

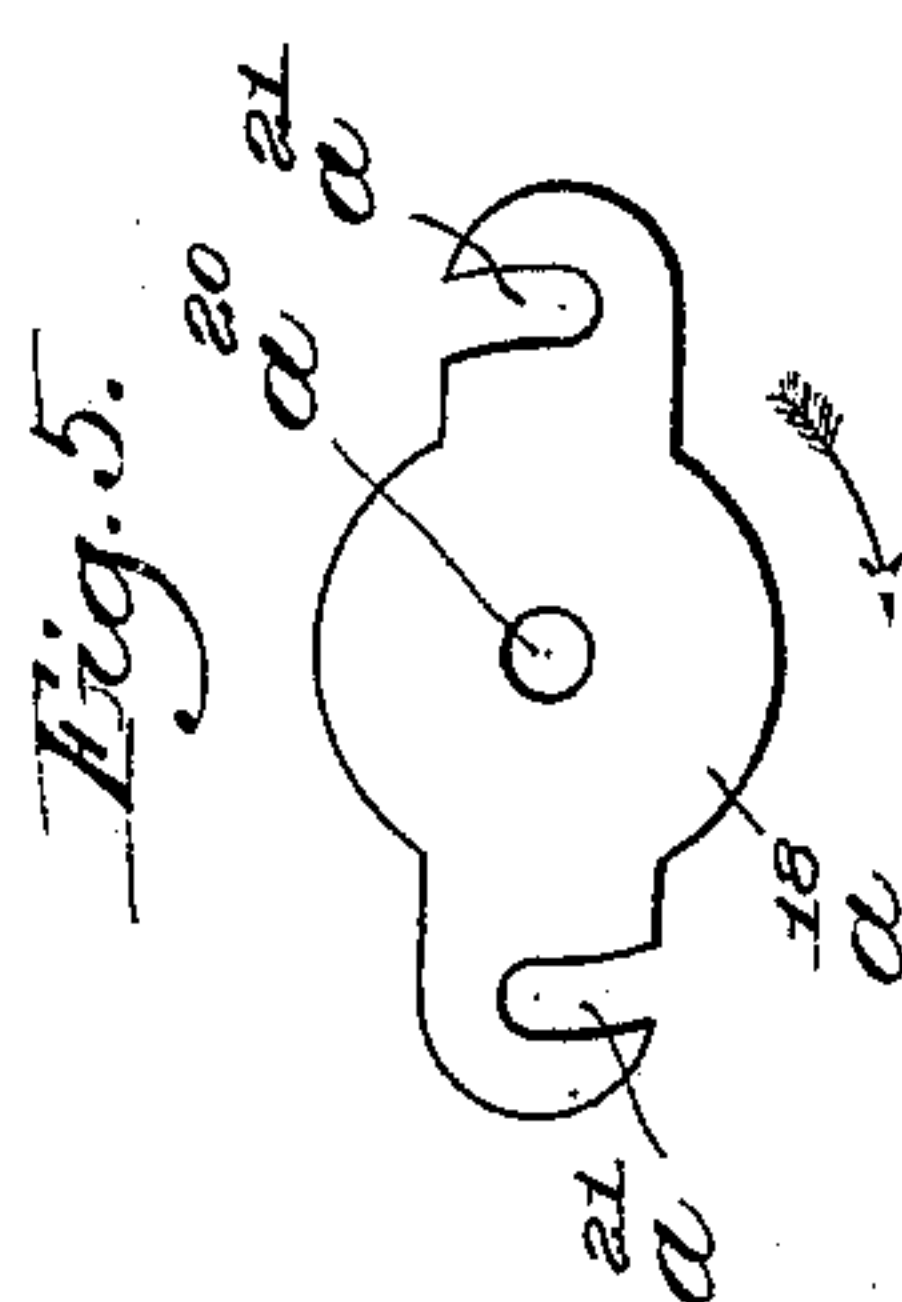
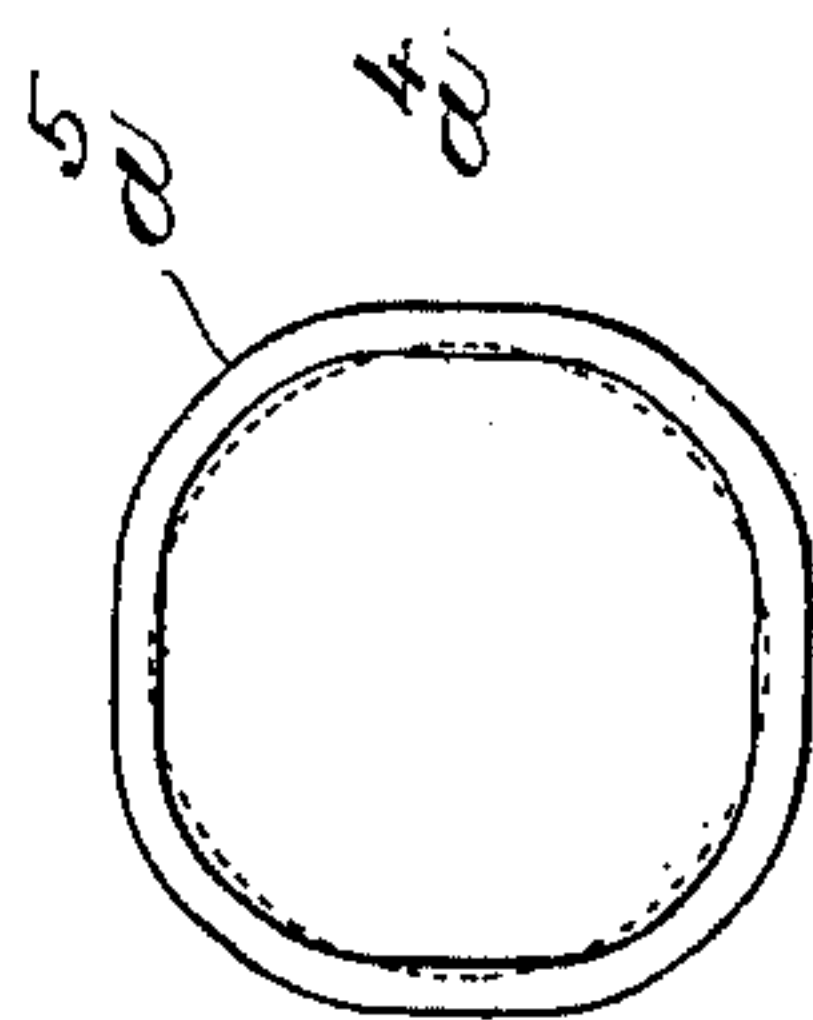
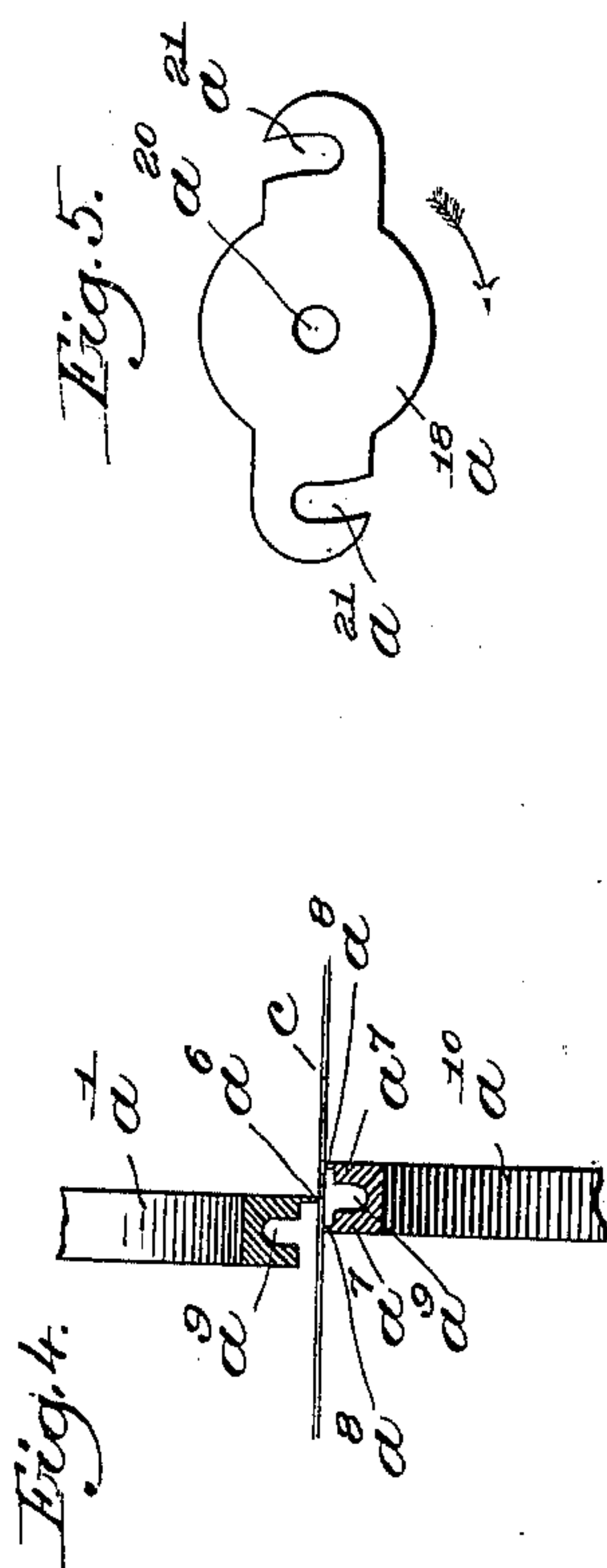
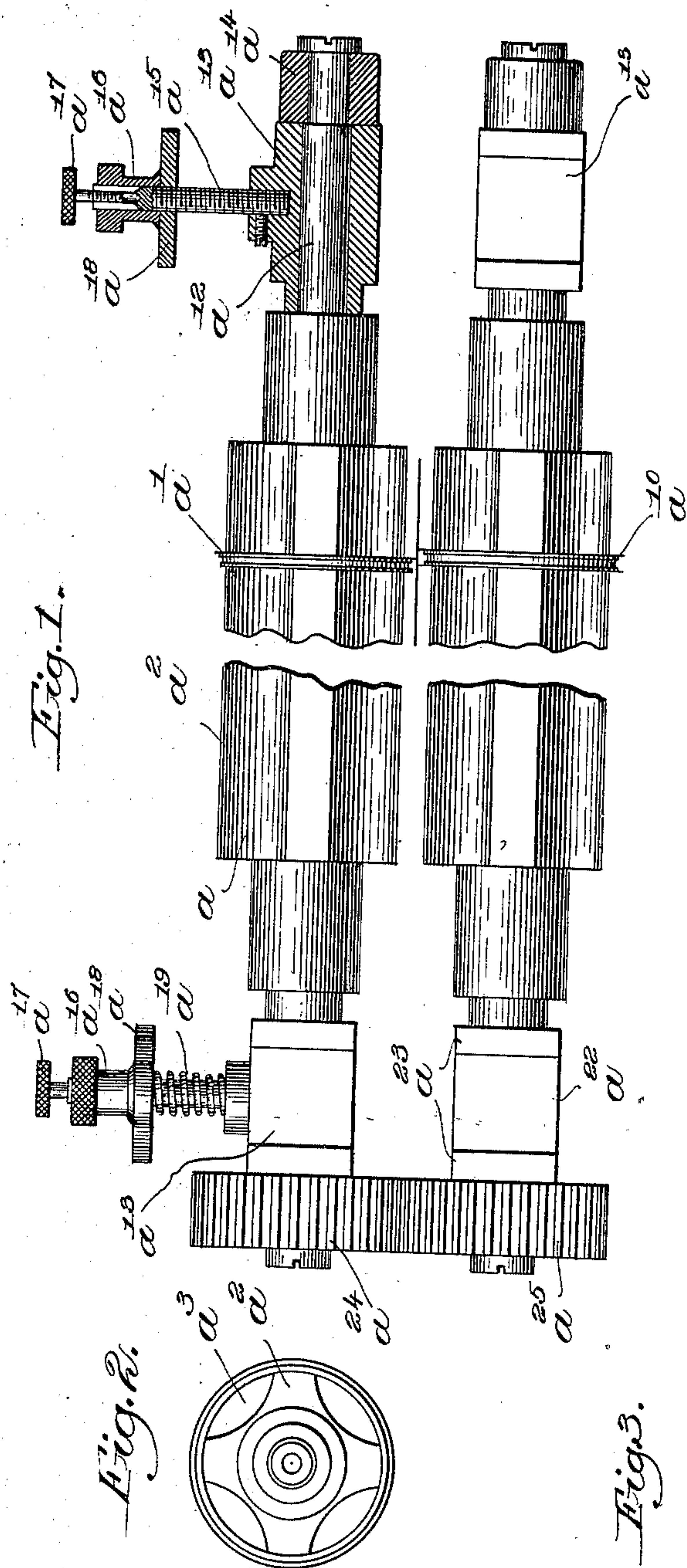
No. 672,528.

Patented Apr. 23, 1901.

D. E. HUNTER.
ADJUSTABLE RING RULING SPINDLE.

(Application filed July 5, 1900.)

(No Model.)



Witnesses:
Thomas J. Drummond.
Fred S. Grumbaf.

Inventor:
David E. Hunter.
by Leroy & Gregory
attys.

UNITED STATES PATENT OFFICE.

DAVID E. HUNTER, OF CAMBRIDGE, MASSACHUSETTS, ASSIGNOR TO
LIBRARY BUREAU, OF BOSTON, MASSACHUSETTS.

ADJUSTABLE-RING RULING-SPINDLE.

SPECIFICATION forming part of Letters Patent No. 672,528, dated April 23, 1901.

Application filed July 5, 1900. Serial No. 22,538. (No model.)

To all whom it may concern:

Be it known that I, DAVID E. HUNTER, a citizen of the United States, and a resident of Cambridge, county of Middlesex, State of Massachusetts, have invented an Improvement in Adjustable-Ring Ruling-Spindles, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

My present invention is an improvement in adjustable disk or ring ruling-spindles having for its object the provision of a ruling-spindle having rings thereon which are adjustable into any desired position without requiring spacers or extraneous holding devices for maintaining their adjustment.

Heretofore rotating ruling devices, by which I mean rotating spindles provided with peripheral rulers or projecting edges which receive the ink and serve to mark or line the paper, have been recognized as much more advantageous for many reasons than the old pen-rulers, and yet it has been exceedingly difficult and expensive to employ this kind of ruling-machine, for the reason that the rings thereon could not be suitably adjusted. The most common form of this machine has required a separate ruling-spindle for every change in the ruling produced, it being necessary to make a new spindle for each kind of card or page desired, and the only successful substitute therefor, so far as I am aware, has been a cylindrical spindle or shaft, on which the rings were placed and held in spaced position by tubular spacers or separators. The main objection to the latter form of device is that it takes a great deal of time to construct it, and the accuracy of the spacing of the marking-rings depends upon the accuracy with which the separators are cut, it being necessary to recut or provide new separators and take off all the rings and old separators every time a new adjustment of the spacing is required. Accordingly it is the purpose of my present invention to provide a ring ruling-spindle in which no separators are required and in which the rings may be adjusted with absolute precision to any extent required, being capable of accurate adjustment to the smallest, as well as to the great-

est, extent. I believe this is the first successful spindle of this kind ever devised, and accordingly I intend this patent to cover the same broadly as well as specifically.

The details of construction of my invention will be pointed out in the course of the following description, reference being had to the accompanying drawings, in which I have shown a preferred embodiment of my invention.

Referring to the drawings, Figure 1 is a broken view, in front elevation, showing a complementary pair of ruling-spindles between which a card is being passed, one of said spindles having one of its end boxes shown in section. Fig. 2 is an end elevation of the principal spindle. Fig. 3 represents one of the marking-rings before it is mounted on the spindle, said figure illustrating one method or means by which I may secure the rings in place. Fig. 4 is a vertical section, largely diagrammatic, for more clearly illustrating the operation of my improved "ruling-ring," it being understood that I include under this term both the actual marking-ring, which does the ruling, and also the tension-ring, which is required for coöperating therewith, as will be more fully understood later on. Fig. 5 is a detail in plan of one of the holding-clips.

I have already explained that I do not intend certain of the claims of this patent to be restricted to the particular form of mechanism herein shown, and therefore I wish it understood that while I describe the invention in all the details of one embodiment thereof I intend certain of the claims to cover the generic invention within a broad range of equivalents.

The central or body portion a of the spindle, on which are mounted the rings a' , is not cylindrical, but is provided with a plurality of concentric supporting-ledges a^2 , with intervening depressions a^3 , there being four of each provided in the form herein presented, as is clearly shown in Fig. 2. On this portion a I mount the required number of rings a' , said rings being formed not in a true circle, but distorted, having portions a^4 bent slightly inwardly within the true circle and portions a^5 bulged downwardly beyond the true circle,

the result being that when these rings are placed on the spindle a and turned thereon, so as to bring the portions a^5 opposite the cavities a^3 and the portions a^4 resting on the ledges a^2 , the ring is thereby brought into a perfectly circular form, while being at the same time caused automatically to cling tightly in fixed position. The spaces between the rings are open or interrupted, not being occupied by the before-mentioned separators, so that said rings are capable without removal from the spindle of free and independent adjustment along the body portion thereof and yet are preferably self-retained, as already explained. In practice I have found that these rings are practically immovable for their intended use, being to all intents and purposes as rigid as if held between accurately-formed separators or as if swaged onto the spindle. They are, in fact, much superior to either of the latter, inasmuch as it is impossible for them to slip to one side or the other, as they might do in case the separators were not accurate, and it is impossible for them to turn around or become displaced in any manner in use, while at the same time they are capable of adjustment along the spindle for any spacing desired.

Referring now to Fig. 4, it will be seen that I have illustrated in enlarged detail the principal and also complementary rings a' a^{10} in actual operation on a card or sheet of paper c between them, the principal ring having a marking fin or flange a^6 , which carries the ink and serves to mark the paper, and the lower ring having two ledges a^7 , preferably each terminating in a thin peripheral flange a^8 , which supports the paper to the right and the left, respectively, of the marking-flange a^6 , thereby creating sufficient tension or pressure against the paper to cause the latter to receive a clear definite mark and yet permitting the paper to yield for unevenness or any inequalities or exigencies that may require it, so as to prevent any blurring or unevenness in the lines.

The peripheral grooves a^9 in the respective rings are provided with parallel walls and preferably concave bottoms in order to receive a spacing-wheel of an adjusting-machine described and claimed in my companion application, Serial No. 22,537.

Referring again to Fig. 1, it will be seen that the spindles are reduced at their ends a^{12} to receive journal-boxes a^{13} , held in place by any suitable means, as by collars a^{14} . Said boxes are provided with threaded stems a^{15} , on the upper ends of which are thumb-nuts a^{16} , capable of being set in accurate adjustment by expansion-screws a^{17} and beneath which are holding-clips a^{18} , one of which is shown in Fig. 5, the large clip being normally held in place by a spring a^{19} .

Referring to Fig. 5, it will be seen that the holding-clip has an aperture a^{20} , adapted to surround the stem a^{15} loosely and at either end has a notch a^{21} . Each journal-box has a

recess a^{22} between two flanges a^{23} , and at the left-hand ends of the two spindles intermeshing gears a^{24} a^{25} are mounted, whereby the spindles are caused to rotate in opposite directions in unison.

It will be understood that the class of machines to which my marking-spindles are applied require frequent changes of the spindles for different kinds of rulings, colors, &c., and accordingly in practice the spindles are provided as articles of manufacture in the form explained at length above, so that when a spindle is to be removed it is simply necessary to turn the respective hook-shaped clips in the direction of the arrow in Fig. 5, thereby releasing them from the ruling-machine, whereupon the spindle may be lifted out of its support quickly and without disturbing in any manner whatever the accurate adjustment thereof to which it was set according to the thickness of paper or card which the machine may have been operating upon. Then another similar spindle may be instantly put into place, simply having its journal-bearings slid down into the supports or cuts which are provided in the ruling-machine to enter the recesses a^{22} and may be instantly mounted in operative position simply by turning the clips a^{18} around to the right in the direction opposite the arrow, Fig. 5, no further adjustment being necessary, inasmuch as the turning of the clips a^{18} does not in any wise disturb or affect the micrometer adjustments of the thumb-nuts a^{16} , which have been previously set and are maintained for the particular cardboard being ruled.

The lower or tension ring spindle does not require the micrometer and clamping adjustment required by the upper or marking spindle, because it simply rests in the bottom of the support of the ruling-machine, always at the same level to receive and support the paper or cardboard being ruled.

As already mentioned, a great many changes in arrangement and details of construction may be resorted to without departing from the spirit and scope of my invention.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A spindle for ruling-machines, comprising a body portion having a plurality of supporting-ledges and intervening depressions, and rings therefor, said rings being normally out of a true circular shape and when mounted in operative position on said body portion being held in abnormal position by said ledges, and maintained in position by frictional engagement therewith.

2. A spindle for ruling-machines, comprising a body portion, and normally-distorted rings mounted on said body portion and held thereon in true circular form, said rings being maintained in place on said spindles by frictional engagement due to their tendency to recover their normal distorted shape.

3. A ring for a ruling-spindle, said ring

having a peripheral spacing-groove with approximately parallel sides as and for the purpose set forth.

4. A tension-ring for a ruling-spindle, having a peripheral depression, and thin frictional flanges adjacent the opposite edges of the ring for receiving and supporting the paper to be ruled.

5. A ruling-spindle, comprising a body portion provided with self-retaining rings for operating upon the paper being ruled, journal-bearings mounted on said spindle adjacent its opposite ends, and means mounted on said spindle for retaining said journal-bearings on the spindle.

6. A ruling-spindle, comprising a body portion provided with rings for operating upon the paper being ruled, journal-bearings mounted on said spindle adjacent its opposite ends, and

said bearings being provided with stems, micrometer-adjusting devices cooperating with said stems, and clips carried on said stems for detachably securing the spindle in place in the ruling-machine.

7. A ruling-spindle, comprising a body portion polygonal in cross-section provided with self-retaining rings for operating upon the paper being ruled, journal-bearings mounted on said spindle adjacent its opposite ends, and a gear permanently mounted on said spindle.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

DAVID E. HUNTER.

Witnesses:

GEO. H. MAXWELL,

GEO. W. GREGORY.