound, means for rotating said folder wheel, and means for swinging said folder wheel across the end of the mandrel.

7. In a device of the character described, the combination with a rotatable mandrel, of a rotatable folder adapted to swing in a plane parallel to the end of the mandrel, said folder comprising a wheel provided with a plurality of fingers projecting radially therefrom, means for rotating said wheel, and means for swinging said folder to an operative position.

8. In a device of the character described, the combination with a rotatable folder adapted to swing in a plane parallel to the end of the mandrel, said folder comprising a wheel provided with a plurality of fingers projecting radially therefrom, means for rotating said wheel in unison with said mandrel, and means for automatically and periodically swinging said folder to an operative position.

9. The combination with a rotatable mandrel, of a folder adapted to rotate across the end thereof, said folder comprising a wheel provided with a plurality of fingers projecting radially therefrom and extending partially therearound, the first one of said fingers being provided with a supplemental finger extending from the rear edge thereof and projecting beyond the end thereof, said supplemental finger lying in the same plane and forming a continuation of the finger from which it extends.

10. A folder of the character described comprising a wheel adapted for rotation and provided with a plurality of substantially regularly spaced fingers projecting radially therefrom, the first one of said fingers being provided with a supplemental finger extending from the rear edge thereof and projecting beyond the end thereof, said supplemental finger lying in the same plane and forming a continuation of the finger from which it extends.

11. In a device of the character described, the combination with a rotatable mandrel, of a member movable in a plane parallel to the plane of the end of said mandrel, a shaft removably secured in said member, and folder members carried by the opposite ends of said shaft.

12. In a device of the character described, the combination with a rotatable mandrel, of an arm mounted to swing in a plane parallel to the plane of the outer end of said mandrel, a shaft removably secured in said arm, and folder wheels carried by the opposite end of said shaft.

13. In a device of the character described, the combination with a rotatable mandrel, of an arm mounted to swing in a plane parallel to the plane of the outer end of said mandrel, a shaft removably secured in said arm, and folder wheels having differentiating characteristics carried by the opposite ends of said shaft.

14. In a device of the character described, the combination with a rotatable mandrel, of an arm mounted to swing in a plane parallel to the plane of the outer end of said mandrel, a folder carried by said arm, and means for continuously rotating said folder.

15. In a device of the character described, the combination with a rotatable mandrel, of a pivoted arm mounted to swing in a plane



parallel to the plane of the outer end of said mandrel, a folder carried by the upper end of said arm, means for normally holding said folder in an inoperative position, and a rotatable shaft provided with an offset portion adapted to periodically contact with the lower end of said arm.

16. In a device of the character described, the combination with a rotatable mandrel, of a pivoted arm mounted to swing in a plane parallel to the plane of the outer end of said mandrel, a rotatable folder carried by the upper end of said arm, a spring for normally holding said folder in an inoperative position, a rotatable shaft provided with an offset portion adapted to periodically contact with the lower end of said arm, and gearing connecting said rotatable shaft and said folder.

17. In a device of the character described, the combination with a rotatable mandrel, of a folder adapted to fold the end of a shell formed on said mandrel, and a swinging arm movable toward and away from the end of said mandrel provided with a portion adapted to tuck in the folds formed by the folder.

18. In a device of the character described, the combination with a rotatable mandrel, of a folder adapted to fold the end of a shell formed on said mandrel, and a swinging arm provided with an adjustable pin therein the

outer end of said pin being provided with a conical shaped head.

19. In a device of the character described, the combination with a rotatable mandrel, of a rotatable folder and means for bodily shifting said rotatable folder in a plane parallel to the plane of the outer end of said mandrel to move the same into and out of operative position.

20. In a device of the character described, the combination with a rotatable mandrel, of a shiftable folder supporting member, a folder carried by said supporting member and adapted to overlap the end of the mandrel when the supporting member is moved to its operative position and means for rotating said folder.

21. In a device of the character described, the combination with a rotatable mandrel, of a folder supporting member movable toward and away from the end of said mandrel, a shaft carried by said supporting member, and interchangeable folder members mounted upon the opposite ends of said shaft.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN A. JOHNSTON.

Witnesses:

I. N. HACKLEY,  
H. R. KLEES.