

No. 695,601.

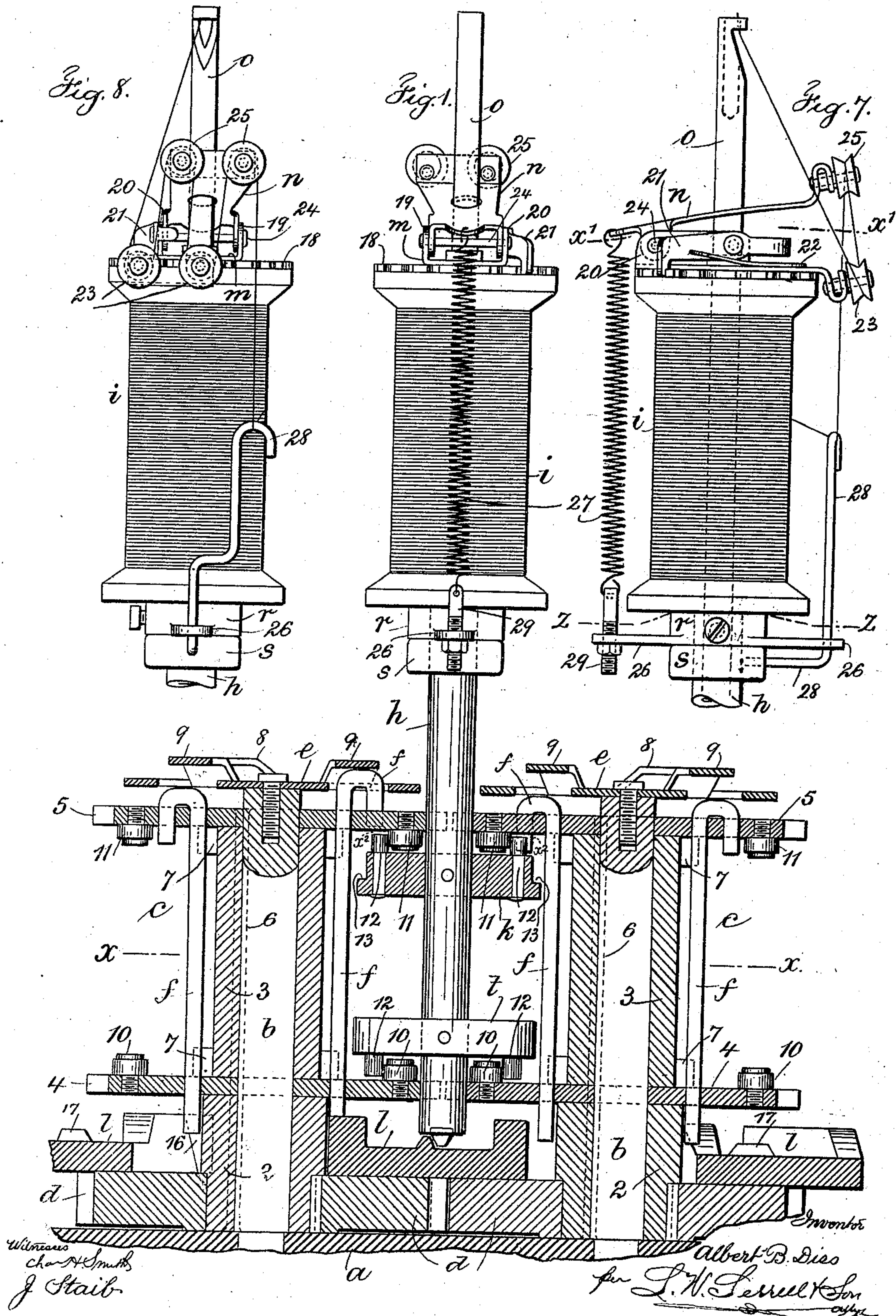
Patented Mar. 18, 1902.

A. B. DISS.
BRAIDING MACHINE.

(Application filed Apr. 8, 1901.)

(No Model.)

3 Sheets—Sheet 1.



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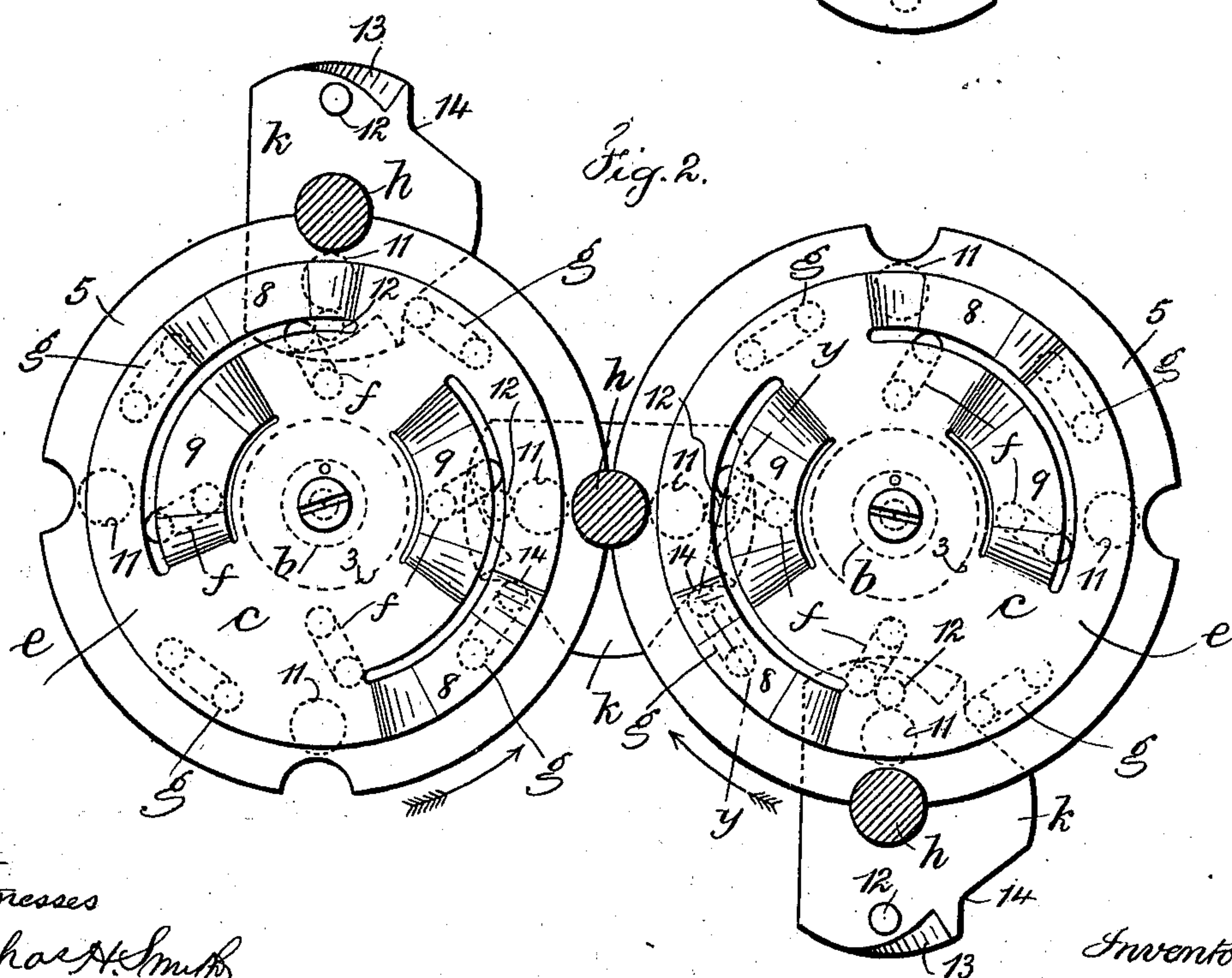
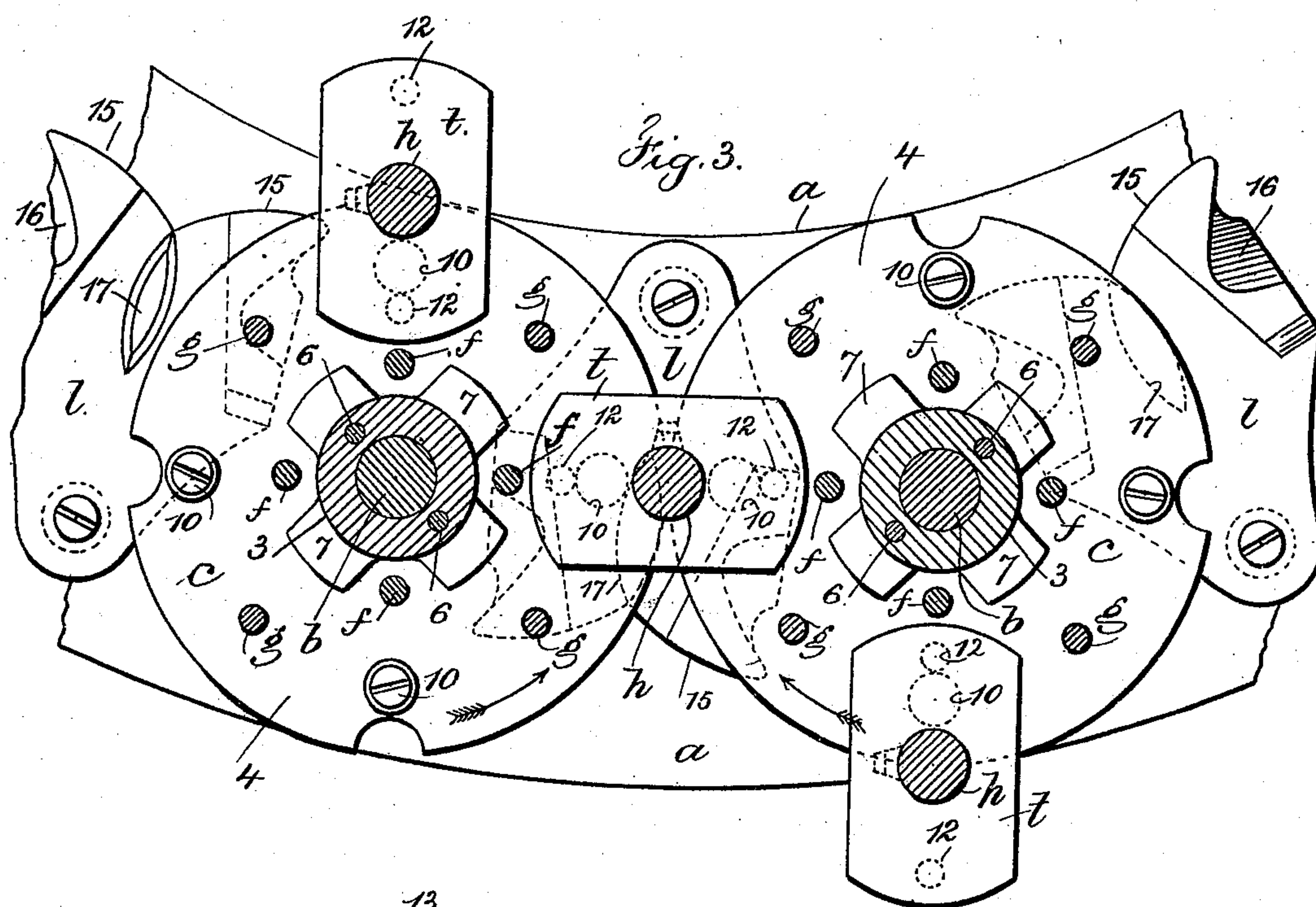
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3 Sheets—Sheet 2.



Witnesses
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3 Sheets—Sheet 3.

Fig. 9.

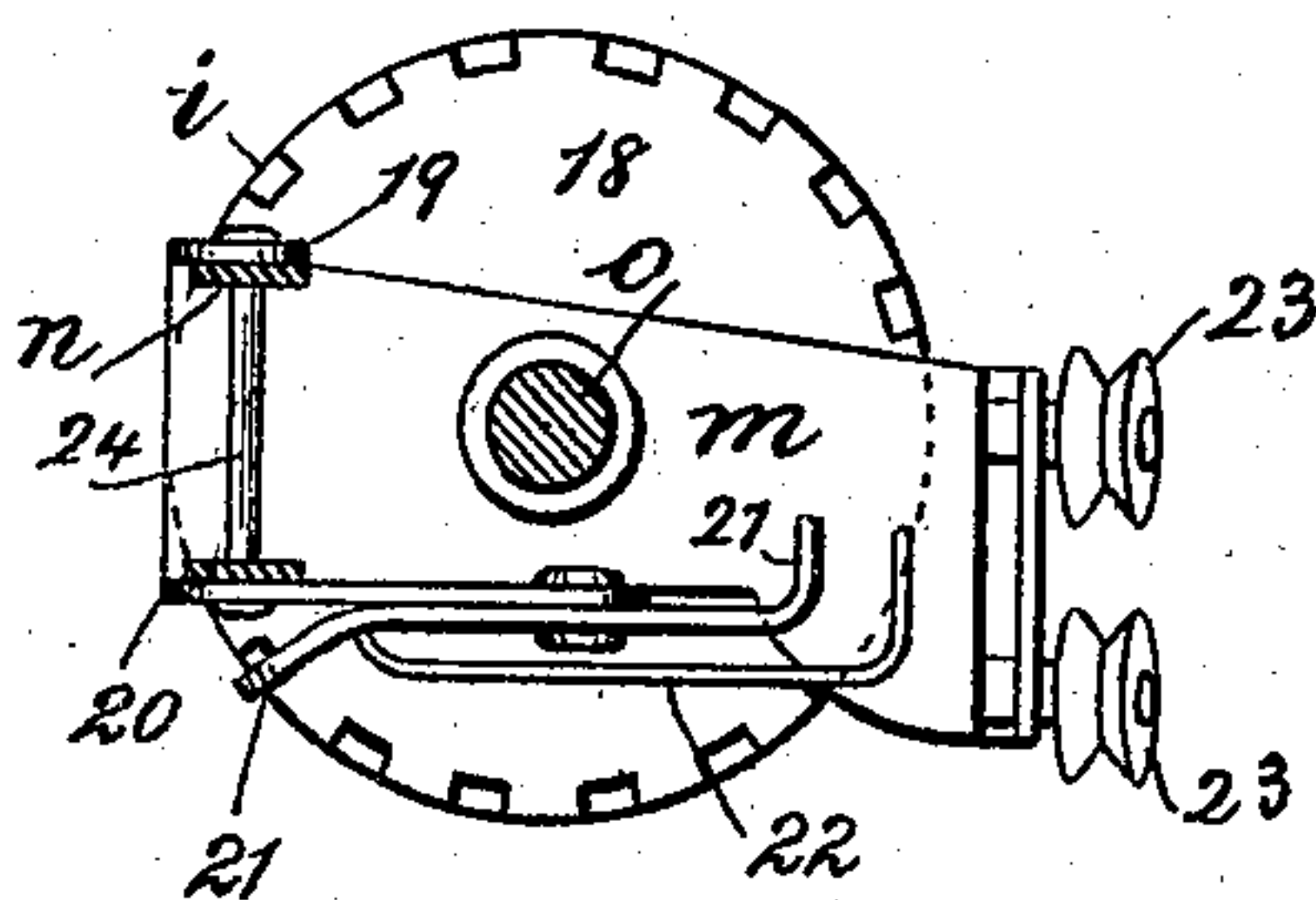


Fig. 6.

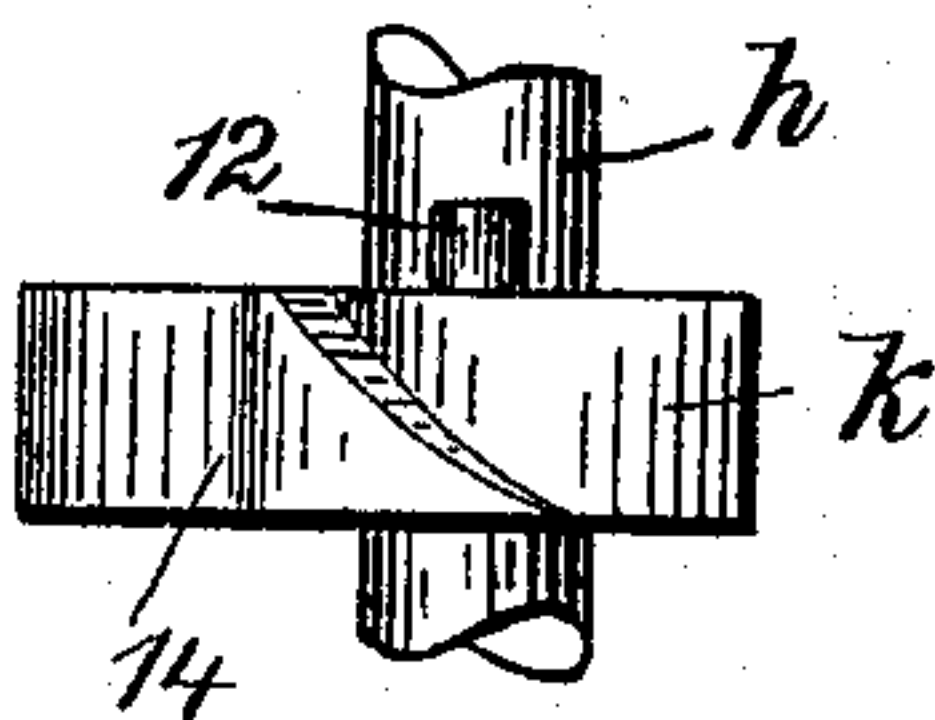


Fig. 11.

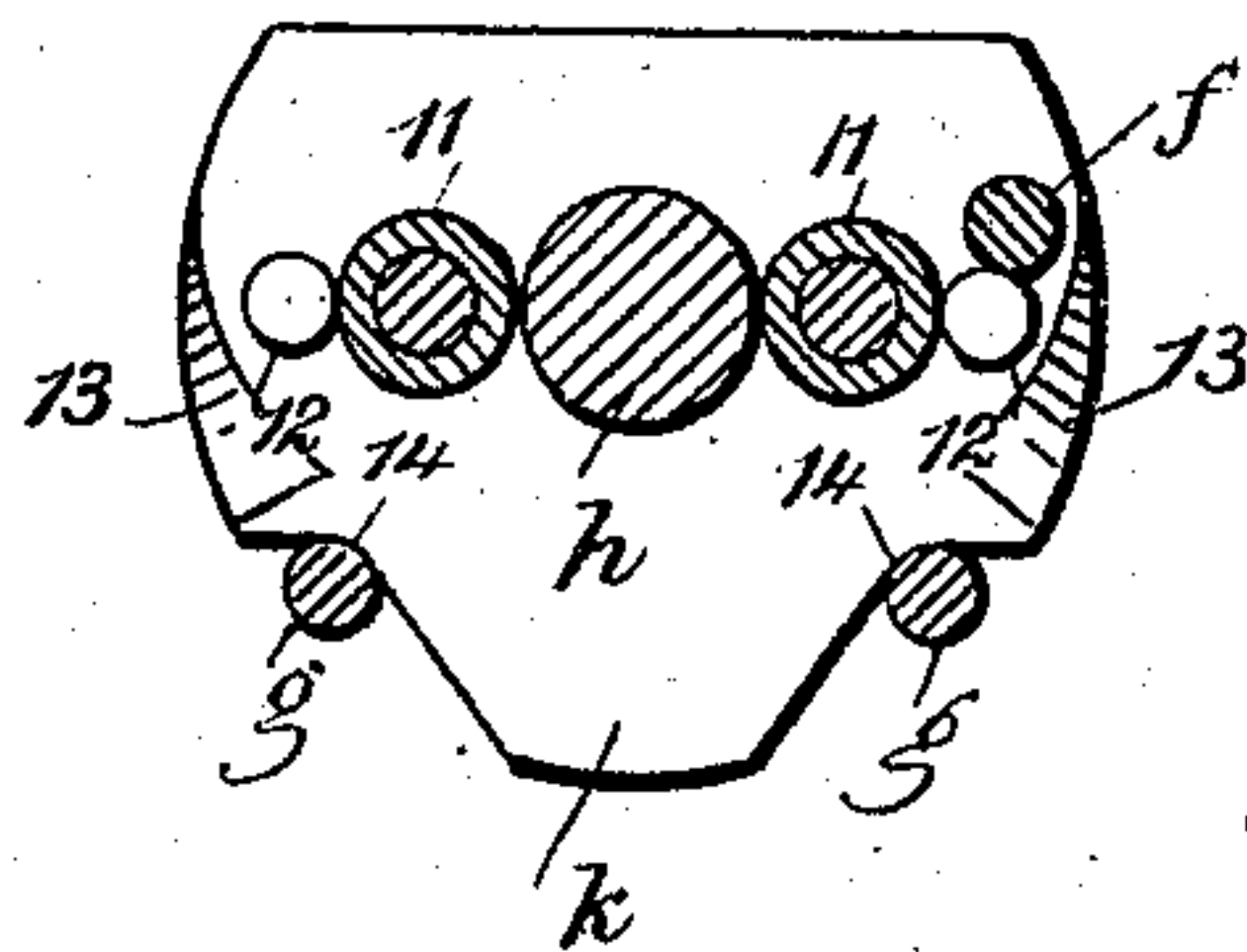


Fig. 5.

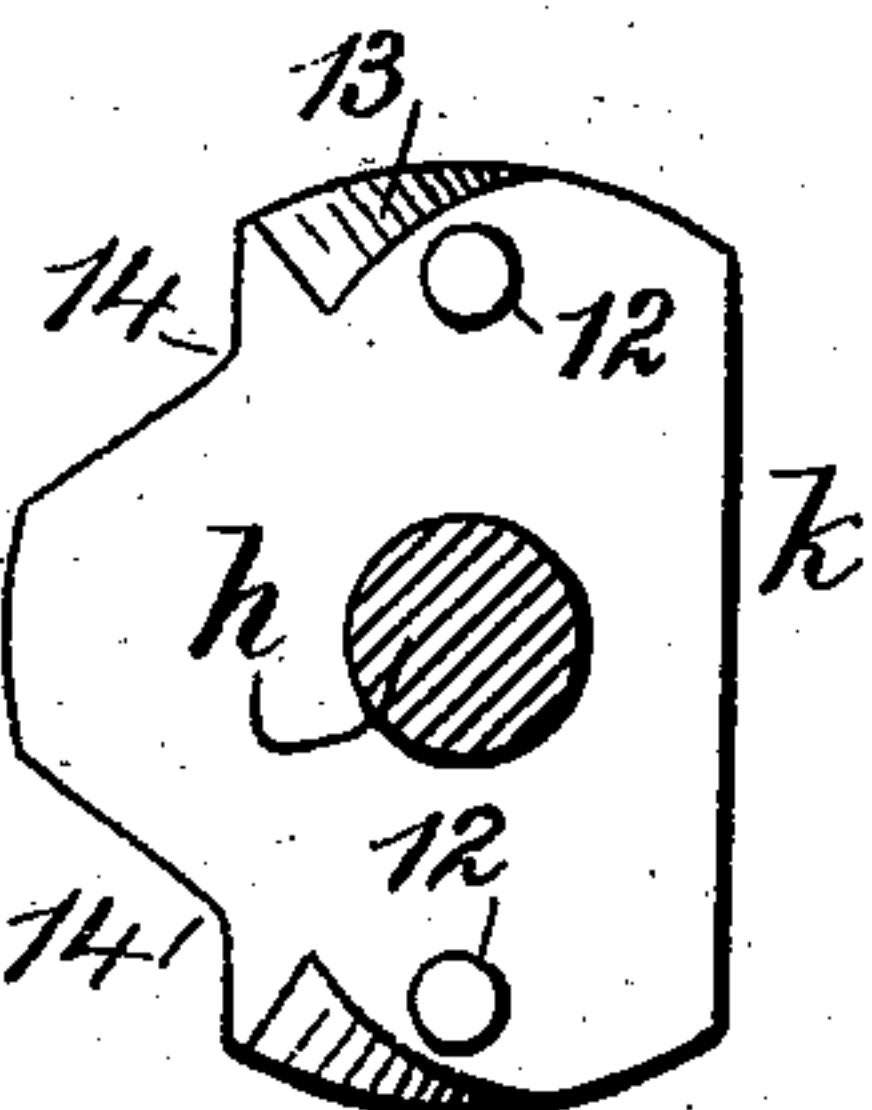


Fig. 10.

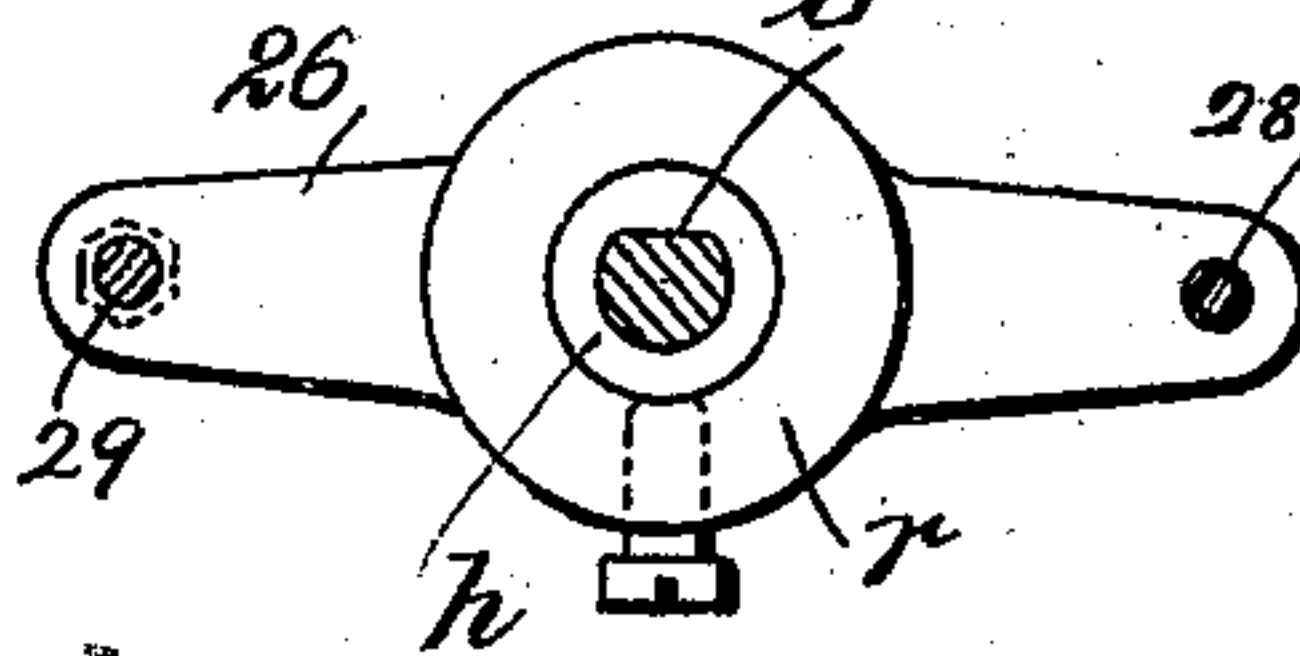
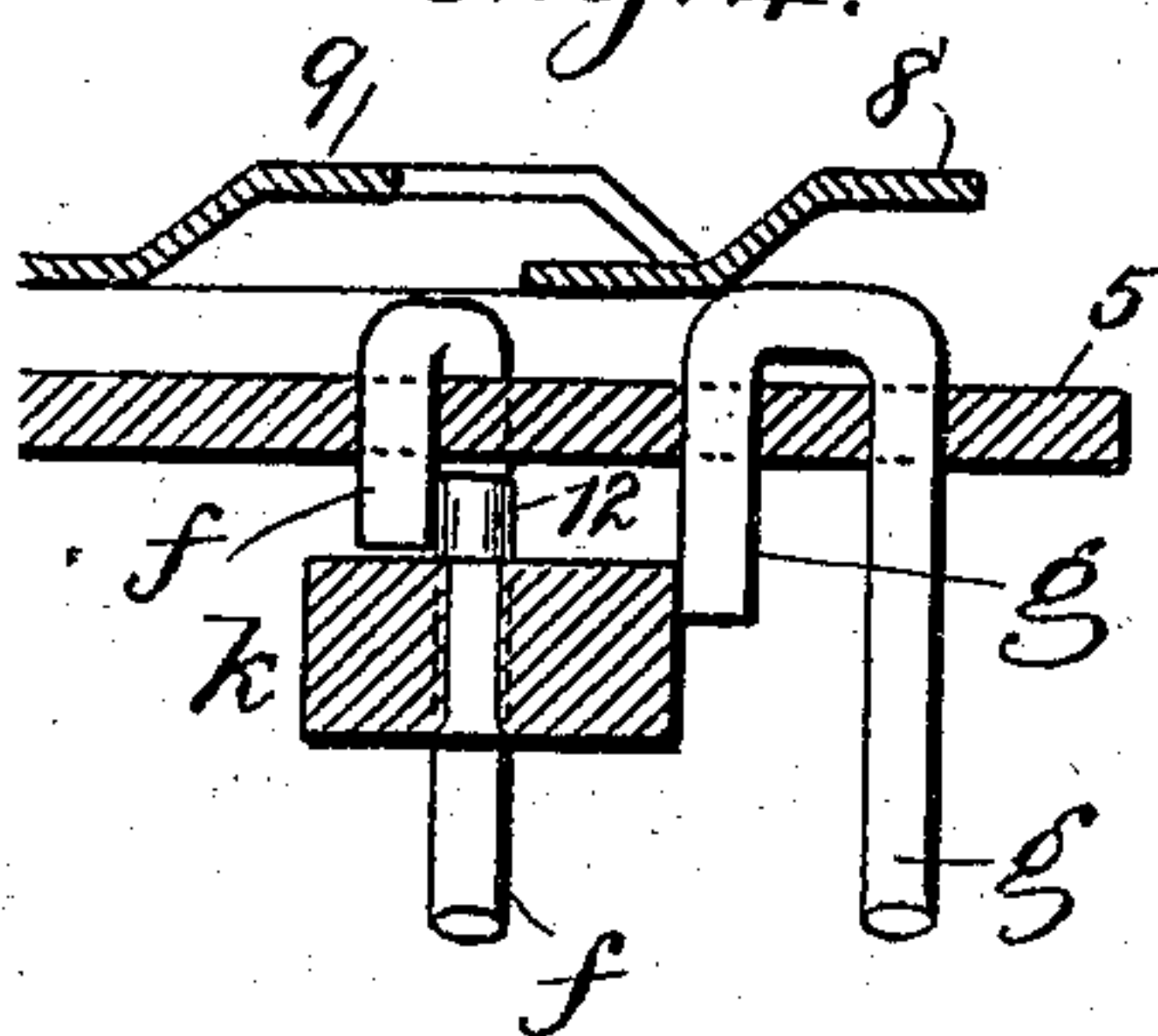


Fig. 4.



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UNITED STATES PATENT OFFICE.

ALBERT B. DISS, OF BROOKLYN, NEW YORK, ASSIGNOR TO THE UNITED STATES BRAID MACHINE MANUFACTURING COMPANY, OF NEWARK, NEW JERSEY, A CORPORATION OF NEW JERSEY.

BRAIDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 695,601, dated March 18, 1902.

Application filed April 8, 1901. Serial No. 54,796. (No model.)

To all whom it may concern:

Be it known that I, ALBERT B. DISS, a citizen of the United States, residing at the borough of Brooklyn, in the city and State of New York, have invented an Improvement in Braiding-Machines, of which the following is a specification.

Heretofore it has been usual to construct braiding-machines with heads upon a suitable support connected by gears to revolve in opposite directions. In these machines spindles carrying the bobbins of thread were made with exchange devices, and transfer devices were employed connected to the revolving heads and engaging the exchange-plates of said spindles, so as to change the path of movement of the spindles and cause the same to travel from one revolving head to the next in order.

My present invention relates to this class of machines; and the object thereof is to simplify the mechanism, to lessen the cost of construction of said machines, and to increase the effectiveness of the same.

My invention embraces devices for positively holding, releasing, and transferring the exchange-plates and spool-spindles and devices for periodically and progressively supplying thread, applying tension thereto, and holding the thread-spool. These devices are adapted for use in braiding-machines making tubular or flat braid.

The devices constituting my invention are hereinafter more particularly described.

In the drawings, Figure 1 is a vertical section through two of the revolving heads and connected parts and an elevation of the spool-spindle, the bobbin of thread, and the thread-tension devices connected therewith. Fig. 2 is a plan of the two revolving heads and a section of several spool-spindles in their progressive positions. Fig. 3 is a section at xx of Fig. 1 through the two revolving heads, together with a plan of the exchange-plates and switches. Fig. 4 is a vertical section and partial elevation at the line yy of Fig. 2. Fig. 5 is a plan of one of the exchange-plates and section of a spool-spindle. Fig. 6 is an elevation of the parts shown in Fig 5. Figs. 7 and 8 are elevations of the bobbin of thread

and the thread-tension devices at right angles to one another and in the other positions of the said parts in Fig. 1. Fig. 9 is a sectional plan at $x'x'$ of Fig. 7, and Fig. 10 is a sectional plan at zz of Fig. 7, and Fig. 11 is a sectional plan at x^2x^2 of Fig. 1 above the upper exchange-plate, illustrating the parts and their relative positions in locking an exchange-plate to a revolving head.

Devices for positively holding, releasing, and transferring the exchange-plates and spool-spindles.—The platform a serves as a support for the various revolving heads of the machine. This platform may be of any desired construction, but would probably be in the form of a ring, as these heads are usually placed in a circular series, so that the movements of the spool-spindles, thread-bobbins, and tension devices are continuous in a serpentine circular path. Pivot-posts b are secured in the platform a and constitute fixed centers about which the revolving heads c rotate.

In my present invention each of the revolving heads is composed of a sleeve 2, a sleeve 3 above the sleeve 2, a disk 4 between the sleeves 2 and 3, and a disk 5 above the sleeve 3, and I prefer to employ pins 6, passing through holes in the disks 4 and 5, and sleeves 2 and 3 at opposite points of the center of the sleeve, said disks being riveted up at the ends to securely connect said parts together as one, and I prefer to employ lugs 7 upon the respective ends of the sleeve 3 at spaced-apart intervals. Fig. 3 shows that there are four of these lugs at equidistant points, and these form bearings beyond the periphery of the sleeve for the disks 4 and 5, employing less metal for the purpose than there would be in flanges upon the ends of the sleeve 3 and serving equally well, the lugs being made integral with the sleeve.

Each of the disks 4 and 5 is shown as a single plate of metal; but they may be stamped up from two or more pieces securely fastened together and be just as effective as if made of one piece. Gears d are secured upon the lower ends of the sleeves 2, and these gears mesh with one another and are driven by a suitable power-gear to rotate the revolving

heads in opposite directions. I employ above the revolving heads and secured by a screw to the upper ends of the pivot-posts *b* stationary cam-disks *e*. These are preferably
 5 formed from a plate of metal, in which the pairs of cam-faces 8 and 9 are cut and pressed to shape in the stamping up of the disk. These cam-faces are of curved form and concentric with one another and occupy posi-
 10 tions on the disk *e* at opposite points of the center.

Upon the upper surface of the disk 4 and under surface of the disk 5 and at equally-spaced-apart positions I employ rollers 10 11,
 15 there being four of the rollers 10 upon the disk 4 and four of the rollers 11 upon the disk 5, directly above the rollers 10, and the edges of the disks 4 and 5 are provided with semi-circular notches adjacent to the rollers and
 20 upon radial lines from the center of the pivot-posts passing through said rollers. These notches receive the spool-spindles *h*, the same being held vertical in said notches by the exchange-plates *k t*, connected therewith, and
 25 the locking-pins *f* and stop-pins *g*, placed vertically in openings in the disks 4 and 5 of the revolving heads. These locking-pins *f* and stop-pins *g* are bent over at their upper ends into the form of hooks, the stop-pins having
 30 a larger hook end than the locking-pins, Figs. 1 and 4 showing said locking and stop pins clearly in elevation, while Figs. 2 and 3 show the plan and sectional positions of said parts.

The stems of the locking-pins *f* and stop-pins
 35 *g* pass through both disks 4 and 5, and the locking-pins *f* are moved vertically by the switches *l*, while the stop-pins *g* are moved vertically by the exchange-plate *k*. Each of these exchange-plates *k t* is provided with
 40 two pins 12, projecting downward from the under surface of the lower exchange-plate and upward from the upper surface of the upper exchange-plate, and the upper ex-
 45 change-plate, in contradistinction to the lower exchange-plate, is provided with cam edges 13 and notches 14 in the back. The switches *l* are made similar to those heretofore employed by me. They are pivotally
 50 supported upon the platform *a* and occupy a position above the gears *d* and between the parts of the revolving heads, the same being placed in alternate opposite directions. Each of these switches is provided with cam-faces
 55 15, with converging cams 16, and with a central elliptical cam projection 17. In the position of these parts Fig. 1 a spool-spindle *h* and its exchange-plates *k t* are about being transferred from one revolving head to the next, and by reference to Figs. 1, 2, and 3 it
 60 will be noticed that the direction of transfer is from the left-hand head to the right-hand head in the direction of movement. The parts are at all times so placed that when the spool-spindle *h* is in the edge notches of the disks
 65 4 5 and occupies a vertical position the rollers 10 and 11 come between the pins 12 of the exchange-plates and the spool-spindle, so as

to hold the spool-spindle against the disks. This condition is apparent from Figs. 1, 2, 3. It will be noticed from Fig. 1 that one of the
 70 locking-pins *f* to the left of the spool-spindle has been raised by one of the cams 16 of the switch *l*, so that the lower end of this locking-pin rests upon the top of the switch and the free end of its hook has been raised clear
 75 of the pin 12, while by reference to the right hand of the spool-spindle *h* it will be noticed that the locking-pin *f* hangs free and supported by the disk 5 and that the free end of
 80 its hook is forward of the pin 12 of the upper exchange-plate. This position is shown also in Figs. 2 and 4, and from which latter figures it will also be apparent that the stop-pin
 85 *g* at the free end of its hook portion comes into one of the notches 14 behind the upper exchange-plate. Consequently while the rollers 10 11 hold the exchange-plates and the
 90 spool-spindle against the disks of the right-hand head the locking-pin *f* prevents a swinging movement in one direction and the stop-pin *g* a swinging movement in the opposite
 95 direction, and as the heads turn from the position Figs. 2 and 3 the exchange-plates and spool-spindles are free to come away from the left-hand head and continue their move-
 100 ment connected to the right-hand head. The vertical movement imparted to the stop-pins *g* is effected by the cam edges 13 of the upper exchange-plate underrunning the point of the hook portion of said stop-pins and rais-
 105 ing the stop-pins onto the upper surface of the said exchange-plate, and with the forward movement of the exchange-plate as carried by the adjacent head the hook point of said stop-pin will pass over the surface of
 the exchange-plate and drop behind in one of the notches 14.

As the exchange-plate and spool-spindle just described pass half-way around the said revolving head the locking-pin *f*, holding for-
 110 ward of the pin 12, will be raised by the switch, and the locking-pin on the next adjacent revolving head will then come forward of the opposite pin 12, and the stop-pin
 115 *g* will be operated on the opposite side of the exchange-plate, passing over the same, as hereinbefore described, and dropping into the other notch 14 to hold the exchange-plate to the next head.

The cam-faces 8 9 of the stationary cam-disk
 120 *e* provide for the vertical movements of the locking-pins and stop-pins as operated upon by the switches *l* and the cam edges 13 of the exchange-plate *k*, the said cam-faces serving the further function of forcing downward
 125 into their operative positions the locking-pins *f* and stop-pins *g* with the movement of the revolving heads in case their movement is arrested and they do not fall by gravity as promptly as they should. The switches *l* and
 130 the operation of the same do not require further description in the present application, as these switches are constructed and operate the same as those heretofore employed by

me in similar machines and shown and described in my application for Letters Patent, Serial No. 37,576, filed November 24, 1900. I prefer to employ the rollers 10 and 11 upon the disks 4 and 5 rather than to employ pins or studs in the same position as the rollers, which are really annuli mounted on studs having an antifriction function which facilitates the easy and quick running of the parts of the machine as they come into connection and separate from one another.

Devices for periodically and progressively supplying thread, applying tension thereto, and holding the thread-spool.—The upper end of the spool-spindle is made hollow or tubular to receive the lower end of an auxiliary spindle *o*, and the thread-bobbin *i* is mounted upon this auxiliary spindle. The upper end of this spindle is provided with an eye for the passage of the thread from the tension devices to the work being accomplished. Around the upper end of the spool-spindle *h* I place a sleeve *r*, having oppositely-extending arms 26, and said sleeve is fastened to the spool-spindle by a set-screw, so that the thread-bobbin *i* rests substantially simultaneously upon the said sleeve and end of the spool-spindle. I employ in connection with these devices a collar *s* below the sleeve *r* and around the spool-spindle, and the same is provided with a hook-ended vertically-placed wire 28, beneath the hook end of which the thread passes from the thread-bobbin up to the thread-tension devices.

Secured to the upper end of the thread-bobbin *i* is a toothed disk 18, and I employ a base-plate *m*, surrounding and secured to the auxiliary spindle and free from the toothed disk 18 and provided with lugs 19 20, which form parts of a hinge. The lug 20 is made long in a horizontal direction, and a pawl-plate 21 is pivoted to its free end. This pawl-plate is shown clearly in Figs. 7 and 9, in which it will be noticed that the right-hand end of the pawl-plate is bent at approximately right angles to the main portion and that the left-hand end is bent at an acute angle and continued downward, so that its free end engages one notch at a time of the disk 18, and I employ a spring 22, fastened at one end to the pawl-plate 21 and at its free end resting upon the upper surface of the base-plate *m*, the function of the spring 22 being to cause the left-hand end of the pawl-plate to bear forcibly downward to insure the engagement of the said end of the pawl-plate with the notches of the disk 18—that is, with one notch at a time successively for every playing out of the thread. The base-plate *m* at the edge opposite to the lugs is provided with tension-rollers 23, two in number, upon short studs secured to the said base-plate. As a convenient manner of securing these tension-rollers and their shafts I prefer to double the edge of the base-plate *m*, so as to form two thicknesses spaced apart, and the short shafts of

these tension-rollers pass through and are connected to these two parts.

A plate *n* is pivotally connected by lugs and a pivot-rod 24 to the lugs 19 20 of the base-plate *m*, and this plate *n* is provided on one end with a tailpiece and on the opposite end or edge with tension-rollers 25, secured to the edge of this plate preferably in a manner identical with the manner of securing the tension-rollers 23 to the plate *m*, and the tension-rollers 25 are substantially above the tension-rollers 23, and a spring 27 connects with the tailpiece of the plate *n* and extends down to an adjusting-screw 29, passing through one of the arms 26 of the sleeve *r*, the tendency of said spring being to draw down the plate *n* at the tailpiece and to raise the end having the tension-rollers. Figs. 7 and 8 show the manner of passing the thread over the tension-rollers—that is to say, the thread passes from the thread-bobbin under the hook end of the wire 28 vertically to the first roller of the plate *n*, over the same down to the first roller of the plate *m*, up to the second roller of the plate *n*, down and beneath the second roller of the plate *m*, and up through the eye of the auxiliary spindle *o* and away. In the operation of this tension device and with the movement of the spool-spindle and the thread-bobbins around the revolving heads the thread is gradually worked into the braiding-machine, and the pairs of rollers of the plates *m* and *n* gradually approach one another, and before they come into actual contact the plate *n* strikes the intumed right-hand end of the pawl-plate 21, forcing the same down and raising its opposite end out of a notch of the toothed disk. The tension on the thread at this period is so great that the moment the thread-bobbin is thus released the thread is paid out quickly and the spring 27 as the thread is paid out raises the plate *n*, elevating the tension-rollers 25 connected therewith to their highest point, taking up the slack thread. As the plate *n* rises the spring 22 quickly returns the pawl-plate 21 to its normal position, its end engaging with the nearest notch of the toothed disk, so as to stop the thread-bobbin and reestablish the normal relation between the same and the base-plate *m*. This movement is repeated each time the thread is used up to such an extent that the parts of tension-rollers come almost together. Each of these tension-rollers has a V or concave periphery to receive the thread passing around the various rollers, and by the employment of two rollers on each plate an even degree of tension is assured that would not exist were only two rollers employed. More than two rollers to each plate might be employed without changing the nature of the invention, but the movement of the parts would thereby not be so desirable or advantageous.

The hook-ended wire 28 of the collar *s* passes through one of the arms 26, said arm forming

a guide therefor. These parts are the same and operate like similar parts heretofore employed by me, as shown and described in my application for Letters Patent Serial No. 37,576, filed November 24, 1900—that is to say, when the thread breaks the collar falls, so that other parts in such machines may contact with said collar for the purpose of stopping the mechanism.

I do not herein limit myself to the number of rollers or to the number of locking-pins or stop-pins and coacting parts employed upon and with each revolving head, for while I have shown and prefer these parts arranged in four groups on each head a less or greater number may be employed without departing from my invention.

I claim as my invention—

1. In a braiding-machine, the combination with a platform, revolving heads supported upon said platform and gears for actuating the same in opposite directions, of spool-spindles and exchange-plates connected therewith, switches pivoted in opposite directions upon said platform, locking-pins moving vertically in the revolving heads and raised by the switches and permitted to drop by gravity, stop-pins independent of the locking-pins and raised by the exchange-plates and permitted to fall by gravity, and devices connected respectively to parts of the head and to the exchange-plates and which parts are adapted to come into engagement and to cooperate with the locking and stop pins for engaging and holding the exchange-plates and spool-spindles to the revolving heads, substantially as set forth.

2. In a braiding-machine, the combination with a platform, revolving heads supported upon said platform and gears for actuating the same in opposite directions, of spool-spindles and exchange-plates connected therewith, switches pivoted in opposite directions upon said platform, locking-pins moving vertically in the revolving heads and raised by the switches and permitted to drop by gravity, stop-pins independent of the locking-pins and raised by the exchange-plates and permitted to fall by gravity, pins upon the exchange-plates and rollers upon the revolving heads adapted to come into engagement and opposition whereby the exchange-plates are held to the revolving heads, the locking-pins and stop-pins holding the exchange-plates so as to prevent a swinging movement of the same and the spool-spindles, substantially as set forth.

3. In a braiding-machine, the combination with a platform, revolving heads supported upon said platform and gears for actuating the same in opposite directions, of spool-spindles and exchange-plates connected therewith, switches pivoted in opposite directions upon said platform, locking-pins moving vertically in the revolving heads and raised by the switches and permitted to drop by gravity, stop-pins independent of the locking-pins

and raised by the exchange-plates and permitted to fall by gravity, and devices connected respectively to parts of the head and to the exchange-plates and which parts are adapted to come into engagement and to cooperate with the locking and stop pins for engaging and holding the exchange-plates and spool-spindles to the revolving heads, and stationary cam-disks above the revolving heads and adapted to permit the vertical movements of the locking and stop pins and to force the same downward if they do not quickly fall by gravity, substantially as set forth.

4. In a braiding-machine, the combination with a platform and pivot-posts mounted thereon, of revolving heads each comprising a lower and upper sleeve and intermediate disk and a disk above the upper sleeve and pins passing through the sleeves and disks and riveted up for securely connecting the respective parts and a gear surrounding the lower sleeve and by which the head is revolved, substantially as set forth.

5. In a braiding-machine, the combination with a platform and pivot-posts mounted thereon, of revolving heads each comprising a lower and upper sleeve an intermediate disk and a disk above the upper sleeve and pins passing through the sleeves and disks and riveted up for securely connecting the respective parts and a gear surrounding the lower sleeve and by which the head is revolved, and lugs at spaced-apart intervals projecting from the respective ends of the upper sleeve and coming above the lower disk and below the upper disk to insure the parallelism of the respective disks, substantially as set forth.

6. In a braiding-machine, the combination with a platform and pivot-posts mounted thereon, of revolving heads each comprising a lower and upper sleeve an intermediate disk and a disk above the upper sleeve, and pins passing through the sleeves and disks and riveted up for securely connecting the respective parts, and a gear surrounding the lower sleeve and by which the head is revolved, and means for insuring the parallelism of the respective disks, locking-pins and stop-pins having stems passing vertically through both disks and guided thereby and hook ends passing through the upper disk, said locking and stop pins being at spaced-apart intervals around the head and rollers upon the upper surface of the lower disk and under surface of the upper disk also at spaced-apart intervals, substantially as set forth.

7. In a braiding-machine the combination with a platform and pivot-posts mounted thereon, of revolving heads each comprising a lower and upper sleeve, an intermediate disk and a disk above the upper sleeve, and pins passing through the sleeves and disks and riveted up for securely connecting the respective parts, and a gear surrounding the lower sleeve and by which the head is re-

involved, and means for insuring the parallelism of the respective disks, locking-pins and stop-pins having stems passing vertically through both disks and guided thereby and hook ends passing through the upper disk, said locking and stop pins being at spaced-apart intervals around the head and rollers upon the upper surface of the lower disk and undersurface of the upper disk also at spaced-apart intervals, and a stationary cam-disk above and secured to the upper end of the pivot-post and having cam-faces that are concentric and formed by bending up portions of the disk to permit of the vertical movements of the locking and stop pins and to force the same down when they do not fall quickly by gravity, substantially as set forth.

8. In a braiding-machine, the combination with a platform, pivot-posts mounted thereon, revolving heads upon said pivot-posts and gears for operating the same, of spool-spindles adapted to be received in peripheral vertically-placed notches in the surfaces of the revolving head, exchange-plates two in number connected to each spool-spindle and devices connected to the exchange-plates and other devices connected to the revolving heads adapted to come into connection to hold each spool-spindle at its exchange-plates to a revolving head and locking-pins adapted to contact with the aforesaid connecting devices and stop-pins adapted to contact with one of the exchange-plates and means for periodically raising the locking and stop pins for permitting the progressive movements of the machine, substantially as set forth.

9. In a braiding-machine, the combination with a platform, pivot-posts mounted thereon, revolving heads upon said pivot-posts and gears for operating the same, of spool-spindles adapted to be received in peripheral vertically-placed notches in the surface of the revolving head, exchange-plates two in number connected to each spool-spindle, pins connected to the lowermost exchange-plate and extending downward, similar pins connected to the upper exchange-plate and extending upward, cam edges on opposite sides of the upper exchange-plate and notches in the back edges of the upper exchange-plate, devices connected to the heads and adapted to engage the pins of the exchange-plates and to come between the said pins and the spool-spindle, locking-pins adapted progressively to come in front of the pins of the upper exchange-plate and stop-pins adapted to come progressively into the notches in the back edges of the upper exchange-plate, so that

the exchange-plates and spool-spindles are not only held to the revolving heads, but prevented from turning and becoming disengaged in their relation thereto, substantially as set forth.

10. In a braiding-machine, the combination with a platform and pivot-posts mounted thereon, of revolving heads upon said pivot-posts comprising connected portions and upper and lower disks and rollers upon the upper surface of the lower disk and under surface of the upper disk at spaced-apart intervals and peripheral notches adjacent to said rollers and spool-spindles adapted to be received in said notches, two exchange-plates mounted upon each spool-spindle and coming between the upper and lower disks of the revolving heads, and means connected to said exchange-plates and engaged by said rollers, and locking-pins moving vertically in said heads and adapted to engage said means and stop-pins also moving vertically in said revolving heads and adapted to engage the exchange-plates, substantially as set forth.

11. In a braiding-machine, the combination with a platform and pivot-posts mounted thereon, of revolving heads upon said pivot-posts comprising connected portions and upper and lower disks and rollers upon the upper surface of the lower disk and under surface of the upper disk at spaced-apart intervals and peripheral notches adjacent to said rollers and spool-spindles adapted to be received in said notches, two exchange-plates mounted upon each spool-spindle and coming between the upper and lower disks of the revolving heads, pins secured in said exchange-plates and extending in opposite directions toward the said disks and adapted to come into engagement with the said rollers, locking-pins moving vertically in said revolving heads and progressively coming into a forward position against said pins, switches for periodically and progressively raising the said locking-pins, stop-pins moving vertically in said revolving heads, cam edges on one of said exchange-plates adapted to raise the stop-pins progressively and pass the same over the exchange-plate and permit the same to fall behind the exchange-plate whereby the stop-pins coact with the locking-pins to prevent a swinging movement of the exchange-plates and insure their being held in position by the pins and rollers, substantially as set forth.

Signed by me this 29th day of March, 1901.

ALBERT B. DISS.

Witnesses:

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S. T. HAVILAND.