

(No Model.)

2 Sheets—Sheet 1.

T. WOLSTENHOLME.  
ROTARY YARN DYEING MACHINE.

No. 581,801.

Patented May 4, 1897.

FIG. 1.

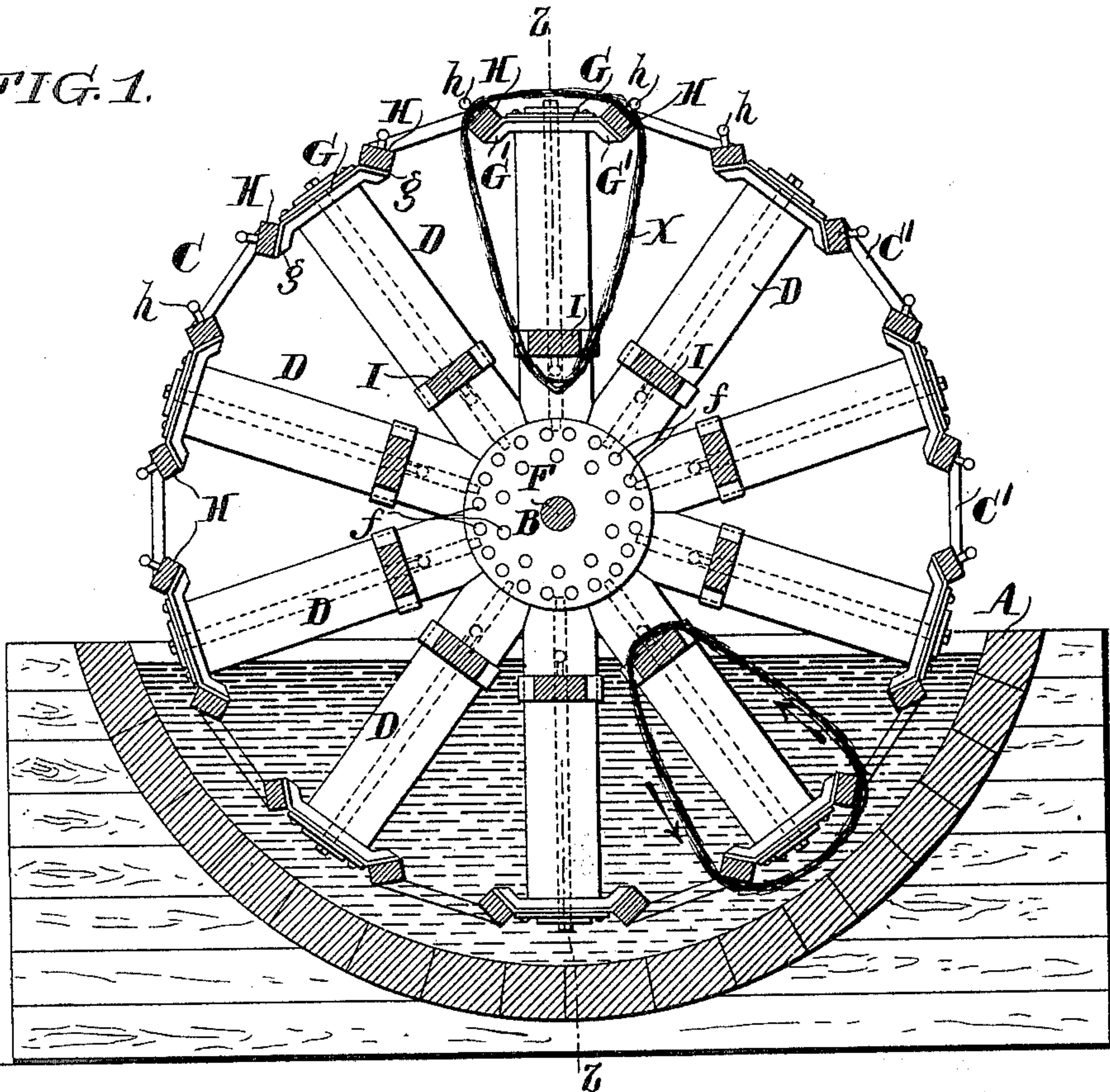
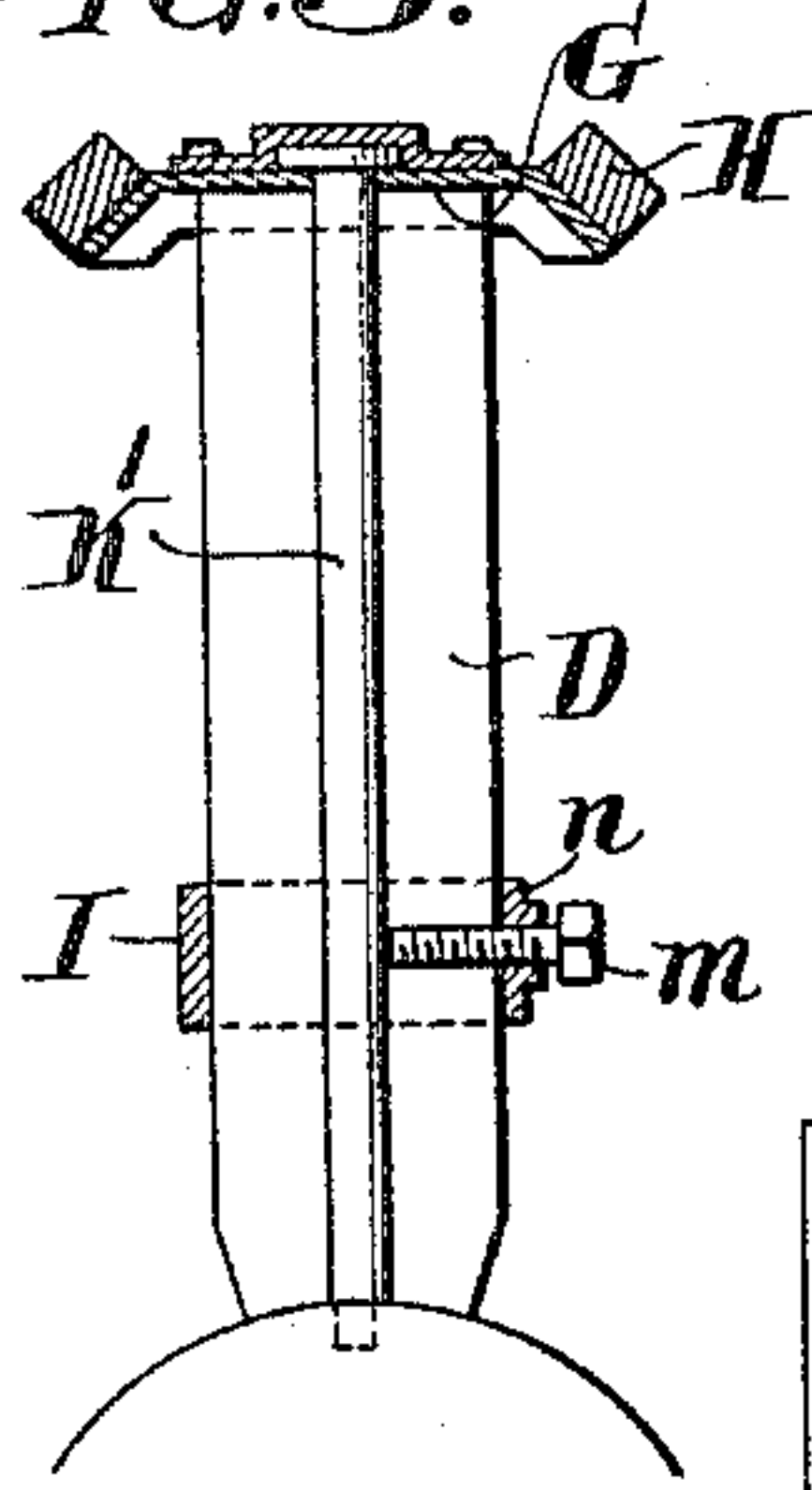


FIG. 3.



Witnesses.

*Henry Dwyer*  
*Wm. H. Lewis*

FIG. 2.

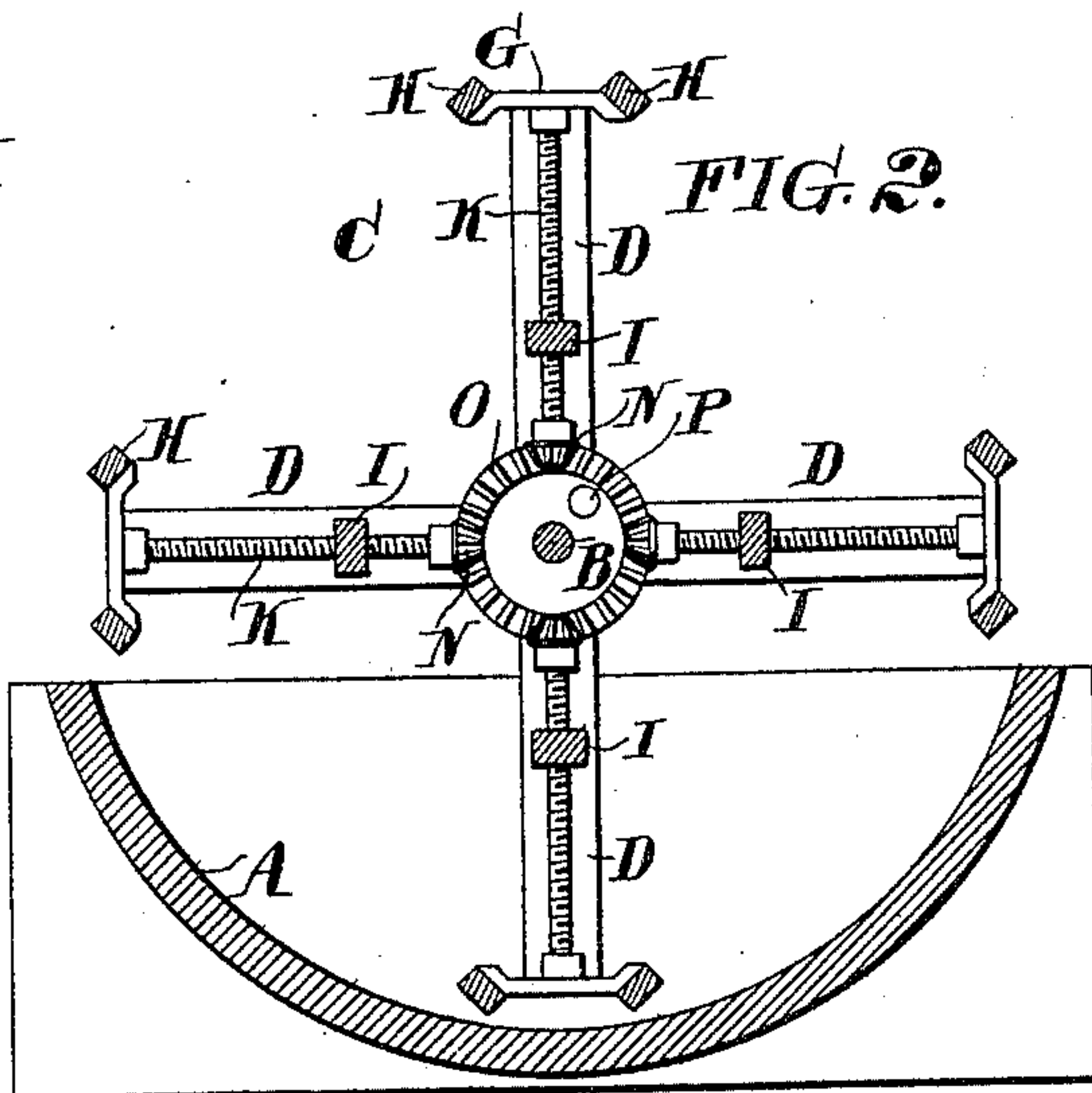


FIG. 5.

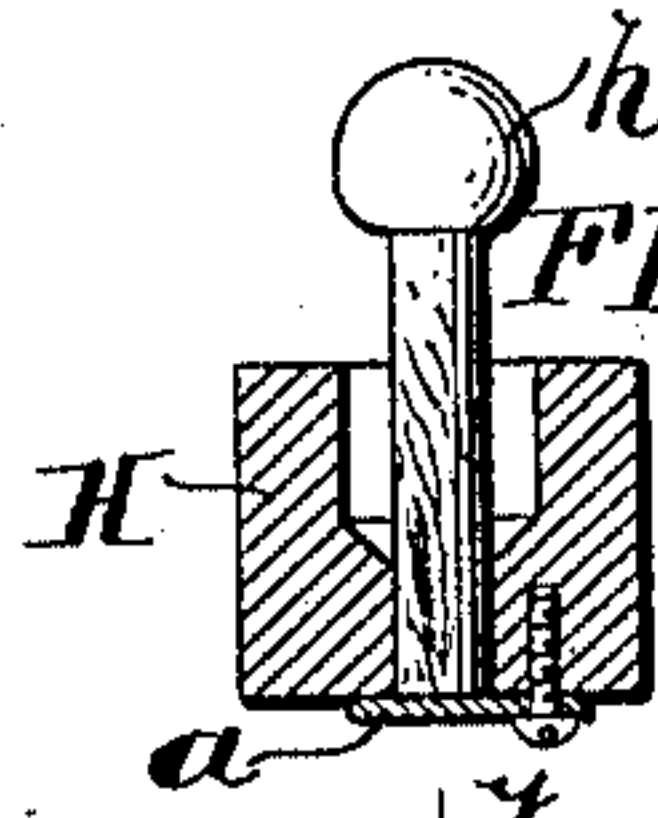


FIG. 4.

Inventor.

*Thos. Wolstenholme*

By *Wm. H. Lewis*  
Attorney.

(No Model.)

2 Sheets—Sheet 2..

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*FIG. 6.*

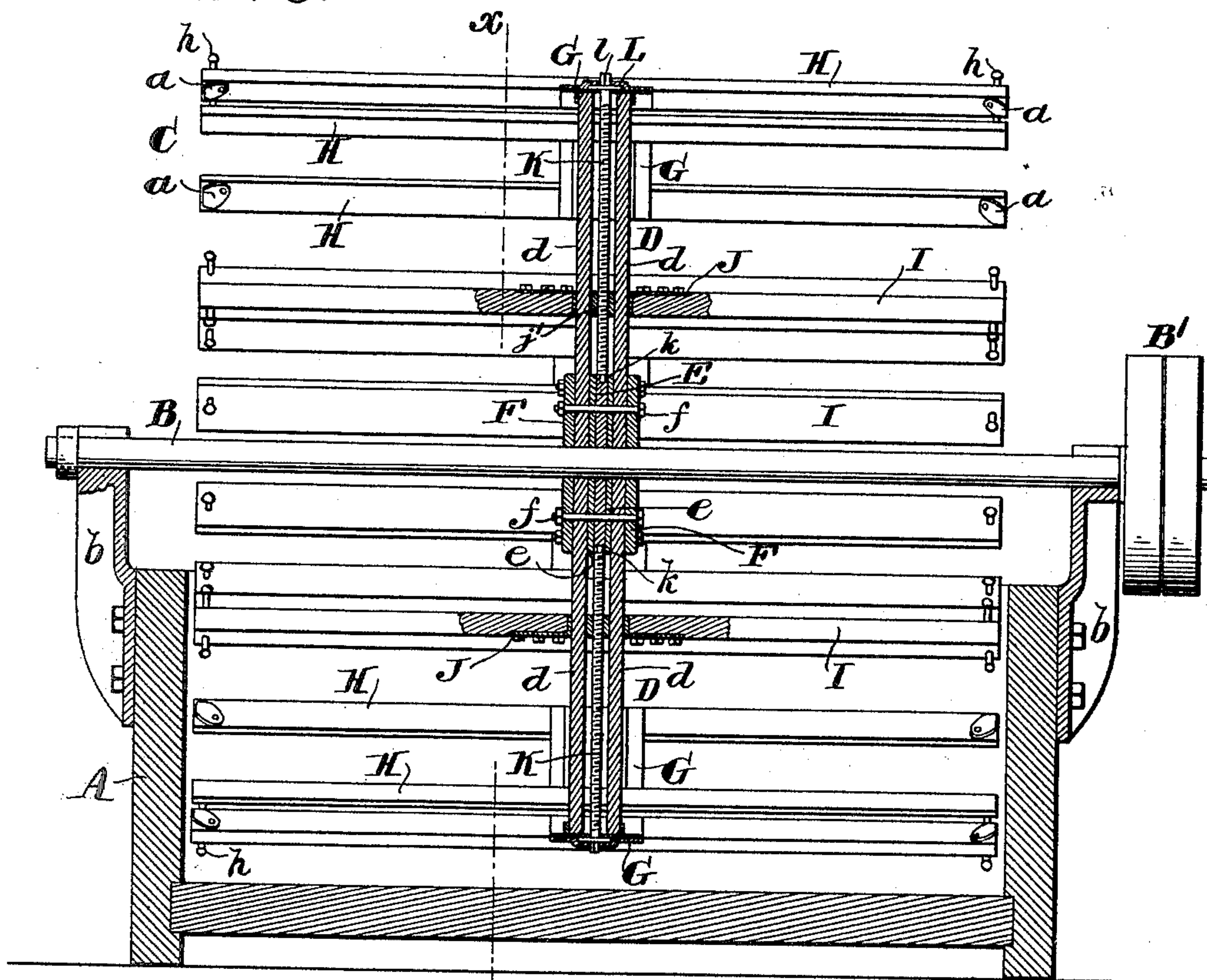
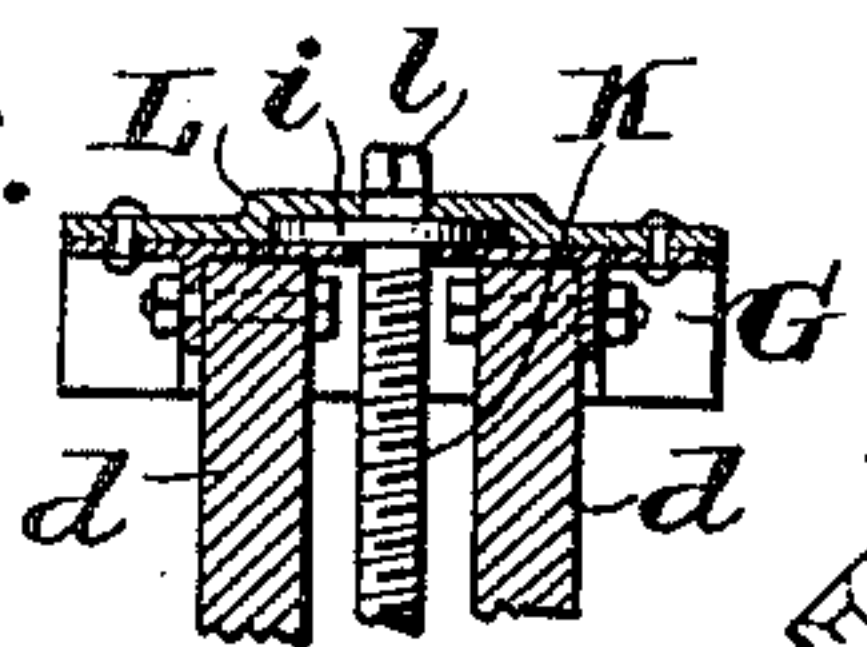
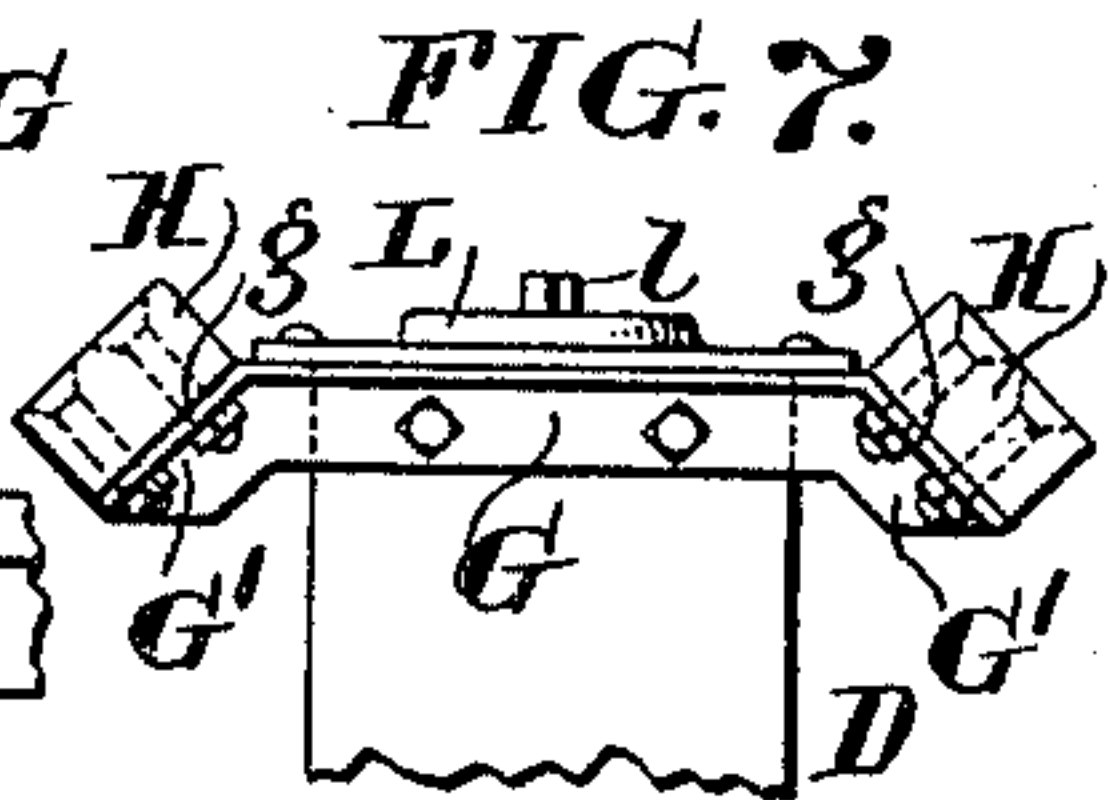


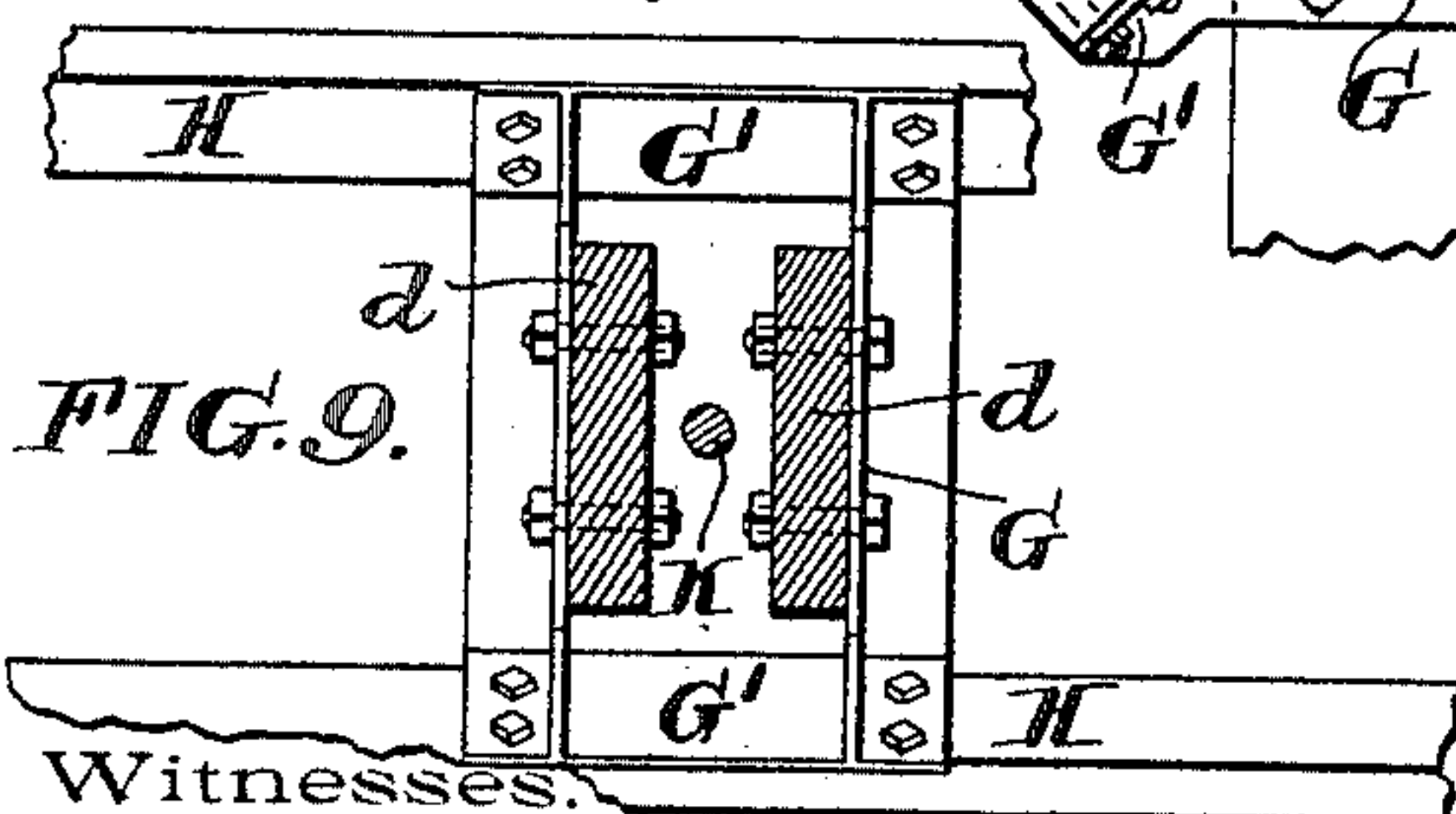
FIG. 8. *L i l K*



**FIG. 7.**



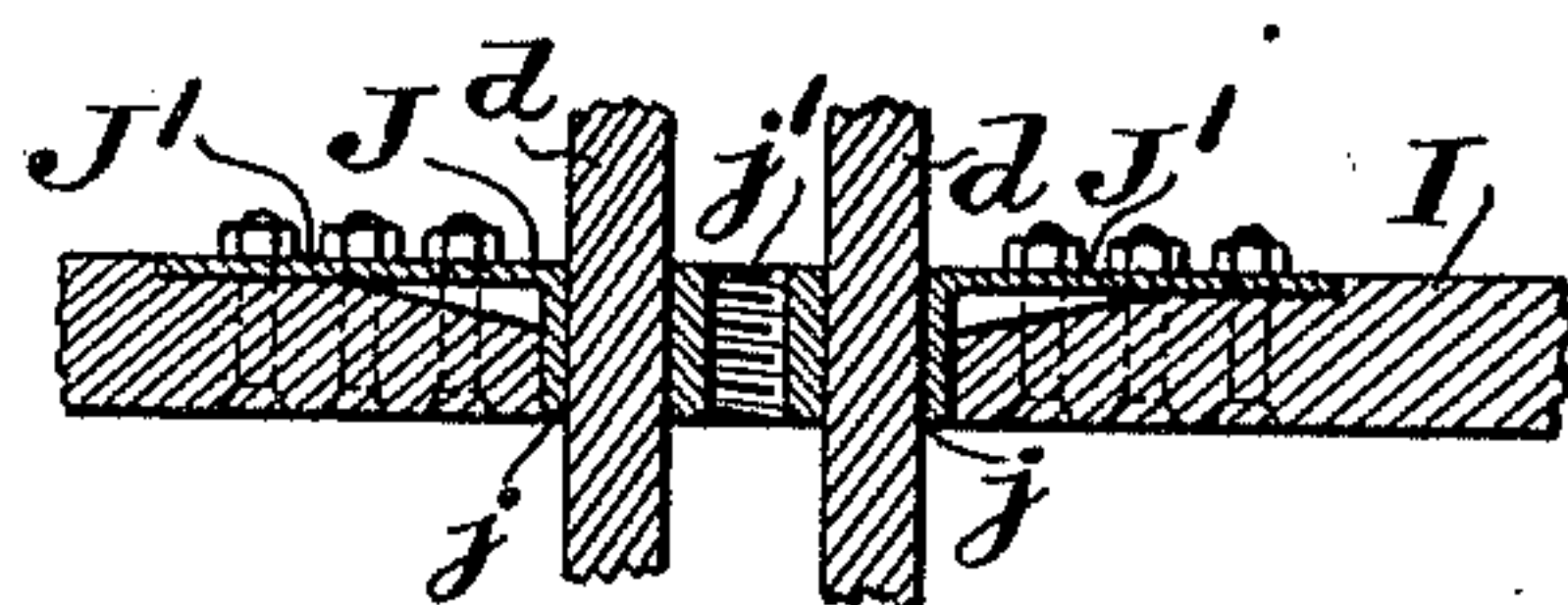
*FIG. 9.*



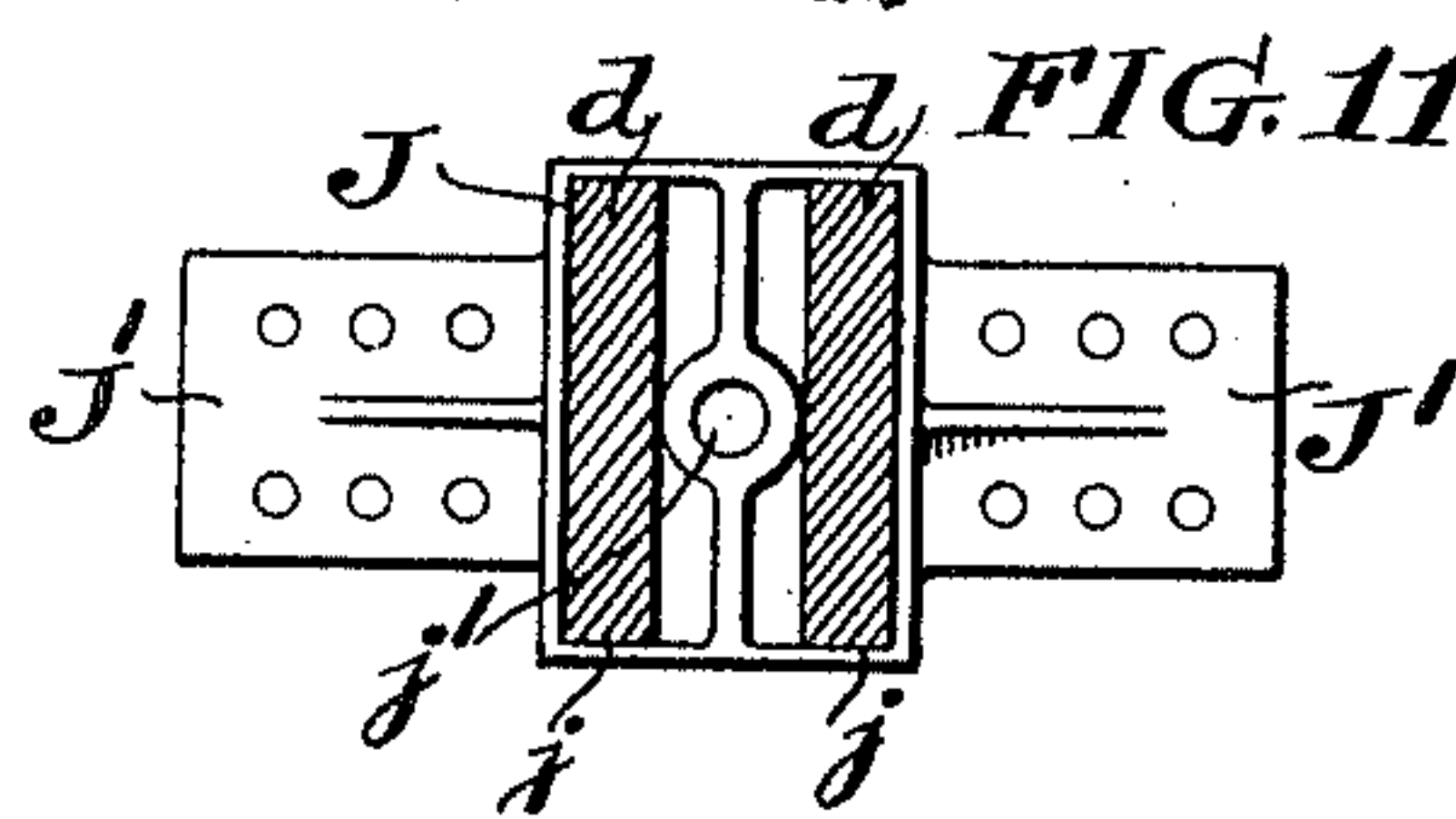
Witnesses.

Henry Denny  
Wm L. Evans

*FIG. 10.*



**FIG. 11.**



Inventor.

Thomas Wolstenholme

13 *Wm. B. Smith*  
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# UNITED STATES PATENT OFFICE.

THOMAS WOLSTENHOLME, OF PHILADELPHIA, PENNSYLVANIA.

## ROTARY YARN-DYEING MACHINE.

SPECIFICATION forming part of Letters Patent No. 581,801, dated May 4, 1897.

Application filed April 4, 1896. Serial No. 586,224. (No model.)

*To all whom it may concern:*

Be it known that I, THOMAS WOLSTENHOLME, of the city and county of Philadelphia and State of Pennsylvania, have invented an Improvement in Rotary Yarn-Dyeing Machines, of which the following is a specification.

My invention relates to rotary yarn-dyeing machines; and it consists of the improvements which are fully set forth in the following specification and claims and are shown in the accompanying drawings.

My invention relates particularly to that class of apparatus in which skeins of yarn are carried upon a rotary reel partially submerged in the liquor.

It is one of the objects of my invention to produce a uniform dyeing of the yarn in a machine of this kind without employing devices for turning the supporting bars or sticks to shift the position of the skeins.

It is also an object of my invention to so support the skeins that the threads will be held open and loose, so that the dye liquor may more readily permeate the fibers.

While my invention is adapted for all classes of yarn-dyeing, it is particularly suited for "alizarin" dyeing, in which, by reason of the nature of the process, looseness of the yarn is especially required in order that the dye liquor may easily permeate the fibers.

My invention is also especially adapted for dyeing "slubbing," because the loose supporting of the yarn prevents the matting of the fibers, which is liable to occur in all machines where the yarn is held tightly and is shifted on the supporting-sticks by mechanical means.

My invention also relates to improvements whereby the construction is simplified and the adjustment of the yarn-supporting sticks to suit the sizes of the skeins may be accomplished with facility.

In the drawings, Figure 1 is a transverse vertical sectional view of a rotary yarn-dyeing machine embodying my invention, taken on the line *xx* of Fig. 6. Fig. 2 is a similar view, on a smaller scale, illustrating a modification of the devices for adjusting the inner yarn-sticks. Fig. 3 is a vertical sectional view of part of the yarn-frame, illustrating a further modification of the devices for ad-

justing the inner yarn-sticks. Fig. 4 is an inverted plan view of an end of one of the upper yarn-supports. Fig. 5 is a transverse vertical sectional view of the same on the line *yy* of Fig. 4. Fig. 6 is a longitudinal vertical sectional view of the machine on the line *zz* of Fig. 1. Figs. 7, 8, and 9 are detail views of the connections of the upper yarn-sticks, and Figs. 10 and 11 are detail views of the connections of the lower yarn-sticks.

A is the dye-vat, which may be of convenient shape and construction.

B is the reel-shaft, which carries the reel C and is journaled in suitable brackets *b*, carried by the vat A. The shaft B may be driven by any suitable means, as by the pulley B'.

The reel C is mounted fast on the shaft B and is composed of a series of radial arms D, carrying inner and outer yarn-sticks, by which the skeins X are supported.

The radial arms D are secured to a hub centrally located on the shaft B, so that the arms project radially from the shaft.

In my preferred construction the radial arms are each composed of a pair of wooden pieces *d d*, separated a slight distance apart to leave a space for the rod which adjusts the lower yarn-stick. The inner ends of the pieces *d d* are fastened to the central hub. I prefer to construct the hub, as shown in Fig. 6, of an inner central metallic disk E and two outer disks F, between which the ends of the pieces *d d* are clamped and to which they are bolted by suitable bolts *f*. Metallic washers *e* may be located between the central disk E and the pieces *d d*. The outer ends of each pair of pieces *d d* are secured to a small metallic frame G, which is provided on each end with projecting arms G' G', to which are secured longitudinal supporting-bars H H. The arms G' G' are preferably formed with inclined supports *g g*, so that the bars H H, which they carry, will occupy an inclined position, as shown.

I I are the inner yarn-sticks, which are adjustably supported on the arms D and extend longitudinally parallel to the upper sticks H H. In my preferred construction I employ a metal plate J, provided with openings or guides *j j*, through which the pieces *d d* of arm D extend, and having laterally-projecting arms J' J', to each of which a section of



the bar I is secured. The plate J is thus free to move up and down on the arm D for the purpose of adjusting the position of the bar I.

To move the plate J, I employ a threaded rod K, the inner end of which is journaled in a socket *k* in the periphery of the central metallic disk E and the upper end of which is journaled in the frame G on the upper end of the radial arm. This rod K passes through an internally-threaded sleeve *j* in the plate J, and it is apparent that by turning the threaded rod K the plate J and bar I will be moved in or out.

I have shown the upper end of the rod K extending through an opening in the plate G and provided with a bearing-flange *i* between the face of the plate G and a top cap L, secured to the plate. The rod K terminates in a non-circular extremity *l*, projecting through the cap L, to which a key may be applied to turn the rod and adjust the bar or stick I.

It will be observed that the reel is composed of a series of central radial arms, each of which carries a pair of outer centrally-supported longitudinal stationary yarn sticks or bars and an inner longitudinal adjustable stick or bar. The skeins are slipped upon the yarn sticks or bars from the free ends and are disposed about the pair of outer sticks H and the inner stick I, as shown in Fig. 1. The reel is then rotated and the skeins are carried through the liquor and are exposed to the atmosphere in the usual manner.

By employing the three sticks H, I and I and supporting the skeins loosely I am able to dispense entirely with all devices for rotating the sticks to shift the position of the yarn, as the movement of the reel will impart to the skeins as they travel through the liquor an independent movement, which will cause them to constantly shift and change their position upon the sticks, as indicated by the arrows in Fig. 1.

To prevent the skeins slipping from the open ends of the sticks, I provide the sticks adjacent to their ends with pins *h*, which are preferably loose or removable, so that they may be pushed down or removed when the skeins are being placed in the sticks or removed from them. In Figs. 5 and 6 I have shown one of these pins loosely supported in a hole in the end of the stick and held in a raised position by a pivoted plate *a* on the bottom of the stick. By moving the plate *a* away from the hole the pin *h* may be pushed down so as not to obstruct the skein in passing on or off the stick.

To strengthen the reel as an entirety, brace-pieces C' may be arranged between the adjacent arm D or bars H.

In Fig. 3 is shown a modification of the means for adjusting the inner bars I, in which the bar is provided with a yoke *n*, engaging the arm D, and a set-screw *m*, carried by the yoke and engaging the arm D or a rod K' thereon, clamps the bar I in adjusted position.

In the modification shown in Fig. 2 I employ devices for adjusting all of the inner bars simultaneously and equally. The inner ends of the threaded rods K are provided with bevel-gears N, which engage a rotatable bevel-gear O, loosely mounted on the hub or shaft B. When the bevel-gear O is turned, all of the threaded rods K will be turned correspondingly and the bars I will be moved in or out, exactly as in the construction shown in Figs. 1 and 6. The bevel-gear O may be provided with a handle P for turning it.

The various details of construction which have been shown may be varied without departing from the invention.

What I claim as new, and desire to secure by Letters Patent, is as follows:

1. In a rotary yarn-dyeing machine, the yarn-carrying reel composed of a rotary shaft, a hub centrally disposed upon the shaft, a series of radial arms carried by the hub, a pair of longitudinal bars carried by each of the radial arms and centrally supported thereby with their ends free for the application and removal of the skeins, inner longitudinal supporting-bars carried by the radial arms and centrally supported thereby, and means to adjust the inner bars to and from the corresponding pair of outer bars.

2. In a rotary yarn-dyeing machine, the reel consisting of a central hub, radial arms carried thereby, a series of pairs of longitudinal yarn-supporting bars carried by the outer ends of said radial arms and centrally supported thereby, a series of inner longitudinal adjustable yarn-supporting bars carried by said arms and centrally supported thereby, and means to adjust all of said inner bars simultaneously.

3. In a rotary yarn-dyeing machine, the yarn-carrying reel composed of a rotary shaft, a hub centrally disposed upon the shaft, a series of radial arms carried by the hub, a pair of longitudinal bars carried by each of the radial arms and centrally supported thereby with their ends free for the application and removal of the skeins, the bars in each pair occupying an angular position with reference to one another, inner longitudinal supporting-bars carried by the radial arms and centrally supported thereby, and means to adjust the inner bars to and from the corresponding pair of outer bars.

4. In a rotary yarn-dyeing machine, the yarn-carrying reel composed of a rotary shaft, a hub centrally disposed on the shaft, a series of radial arms carried by the hub, longitudinal bars carried by the outer ends of said radial arms and centrally supported thereby with their ends free for the application and removal of the skeins, inner longitudinal bars guided upon the radial arms and centrally disposed thereon, and rotatable threaded adjusting-rods projecting to the outer ends of the radial arms and engaging threaded sockets on the inner adjustable bars, whereby any of said inner bars may be ad-



justed with reference to the outer bars by the operation of said threaded rods from the outer ends of the radial arms.

5. In a rotary yarn-dyeing machine, the reel composed of a central hub, radial arms carried thereby, a plate carried by the outer end of said radial arms and having lateral projections  $G'$ ,  $G'$ , longitudinal bars carried by said projections  $G'$ ,  $G'$ , and inner longitudinal adjustable bars carried by said radial arms.

6. In a rotary yarn-dyeing machine, the reel composed of a central hub, radial arms carried thereby, a plate carried by the outer end of said radial arms and having lateral projections  $G'$ ,  $G'$ , provided with inclined supports  $g$ ,  $g$ , longitudinal bars carried by the supports  $g$ ,  $g$ , of said projections  $G'$ ,  $G'$  and occupying an angular position with reference to one another, and inner longitudinal adjustable bars carried by said radial arms.

7. In a yarn-dyeing machine, the combination with the hub of the reel, of radial arms  $D$  carried thereby and each composed of two separated pieces  $d$ ,  $d$ , outer longitudinal supporting-bars carried by said radial arms, inner adjustable longitudinal bars guided in said radial arms, and adjusting-rods located between said pieces  $d$ ,  $d$ , of the arms  $D$  and engaging said inner adjustable bars.

8. In a yarn-dyeing machine, the yarn-reel, composed of a central hub having a metallic disk  $E$ , a series of radial arms carried by said hub, longitudinal supporting-bars carried by the outer ends of said radial arms, inner adjustable longitudinal supporting-bars guided on said radial arms, and threaded adjusting-rods  $K$  journaled in said arms, having their lower bearings in said metallic disk  $E$  and engaging a threaded socket in the inner adjustable supporting-bars.

9. The reel for a rotary yarn-dyeing machine, consisting of the central hub composed of the inner metallic disk  $E$ , and the outer disks  $F$ ,  $F$ , the radial arms  $D$  each composed of two pieces  $d$ ,  $d$ , clamped between the disks  $E$  and  $F$ ,  $F$ , and the longitudinal inner and outer supporting-bars carried by said radial arms.

10. The reel for a rotary yarn-dyeing machine consisting of a central hub, radial arms carried thereby and each composed of two pieces  $d$ ,  $d$ , the plates  $G$  carried by the outer

ends of the pieces  $d$ ,  $d$ , and provided with projecting arms  $G'$ ,  $G'$ , the centrally-supported outer longitudinal bars  $H$ ,  $H$ , carried by the arms  $G'$ ,  $G'$ , and the inner adjustable bars  $I$ .

11. The reel for a rotary yarn-dyeing machine consisting of a central hub, radial arms carried thereby and each composed of two pieces  $d$ ,  $d$ , the plates  $G$  carried by the outer ends of the pieces  $d$ ,  $d$ , and provided with projecting arms  $G'$ ,  $G'$ , the centrally-supported outer longitudinal bars  $H$ ,  $H$ , carried by the arms  $G'$ ,  $G'$ , the inner adjustable bars  $I$  guided on the radial arms, and the threaded rods  $K$  journaled at their upper ends in the frames  $G$  and engaging threaded sockets in the adjustable bars  $I$ .

12. The reel for a rotary yarn-dyeing machine consisting of a central hub, radial arms carried thereby and each composed of two pieces  $d$ ,  $d$ , the plates  $G$  carried by the outer ends of the pieces  $d$ ,  $d$ , and provided with projecting arms  $G'$ ,  $G'$ , the centrally-supported outer longitudinal bars  $H$ ,  $H$ , carried by the arms  $G'$ ,  $G'$ , the inner adjustable bars  $I$  guided on the radial arms, the threaded rods  $K$  journaled at their upper ends in the frames  $G$  and engaging threaded sockets in the adjustable bars  $I$ , and the caps  $L$  carried by the frame  $G$  over the bearings of the rods  $L$ .

13. In a reel for a rotary yarn-dyeing machine, the combination with the hub, radial arms carried thereby, and the inner adjustable longitudinal yarn-supporting bars, of the outer stationary yarn-supporting bars carried by the outer ends of the radial arms, the adjustable pins  $h$  carried by the ends thereof, and the pivoted locking-plates for locking the pins in a raised position.

14. In a reel for a rotary yarn-dyeing machine, the combination with the central hub, radial arms carried thereby and longitudinal supporting-bars carried by the outer ends of the arms, of the plate  $J$  supported by the radial arms, and the inner yarn-supporting bars made in sections carried by the plate  $J$ .

In testimony of which invention I have hereunto set my hand.

THOMAS WOLSTENHOLME.

Witnesses:

R. M. KELLY,

ERNEST HOWARD HUNTER.