

No. 630,036.

Patented Aug. 1, 1899.

T. CORSCADEN, Dec'd.

A. J. CORSCADEN, Administratrix.

DIE FOR SHAPING PULLEY SPOKE BLANKS.

(Application filed Oct. 3, 1898.)

(No Model.)

2 Sheets—Sheet 1.

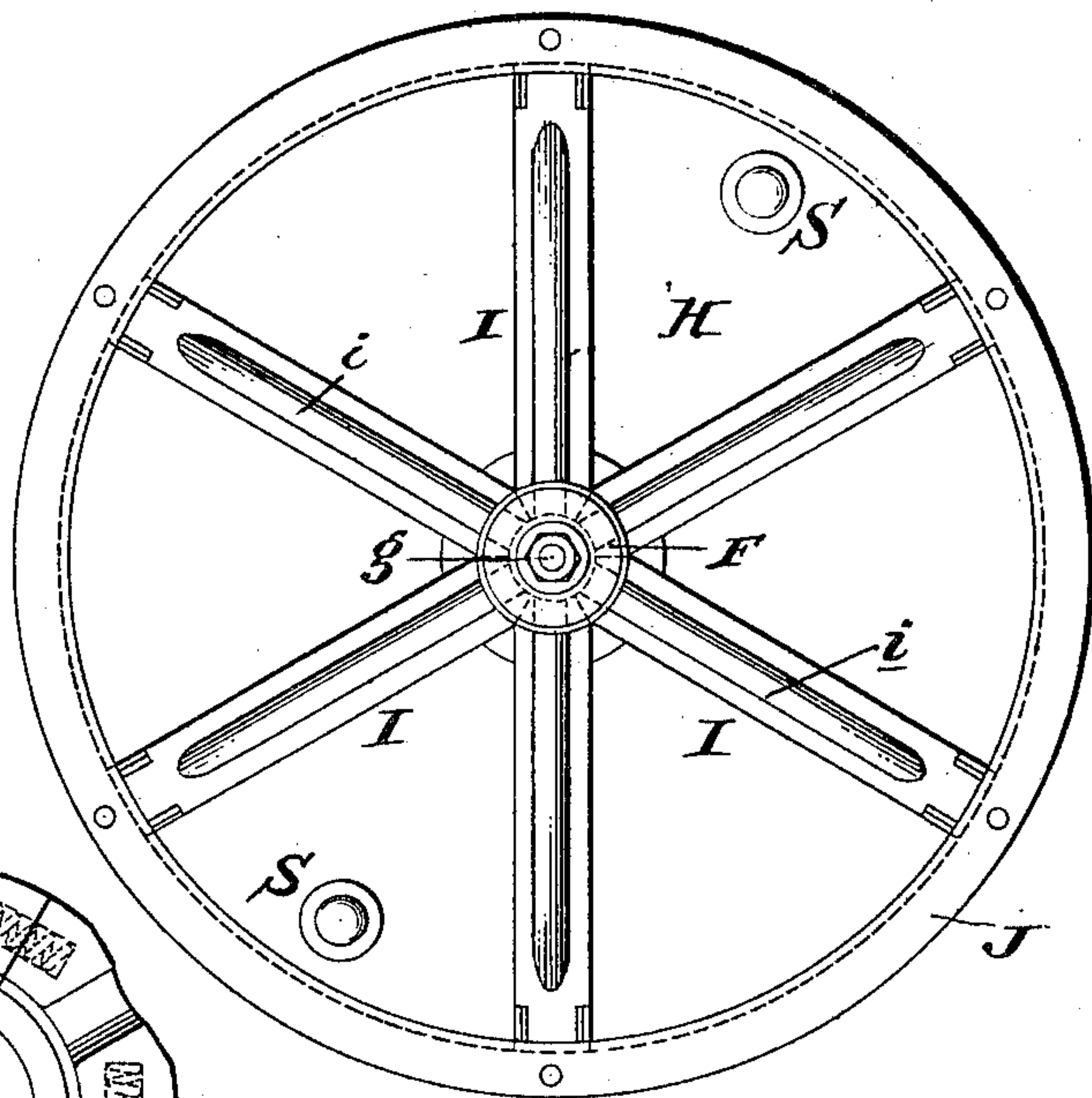


FIG. 1

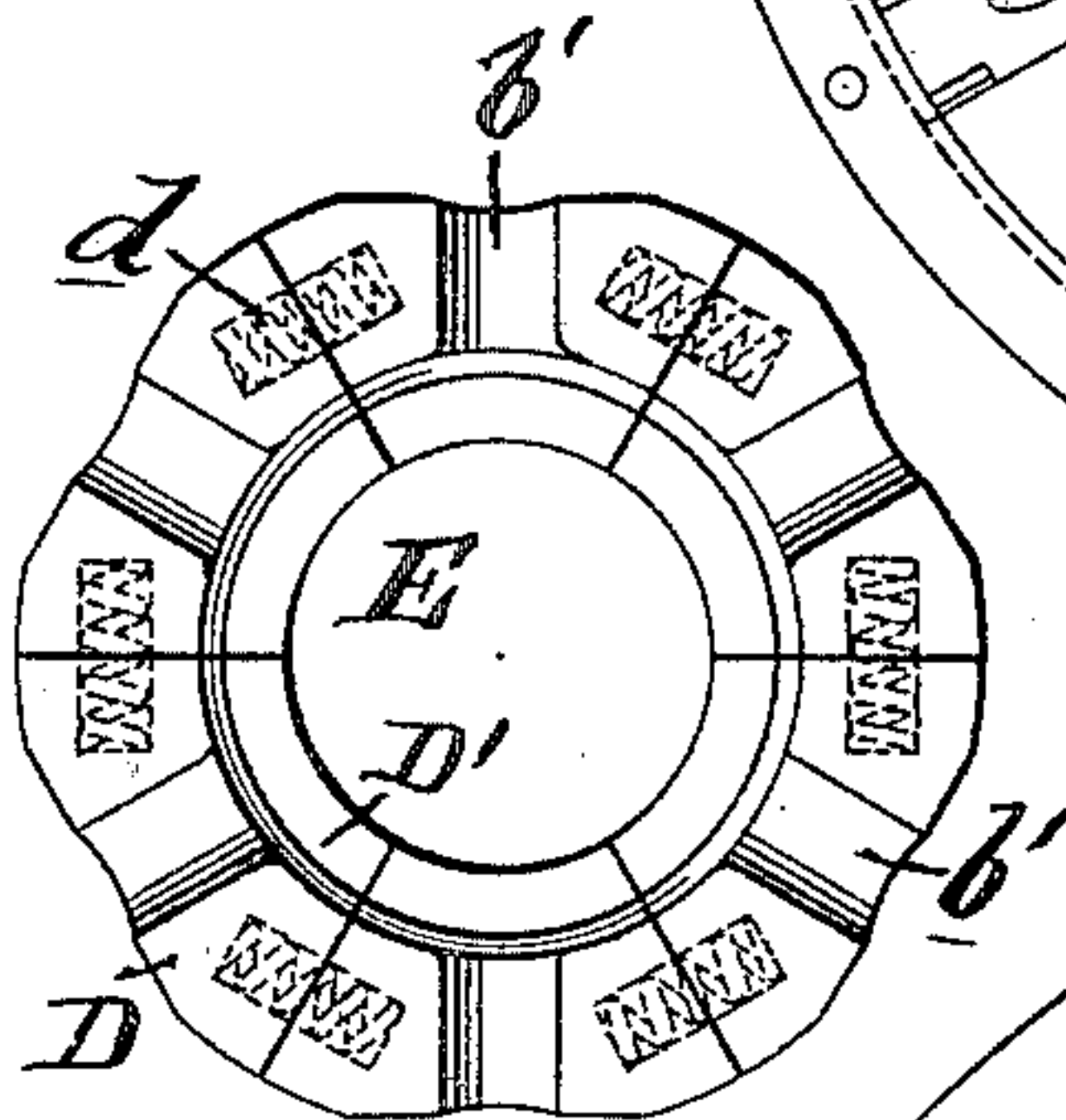


FIG. 3

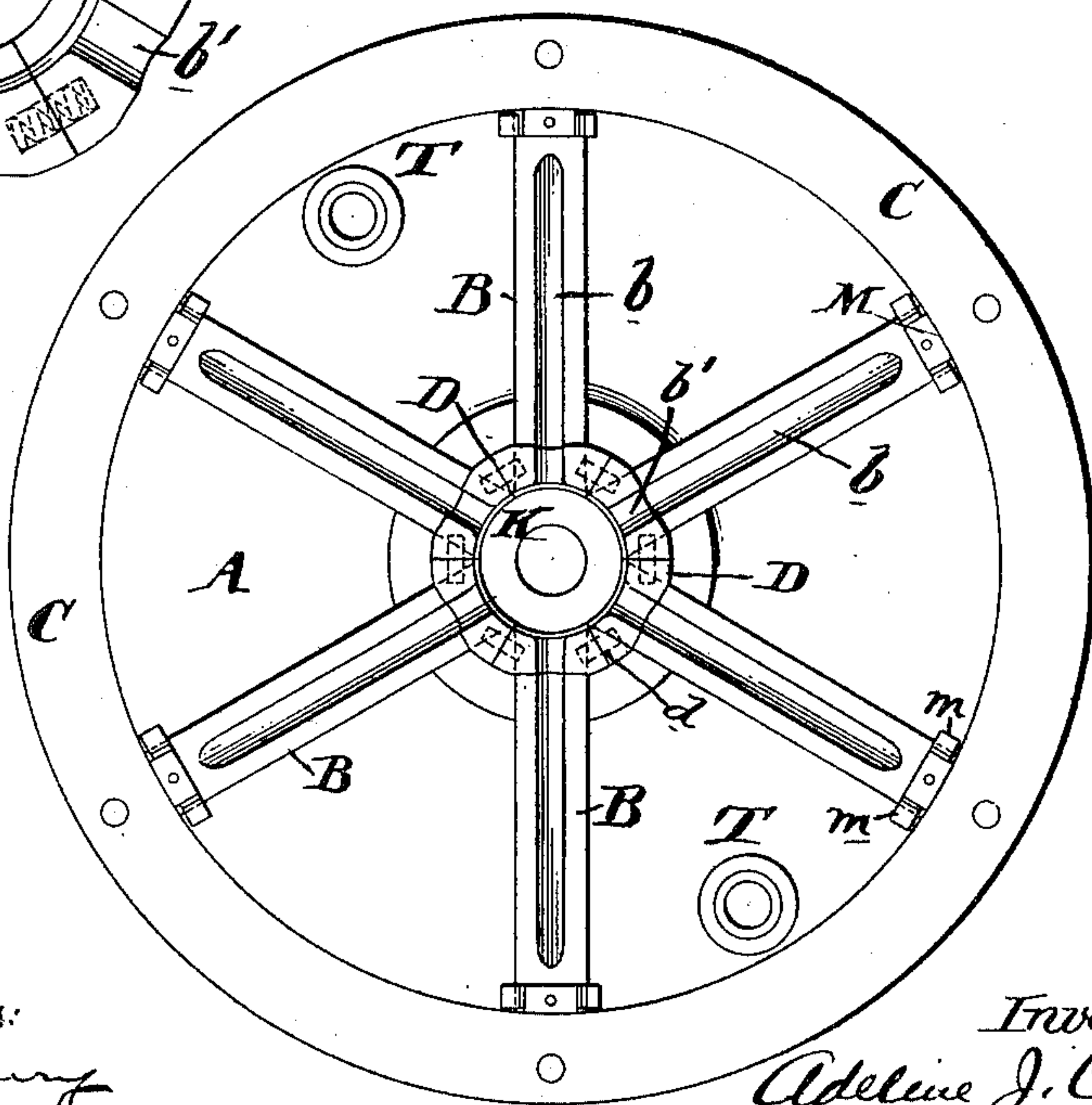


FIG. 2

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By her atty *[Signature]*

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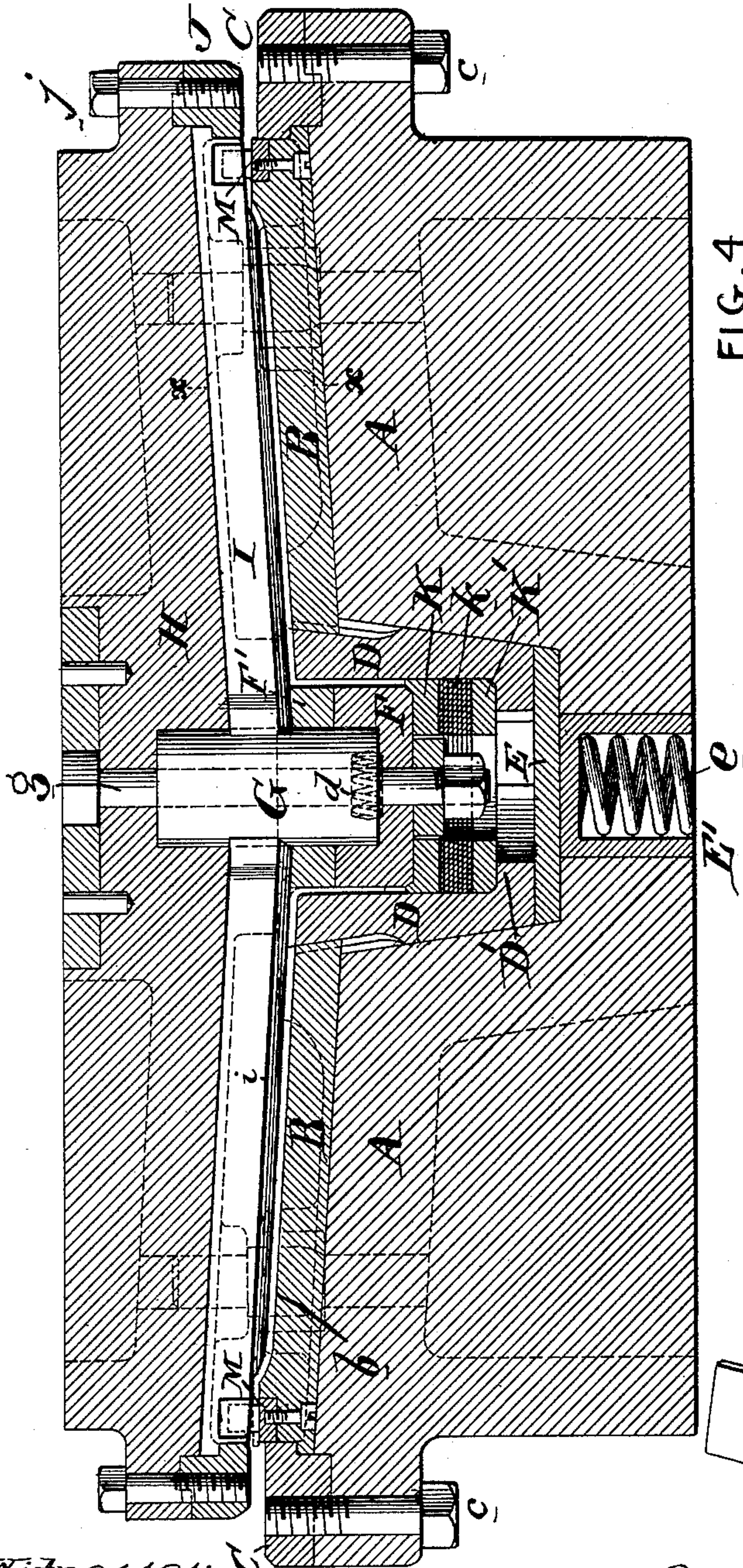


FIG. 4

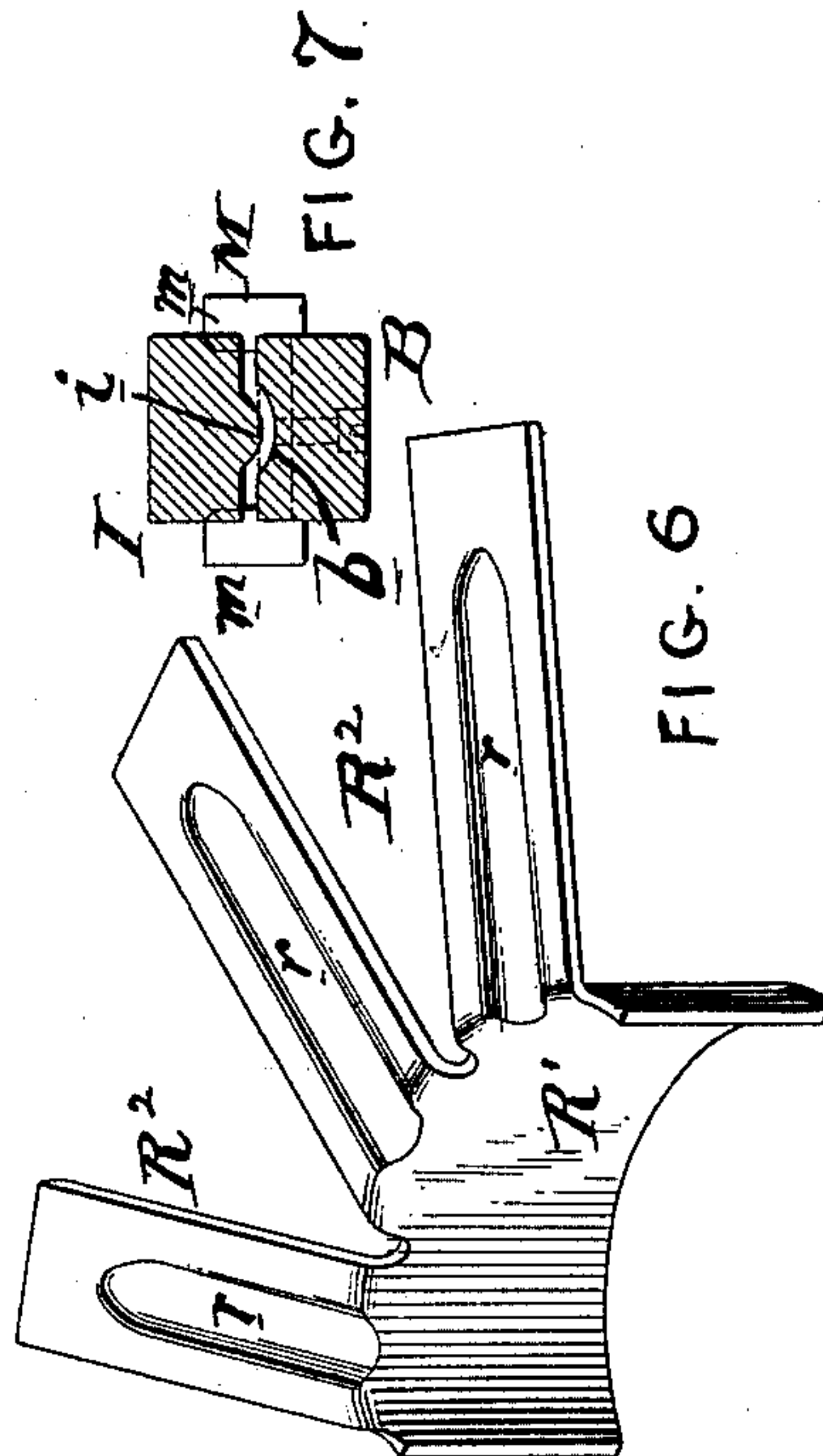


FIG. 6

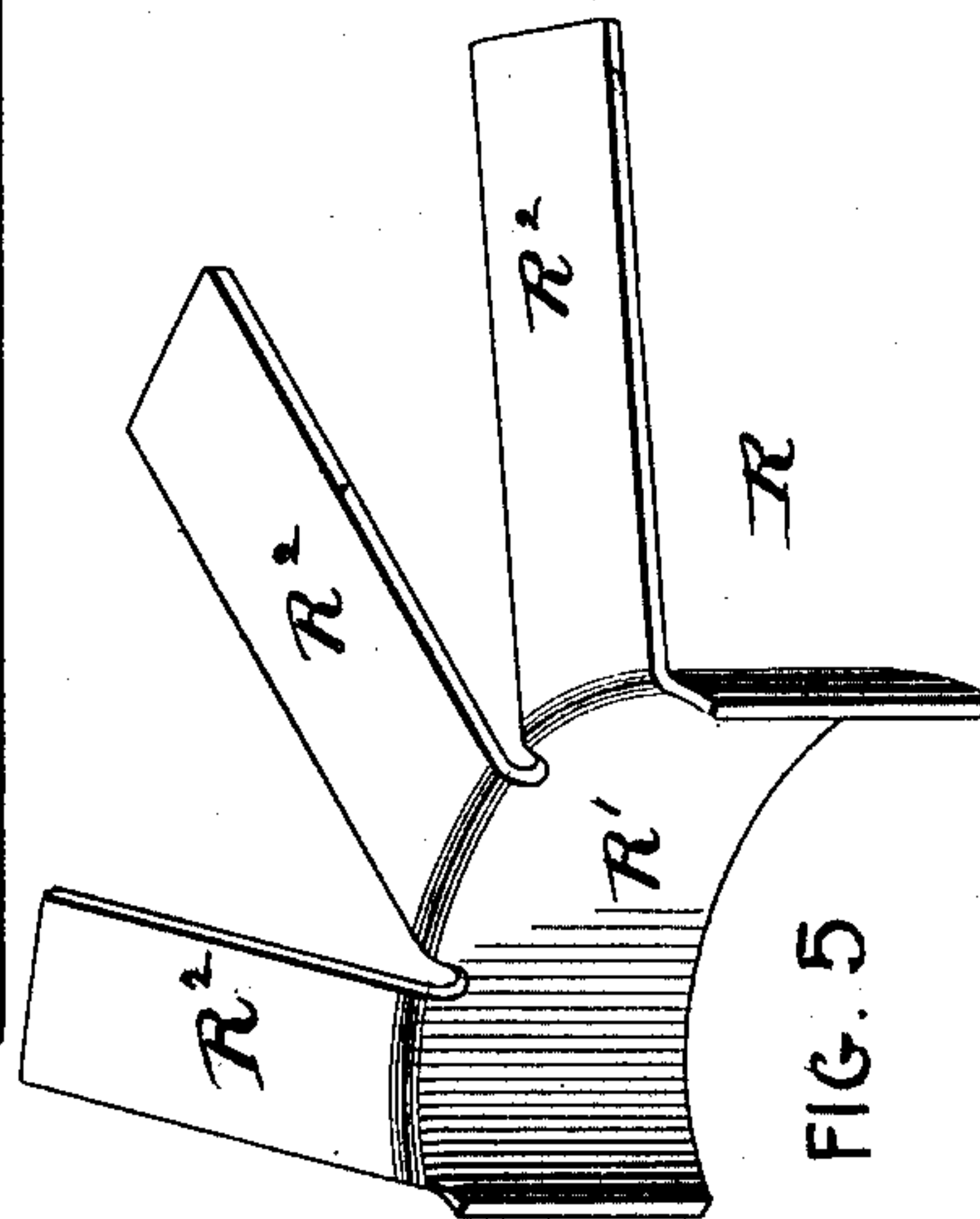


FIG. 5

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UNITED STATES PATENT OFFICE.

ADELINE J. CORSCADEN, OF PHILADELPHIA, PENNSYLVANIA, ADMINIS-
TRATRIX OF THOMAS CORSCADEN, DECEASED.

DIE FOR SHAPING PULLEY-SPOKE BLANKS.

SPECIFICATION forming part of Letters Patent No. 630,036, dated August 1, 1899.

Application filed October 3, 1898. Serial No. 692,461. (No model.)

To all whom it may concern:

Be it known that THOMAS CORSCADEN, deceased, late of Philadelphia, Pennsylvania, did invent an Improvement in Dies for Shaping Pulley-Spoke Blanks, of which the following is a specification.

The invention has reference to dies for corrugating and truing pulley-spoke blanks; and it consists of certain improvements, which are fully set forth in the following specification and shown in the accompanying drawings, which form a part thereof.

The object of the invention is to provide suitable dies especially designed for properly shaping pulley-spoke blanks of sheet metal, whereby the hub or central portion shall be made absolutely accurate in diameter and the arms extending therefrom shall be ribbed or corrugated to secure the proper strengthening thereof.

The particular character of spoke-blanks designed to be produced by the improved dies is such as are employed in pulleys of the character illustrated in Letters Patent No. 595,559, dated December 14, 1897.

In carrying out the invention upper and lower die structures are provided, preferably made circular and adapted to take in two blanks, each corresponding to a semicircular portion of the wheel. The lower-die structure is provided with radial-die portions adapted to receive the arms of the blank, while the upper-die structure is provided with corresponding die-sections adapted to operate in conjunction with the last-mentioned die portions in the lower-die structure, the two sets of radiating dies coacting to corrugate or rib the spokes or radial arms of the blanks. In addition to the radiating-die sections for corrugating the arms the structures are provided with central die portions especially formed for truing the semicircular hub portions of the blanks, so that they shall be absolutely true with regard to diameter. The construction of this part of the dies comprises a cup-shaped expansible portion adapted to the lower-die structure and formed of a series of segments received in a conical socket and adapted to expand, excepting when pressure is applied by the upper die. The upper die is provided with a mandrel of the exact

diameter required for the hub portion of the blanks, and this is made to coact with the cup-shaped die portion in such a manner as to depress the latter and cause it to contract or grip the pulley-blank upon the mandrel.

The invention also comprehends details of construction, all of which will be better understood by reference to the accompanying drawings, in which—

Figure 1 is an inverted plan view of the upper-die structure. Fig. 2 is a plan view of the lower-die structure. Fig. 3 is an enlarged plan view of the cup-shaped central expansible die. Fig. 4 is a transverse section through the die structure completed. Fig. 5 is a perspective view of one of the sheet-metal blanks before being subjected to the action of the dies. Fig. 6 is a similar view of the blank after being subjected to the action of the dies, and Fig. 7 is a transverse section on line $x-x$ of Fig. 4.

A is the main frame of the lower die, and H is the main frame of the upper die. The frame A is recessed in the center by a somewhat conical aperture, into which the cup-shaped conical and annular die D fits, the said die D being subdivided by radial divisions, so as to be in effect made up of a series of sections, as clearly shown in Figs. 2 and 3. These short sections of the die D are forced apart when not otherwise prevented by means of springs d , so that it has a tendency to expand or increase its internal diameter. As the outer surface of the cup-shaped die D is conical and fits a conical seat or aperture in the frame A, it is evident that the raising or lowering of the said cup-shaped die D will cause it to expand or contract, as the case may be. To press this die upward, a plate E is located below it, so as to receive the several sections thereof, and this plate is forced upward by a plunger E' and a coil-spring e . By this means the cup-shaped die D is always elevated a short distance and expanded whenever the upper die is lifted and out of action. The frame A is further formed with a series of radial grooves, in which are fitted radial-die parts B, adapted to form seats for the radial arms R^2 of the blanks R, Fig. 5. These dies B are held in position by the dovetailed connection at the inner end with the cup-shaped

die D and at the outer end by flanges, which are held down by an annular ring C, clamped in position upon the frame A by bolts *c*. The outer ends of the dies B are provided with guides M, formed with uprights *m*, the object of which is to properly locate the free ends of the arms R², so that the corrugations or grooves shall be formed therein centrally.

Referring now to the upper-die structure, the frame H is provided with a central hub G, over which hub-die sections F F' are placed and firmly clamped by means of a bolt *g*, extending through them and the frame H. The hub-die sections F F' are cylindrical and are of the proper diameter to correspond to the internal diameter to which the hub portion R' of the blank is required to be trued. The interior diameter of the cup-shaped dies D is also cylindrical and of a sufficiently greater diameter in its contracted condition as to allow for the thickness of the metal to be treated between the dies D and F F', as will be clearly understood by examining Fig. 4. Radiating from the hub G and corresponding to the die portions B of the upper-die structure are a series of dies I, adapted to cooperate with the dies B in shaping the arms R² of the pulley-blanks. These dies are set in recesses in the frame H and are held in position at the inner ends by the hub-die ring F' and at the outer ends by an annular ring J, held in place upon the frame H by bolts *j*.

The dies B are formed with longitudinal grooves *b*, which terminate at a distance from the outer ends, and said grooves may continue, if so desired, in grooves *b'* through the upper ends of the sections of the cup-die D, so that the grooves or corrugations *r*, formed in the spoke-arms, Fig. 6, may extend all the way to the hub portion R'. It is evident, however, that the extent of these grooves or corrugations is immaterial and may terminate at a short distance from the hub should that be found preferable. The upper dies I are provided with ribbed portions *i*, corresponding to the grooves *b*, the arrangement of the parts *b* and *i* being such that they coact to form the longitudinal ribs *r* from the flat metal of the blank placed in the dies.

When the upper die is forced downward into the lower die, the hub-die portion F is caused to depress the cup-shaped die D to cause it to contract and compress the hub portion of the blank upon the dies F F', and this is accomplished by inserting within the die D the rings K K' and washers *k*. The ring K' rests upon a shoulder D' at the bottom of the die D and sustains the washers *k*, which are formed of thin sheet metal, and these in return sustain the ring K, which receives the direct thrust from the upper die F. The employment of the washers *k* is intended to permit the proper adjustment, so that the die D is driven downward to the proper extent to secure the requisite results, and this adjustment is necessary with each variation in the thickness of metal which may be subjected

to the action of the dies. Ordinarily sheet metal of a given thickness is employed; but it is evident that where the diameter of the pulley is small slightly-thinner metal may be employed than where it is to be of large diameter; but this would also vary according to the duty which is intended to be put upon the pulley. Variations, therefore, in the thickness in the metal employed may readily be compensated for by the adjustment of the washers *k*—namely, by inserting more or less washers or of substituting one or more thicker or thinner washers, as is found necessary. It will now be seen that as the upper die descends and the cup-shaped die D is forced downward the sections thereof will be forced toward the hub-dies F F' during the descent, and will therefore compress the metal of the hub part R' of the blank uniformly upon the hub-dies F F'. In this action the spring *e* is compressed. On the return movement of the dies the spring *e* raises the cup-die and causes it to expand, and thereby releases the grip upon the blank and raise it so as to permit it to be easily removed. This expanded condition of the die D enables the hub portions R' of the blank to be readily inserted.

It is evident that where the spokes or arms are short the dies B may be modified accordingly—that is to say, while they would be of the same total length their corrugating surfaces would be made shorter. Likewise the diameters of the central portions D F F' would also be changed for cases where the hubs of the pulley were to be of different diameters, all of which will be self-apparent to one familiar with the use of dies.

The upper and lower die sections may be kept in proper alinement during the performance of their work by the use of pins S upon the upper die working in connection with sockets or apertures T in the lower die. Any other suitable guides may be employed, if so desired.

It will be observed from an examination of Fig. 4 that the surface of the upper and lower die structures are not formed in true horizontal planes, but are in effect more or less dished, the object of which is to cause the spokes to radiate in a slightly oblique direction to the axis of the pulley, which is a feature found desirable in the construction of sheet-metal pulleys, as will be seen by an examination of the patent hereinbefore referred to. It should be observed, however, that this dishing of the dies is not essential, though desirable in most instances.

It is evident that the dies may be formed so as only to operate upon one of the blanks, (shown, for example, in Fig. 5,) in which case there would be only three sets of the dies B I, and, if desired, only one-half of the sections of the die D may be used; but it is found desirable in practice to shape two of the blanks at the same time for the purpose of equalizing and balancing the strains put upon the various portions of the die struc-

tures and trues up the abutting edges of the hub portions R'. This also accomplishes double the work with a given number of reciprocations of the dies. It is also evident that the hub-dies may be omitted or used without the radiating dies B I, if so desired.

It is immaterial to the invention what means are employed for reciprocating the dies to or from each other or whether the upper or lower die or both are made movable.

While the details of construction herein set out are preferable, it is evident that they may be modified without departing from the principles of the invention.

Having now described the invention, what is claimed as new, and what it is desired to secure by Letters Patent, is—

1. The combination of two frames movable to and from each other, a central cup-shaped die and a series of radial-die sections carried by one of said frames, and a central hub-shaped die and a series of radial dies carried by the other of said frames, the said dies on one frame being adapted to operate in conjunction with the dies on the other frame.

2. The combination of two frames movable to and from each other, a central expansible cup-shaped die and a series of radial-die sections carried by one of said frames, and a central hub-shaped die adapted to fit into the expansible cup-shaped die and cause it to contract and a series of radial dies carried by the other of said frames, the said dies on one frame being adapted to operate in conjunction with the dies on the other frame.

3. The combination of two frames movable to and from each other, a central cup-shaped die and a series of radial-die sections carried by one of said frames, a central hub-shaped die and a series of radial dies carried by the other of said frames, the said dies on one frame being adapted to operate in conjunction with the dies on the other frame, and guides arranged adjacent to the outer ends of the first-mentioned radial dies for holding the blank to be operated upon in position over the radial dies.

4. The combination of two frames movable to and from each other, a central cup-shaped die and a series of radial-die sections carried by one of said frames, a central hub-shaped die and a series of radial dies carried by the other of said frames, the said dies on one frame being adapted to operate in conjunction with the dies on the other frame and further in which the radial dies on one of the frames are provided with longitudinal grooves and the radial dies on the other frame are provided with longitudinal ribs.

5. The combination of two frames movable to and from each other, a central cup-shaped die and a series of radial-die sections carried by one of said frames, a central hub-shaped die and a series of radial dies carried by the other of said frames, the said dies on one frame being adapted to operate in conjunction with the dies on the other frame,

and annular clamping-rings carried by the said frames and respectively adapted to clamp the outer ends of the radial dies to their respective frames.

6. The combination of two frames movable to and from each other, a central expansible cup-shaped die and a series of radial-die sections carried by one of said frames, a central hub-shaped die adapted to fit into the expansible cup-shaped die and cause it to contract and a series of radial dies carried by the other of said frames, the said dies on one frame being adapted to operate in conjunction with the dies on the other frame, and a spring-actuated device for causing the cup-shaped die to expand.

7. The combination of two frames movable to and from each other, a cup-shaped die divided in substantially radial lines and having inclined outer walls adapted to said frame, spring devices to force said sections of the cup-shaped die apart, spring devices to elevate said cup-die, and a hub-shaped die secured to the other frame and movable within the cup-shaped die and adapted to depress the same to contract it.

8. The combination of two frames movable to and from each other, a cup-shaped die divided in substantially radial lines and having inclined outer walls adapted to said frame, spring devices to force said sections of the cup-shaped die apart, spring devices to elevate said cup-die, a hub-shaped die secured to the other frame and movable within the cup-shaped die and adapted to depress the same to contract it, and an adjustable abutment interposed between the expansible cup-die and the hub-shaped die to receive the thrust of the latter and simultaneously operate all of the sections of the said cup-shaped die.

9. The combination of two frames movable to and from each other, a cup-shaped die divided in substantially radial lines and having inclined outer walls adapted to said frame, spring devices to force said sections of the cup-shaped die apart, spring devices to elevate said cup-shaped die, a hub-shaped die secured to the other frame and movable within the cup-shaped die and adapted to depress the same to contract it, an adjustable abutment interposed between the expansible cup-shaped die and the hub-shaped die to receive the thrust of the latter and simultaneously operate all of the sections of the same, the said abutments consisting of two annular rings with one or more interposed thin adjustable washers.

10. The combination of two frames movable to and from each other, a series of radial-die sections secured to one of said frames and each section having its surface provided with a longitudinal groove, and a series of corresponding radial dies secured to the other frame and provided with longitudinal ribs.

11. The combination of two frames movable to and from each other, a series of radial-die sections secured to one of said frames and

having its surfaces provided with a longitudinal groove, a series of corresponding radial dies secured to the other frame and provided with longitudinal ribs, and adjustable
5 means for securing the two sets of radial dies respectively to their supporting-frames.

12. The combination of two frames movable to and from each other, a series of narrow removable radial dies secured to one of said
10 frames and having their adjacent ends at a lower elevation than the outer ends, and a second series of removable radial dies adapted to operate in connection with the first-mentioned series of radial dies and secured
15 to the opposing faces of the other frame and further having their adjacent ends slightly elevated above the outer ends whereby the blank treated by said dies has imparted to it a dish or angular shape.

20 13. The combination of two frames movable to and from each other, a series of narrow radial dies secured to one of said frames and

having their adjacent ends at a lower elevation than the outer ends, a second series of radial dies adapted to operate in connection 25 with the first-mentioned series of radial dies and secured to the opposing face of the other frame and further having their adjacent ends slightly elevated above the outer ends whereby the blank treated by said dies has imparted 30 to it a dish or angular shape, and suitable dies partly carried by one of said frames and partly carried by the other and centrally disposed with respect to the radial dies for clamping and holding the hub portions of the 35 blank.

In testimony of which invention I hereunto set my hand.

ADELINE J. CORSCADEN,
Administratrix of the estate of Thos. Corscaden, deceased.

Witnesses:

HENRY SHUALTZ,
JERE J. CROWLEY.