(No Model.)

2 Sheets—Sheet 1.

J. H. JONES.

BRAIDING MACHINE.

No. 580,944. Patented Apr. 20, 1897.

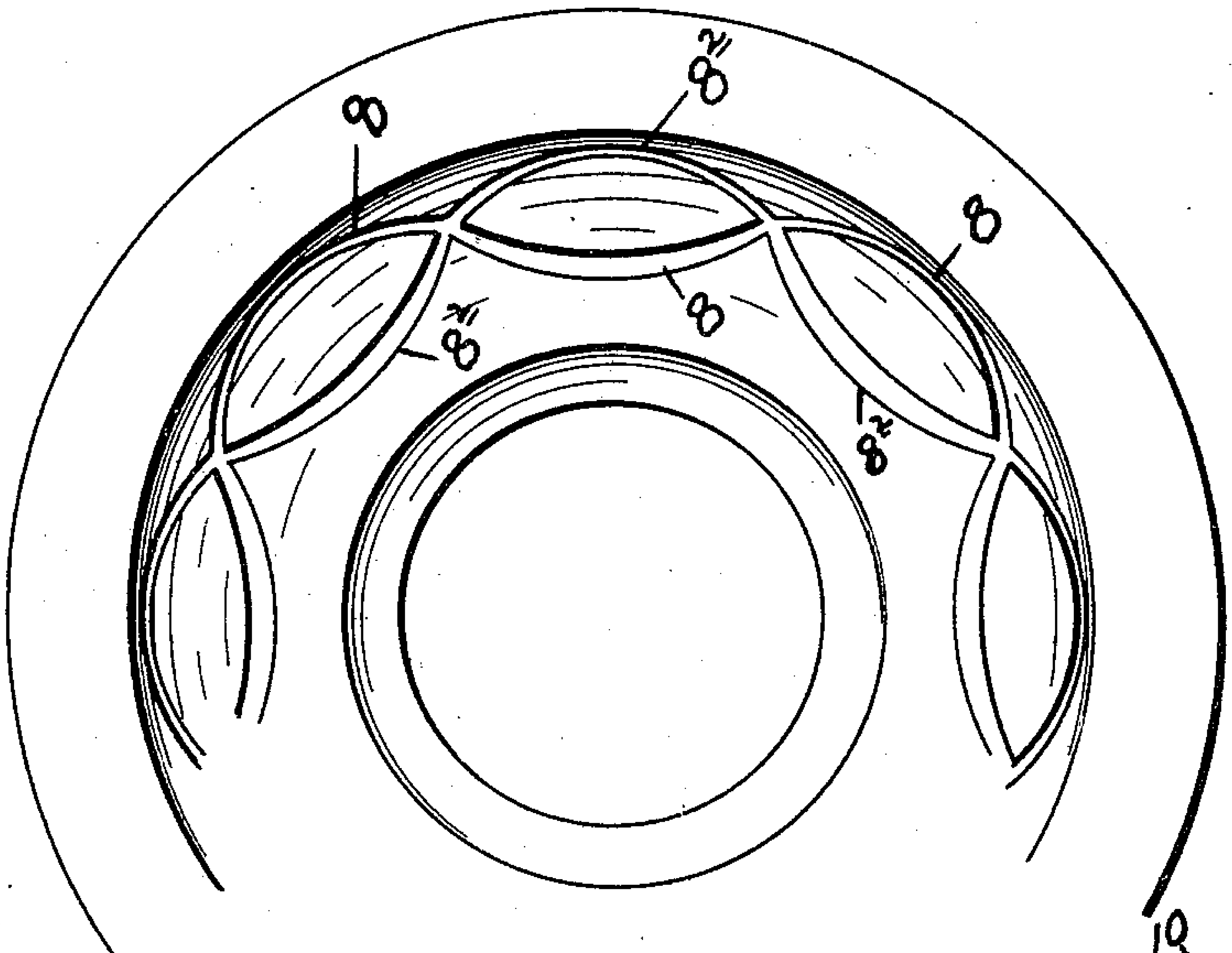

FIG. 2.

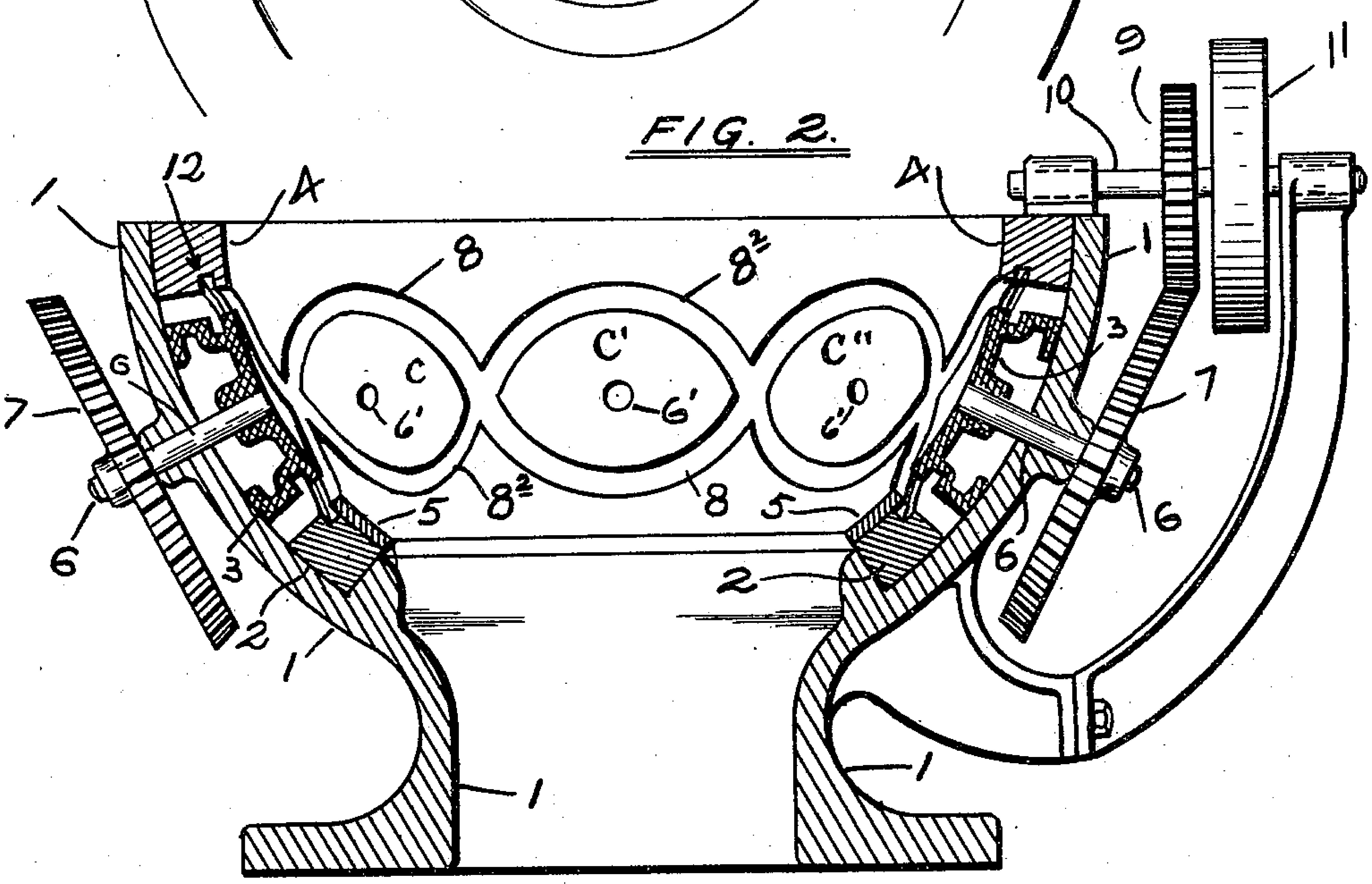

FIG. 1.

WITNESSES.

A. B. Babbitt

Lillian J. Tuck

INVENTOR.

Joseph H. Jones

-BY- James L. Jenks

ATT'Y.

(No Model.) 2 Sheets—Sheet 2.

J. H. JONES.

BRAIDING MACHINE.

No. 580,944. Patented Apr. 20, 1897.

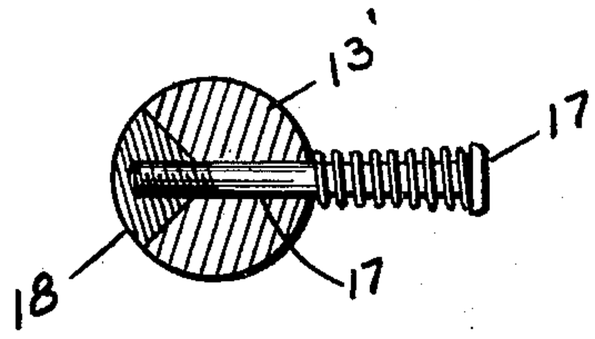

FIG. 7.

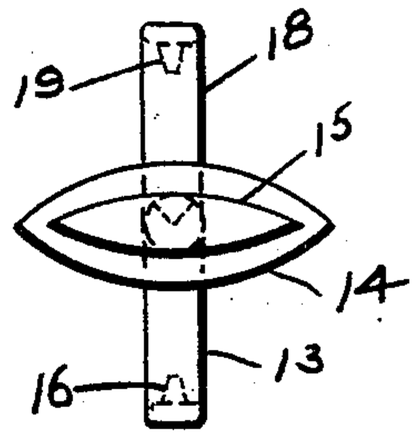

FIG. 6.

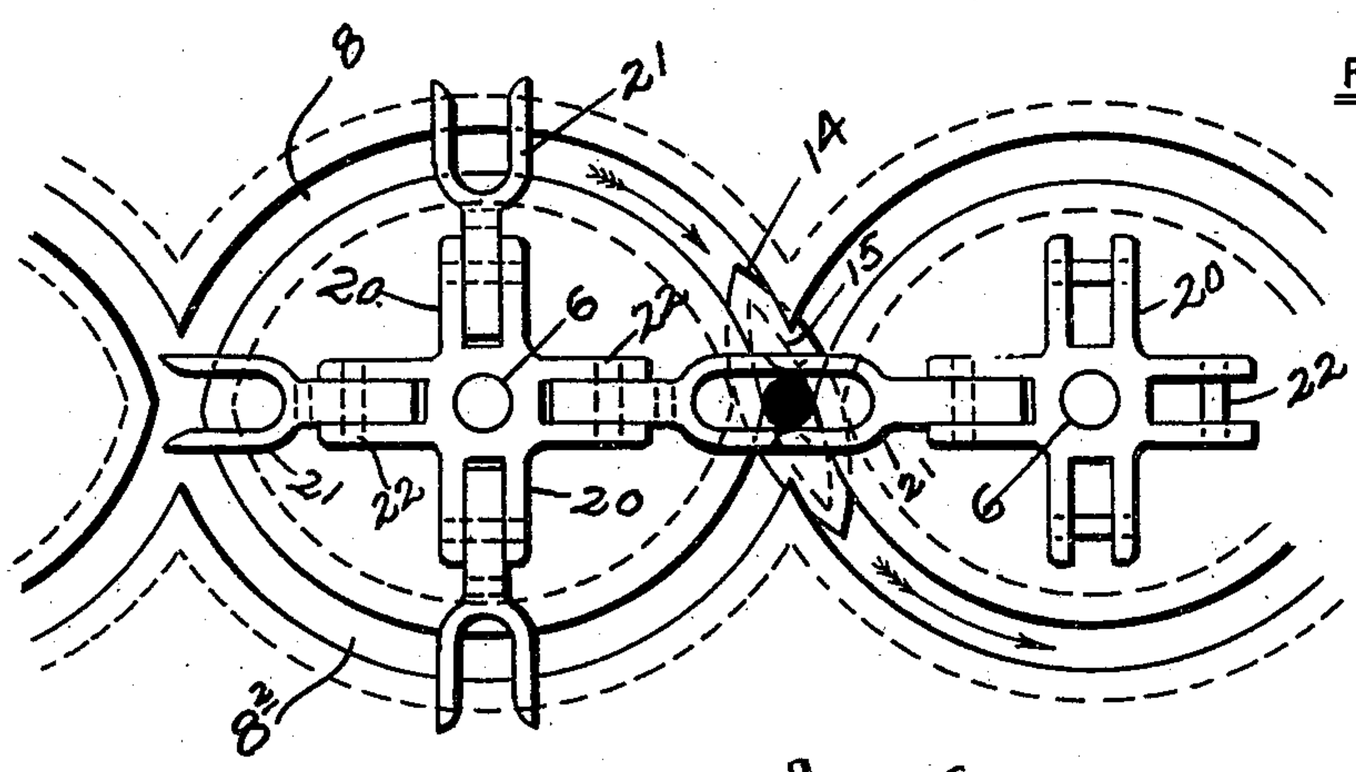

FIG. 4.

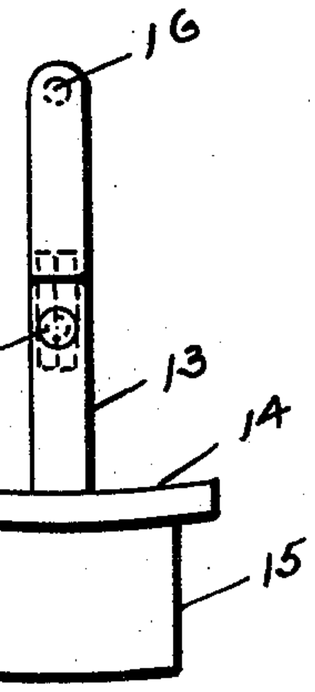

FIG. 5.

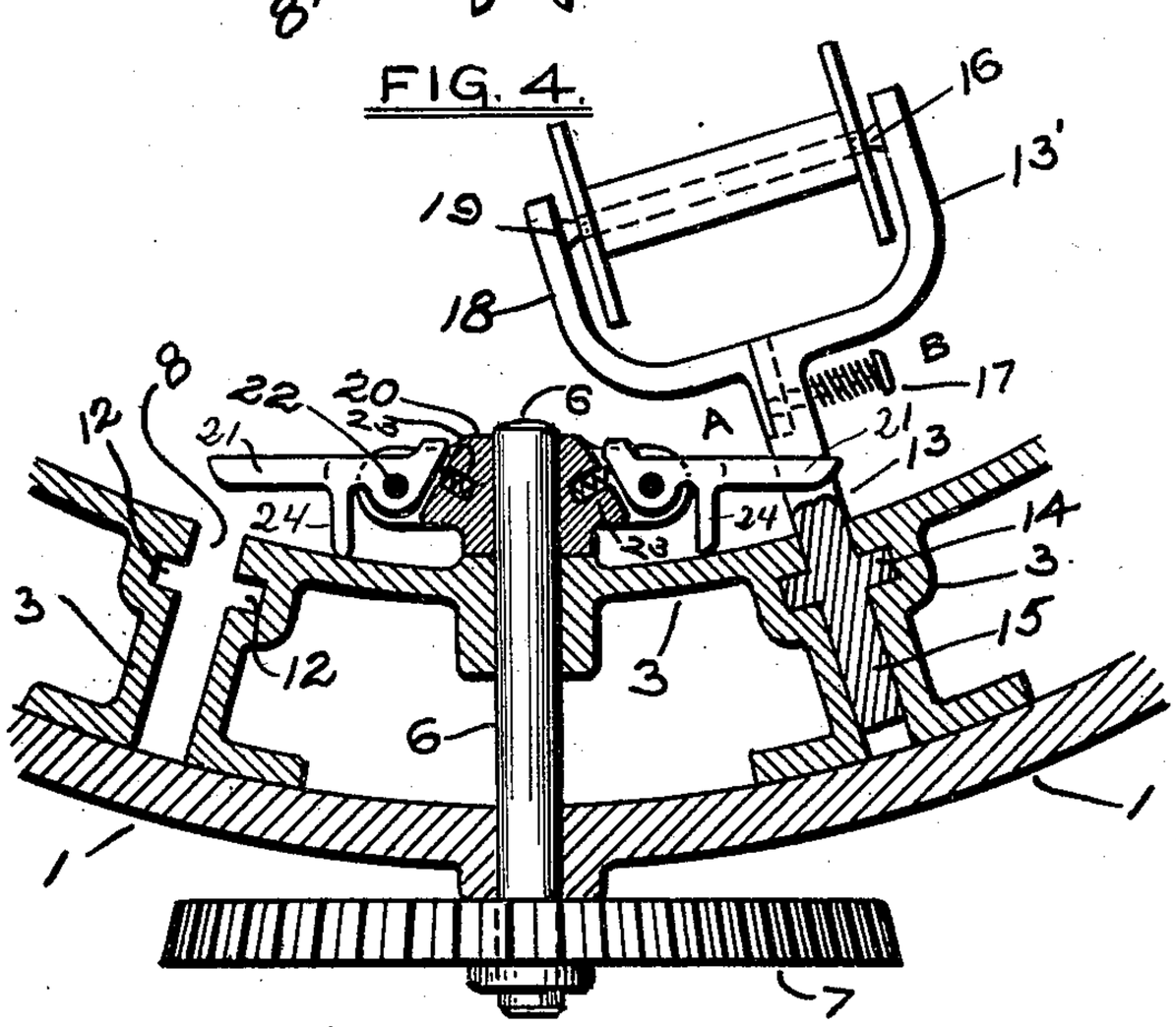

FIG. 3.

WITNESSES.

A. B. Babbitt.

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UNITED STATES PATENT OFFICE.

JOSEPH H. JONES, OF PAWTUCKET, RHODE ISLAND.

BRAIDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 580,944, dated April 20, 1897.

Application filed January 27, 1896. Serial No. 576,946. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH H. JONES, a citizen of the United States, residing at Pawtucket, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Braiding-Machines; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in braiding-machines in which the guide-plate containing the cam-grooves consists of a spherically-concaved surface, the bobbins in their motion following the curvature of the plate; and the purpose of my invention is to provide a braiding-machine in which that point on each bobbin where the thread leaves the same is always at the same distance from the center core, no matter what may be the situation of the bobbin upon the guide-plate. Any variation of distance from the center subjects the yarn or thread to sudden, frequent, and wide changes of tension, which in turn necessitates the use of strong yarn or thread and also very materially limits the speed of the machine, as the more rapid the motion of the machine the more sudden and violent are the changes in tension upon the thread and the more frequent the breaks in the same.

By my invention the point where the thread leaves the bobbin is always at or approximately at the same distance from the center, thus making the tension upon the thread constant, and thus rendering possible the use not only of inferior qualities of thread, but of a very much higher speed upon the machine, thus very greatly increasing its capacity in a given time. This object is realized by the device shown in the accompanying drawings, in which—

Figure 1 is a vertical section through the center of the machine; Fig. 2, a plan view of a section of the guide-plate; Fig. 3, an enlarged detail of a section through one of the cams; Fig. 4, a horizontal development of the cam-grooves upon a plane surface, showing also the delivery-fingers and bobbin-spindle. Fig. 5 is an elevation of the spindle; Fig. 6, a horizontal view of the same, and Fig. 7 a detail of the latter to be explained hereinafter.

The same parts are marked by the same letters and numerals throughout.

In Fig. 1, 1 is the body of the machine, and consists, substantially, of a hollow hemisphere with an opening at the base, as shown.

2 and 4 are respectively the bottom and top plates forming the outer curves of the cam-grooves, the outer portion of the lower groove being formed in part by the plate 5 5.

C, C′, and C″ are the cams, and 8 8 and 8^2 8^2 the cam-grooves, the latter being recessed on both edges throughout the entire length, as shown at 12, to accommodate the flange of the spool-carrier. (Seen at 14 in Fig. 5.)

11 is a driving-pulley communicating motion through 9 to a series of bevel-gears 7 7, which encompass the entire bowl of the machine and which also operate the spool-carriers, as seen more clearly in Figs. 3 and 4.

The cams are shown in section at 3 3 and are secured to the outer shell. They are perforated at 6′ for the admission of the shaft 6 of the bevel-gear 7.

In Fig. 3 the head 20 of the gear-shaft 6 is shown in section. This head may be either cast solid with the shaft or fixed upon the same in any suitable manner. This head is seen more clearly in Fig. 4, and consists of opposite pairs of lugs or sockets 20, each pair having the pivot 22, upon which are mounted the delivery-fingers 21, which operate the spool-carriers. Projecting downward from the fingers is the support 24, which, by means of the spiral spring 23, is kept in contact with the cam throughout its entire revolution. This support 24 supports the fingers 21 as they are revolved, and the springs 23 prevent the fingers from having a tendency to fly upward. Fingers are used, as here shown, instead of the usual slotted disk, which always revolves in the same plane upon an inflexible stud or shaft, because the fingers are independent of each other and are capable of revolving, and do revolve, in different planes, according to the point of contact between the support on the lower part of the fingers and the inside of the case. While the fingers appear to always revolve in the same plane, yet,

as a matter of fact, they revolve in different planes, because they rise and fall in their revolutions, and this rising and falling is either caused by irregularities upon the interior of the case or else for the reason that the case itself departs somewhat from a true spherical form. A slotted inflexible disk revolving upon the stud or shaft will not answer with a semispherical case such as here shown.

The right-hand portion of Fig. 3 shows a spool-carrier with an empty spool thereon, the carrier being retained in the groove by the flange 14 entering the recesses 12 12. This carrier is seen in detail in Figs. 5 and 6, in which 15 is a boat-shaped base surmounted by a flange 14, from which rises the spindle 13, terminating in the yoke-shaped arms 13′ 18. These arms have projecting inwardly therefrom the spurs 16 19, which carry the spool, as shown in Fig. 3. The arms are slightly separable by the joint seen at A B, Fig. 3, and in detail in Fig. 7. The arm 18 is distinct from 13′, but fitted to it by the recess shown in Fig. 7. The pin 17 is fixed in 18 and slides easily through a hole in 13′ and by means of the spiral spring keeps 18 firmly in position.

Fig. 4 shows the development on a plane surface of the cams and grooves, the spindle of the spool-carrier being shown by the large black circle, the arrows showing the direction of its movement.

Instead of the yoke-shaped spool-carrier shown in the drawings a plain spindle may be used, the operation of the machine being the same in either case.

It will be readily seen from the drawings that the cams are all located in a zone about the interior of the bowl, their centers and long diameters being in the same horizontal circle about the interior, and the pitch of the grooves at different points about the cam is such that the shank 13 of the spool-carrier and the thread extending from the carrier to the center form one and the same straight line, being a radius of the sphere or that portion of the sphere which forms the body of the machine. This permanent and constant radial direction of the thread is the result of the spherical concavity of the body of the machine and constitutes the chief and principal element of my invention. As a result of it a more even and regular quality of braid is produced, an inferior grade of thread may be used, such as is not possible on the machines now in use, and the speed and resulting capacity of the machine greatly increased.

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

1. In a braiding-machine, a semispherical concave body, combined with the top and bottom plates placed therein, the cams placed between the plates, the top plate being redressed and the plate 5, secured to the bottom plate whereby grooves or ways are formed for the spool-carriers to move in, substantially as shown.

2. A semispherical body, having cam-grooves upon its inner face, and means for holding the thread-carriers in the grooves, combined with inclined thread-carriers which move in the grooves and which always maintain the same distance from the center of the body, substantially as described.

3. In a braiding-machine, a semispherical body, cams formed on the inner surface thereof, and driving-shafts extending through both body and cams from their outer sides, combined with a mechanism for revolving the shafts, the spool-carriers, and a series of fingers secured to each shaft, the fingers from one cam overlapping those from the adjoining one whereby the spool-carriers are moved from one cam to the other, substantially as set forth.

4. In a braiding-machine, the hemispherical body, the cams and grooves formed thereon, and a series of revolving spring-actuated fingers for each cam, each pair of fingers being provided with a support arranged to bear on the inside of the body, substantially as described.

5. A semispherical body having cam-grooves in its inner face, combined with thread-carriers which move in said grooves, a series of revolving fingers for each cam, and a mechanism for revolving them, whereby the thread-carriers are moved from one cam-groove to the other, substantially as shown.

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

JOSEPH H. JONES.

Witnesses:
LELLAN J. TUCK,
WILLIAM F. BURKE.