

(Model.)

3 Sheets—Sheet 1.

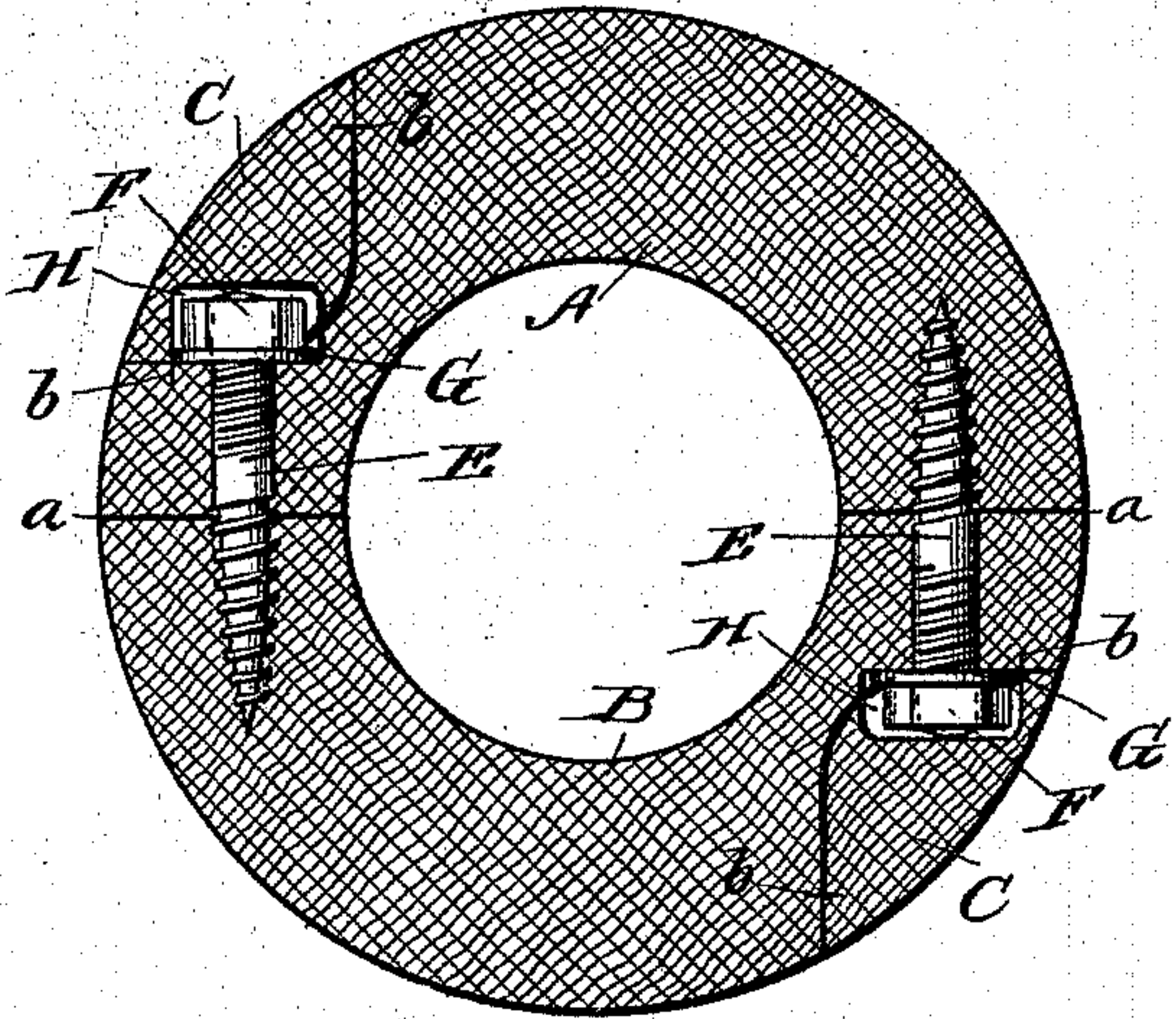
H. J. GILBERT.

WOOD PULLEY AND METHOD OF BUILDING SAME.

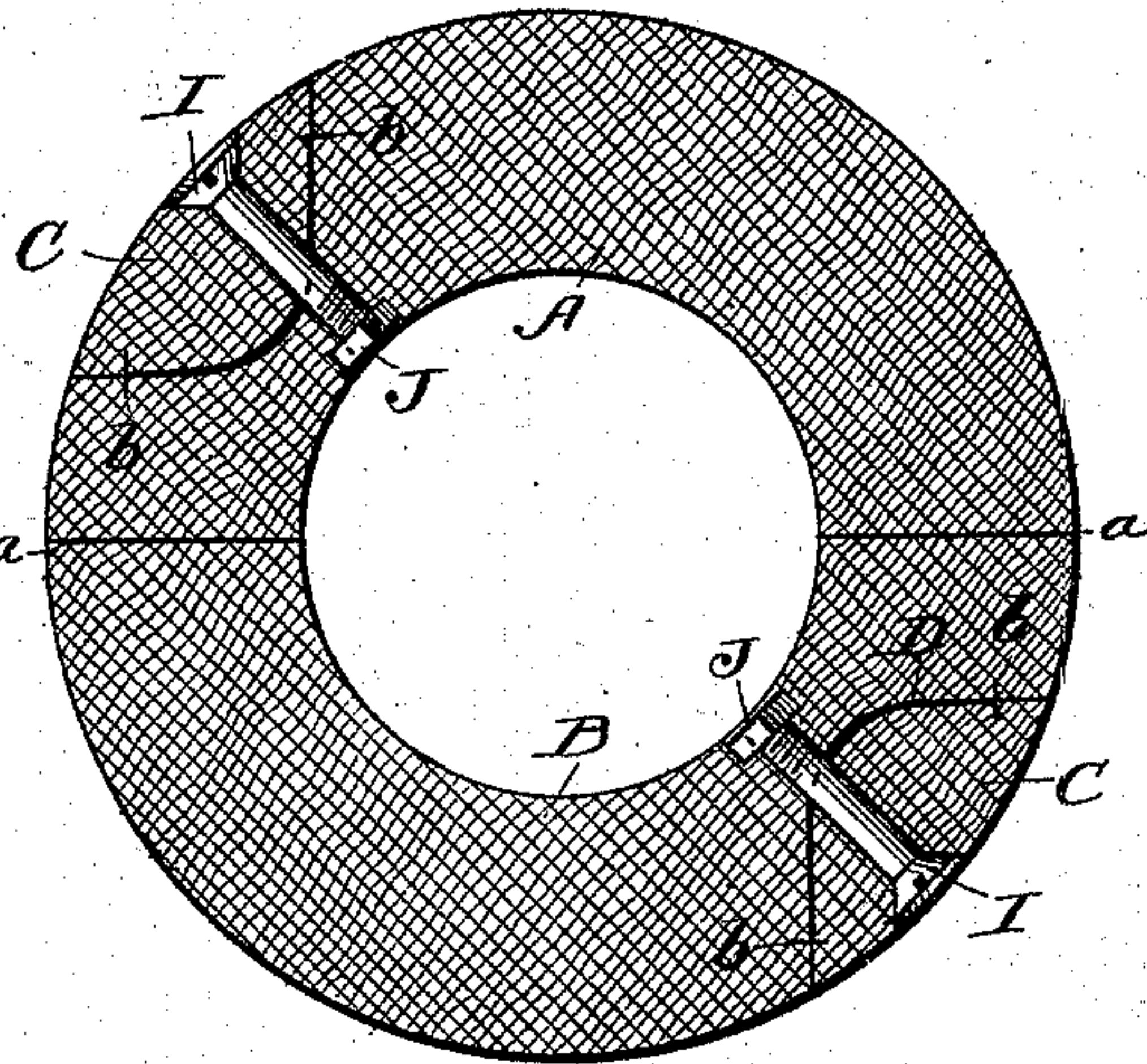
No. 527,965.

Patented Oct. 23, 1894.

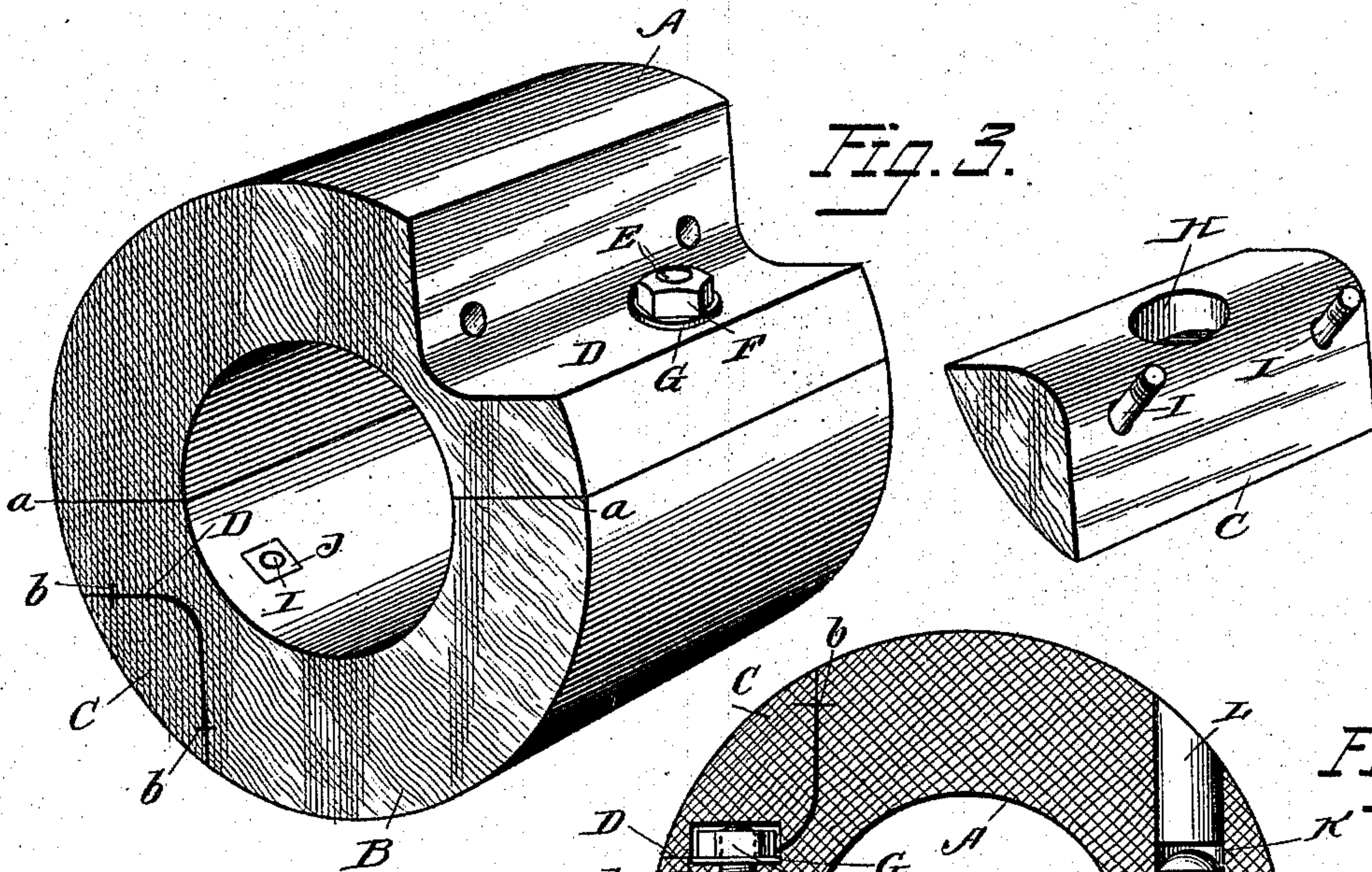
*Fig. 1*



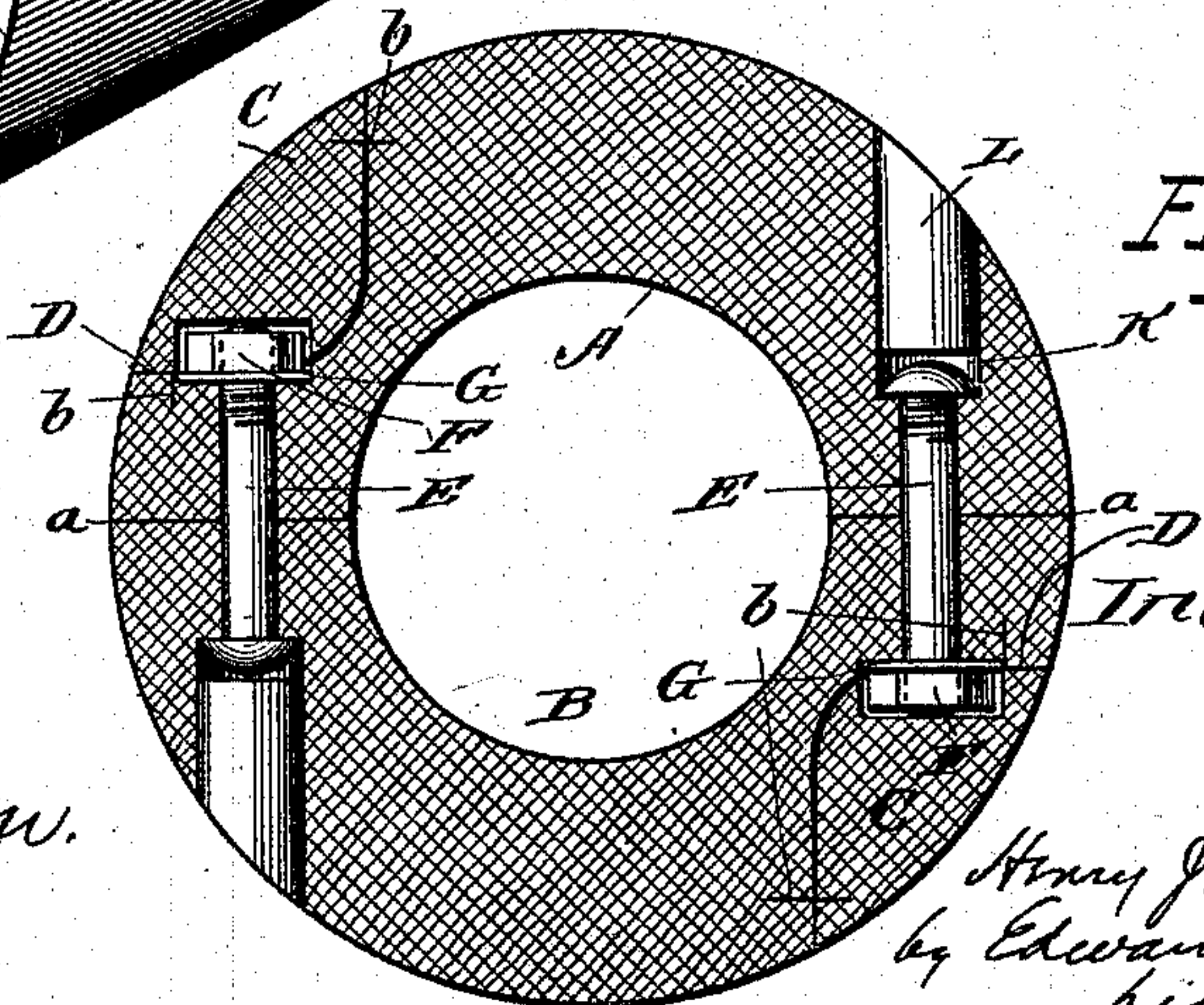
*Fig. 2*



*Fig. 3*



*Fig. 4*



*Witnesses*  
*Martin H. Olsew.*  
*R. B. Gaffray.*

*Inventor*  
*Henry J. Gilbert*  
*by Edward Rector*  
*his attorney*



(Model.)

3 Sheets—Sheet 2.

H. J. GILBERT.

WOOD PULLEY AND METHOD OF BUILDING SAME.

No. 527,965.

Patented Oct. 23, 1894.

Fig. 5.



Fig. 7.

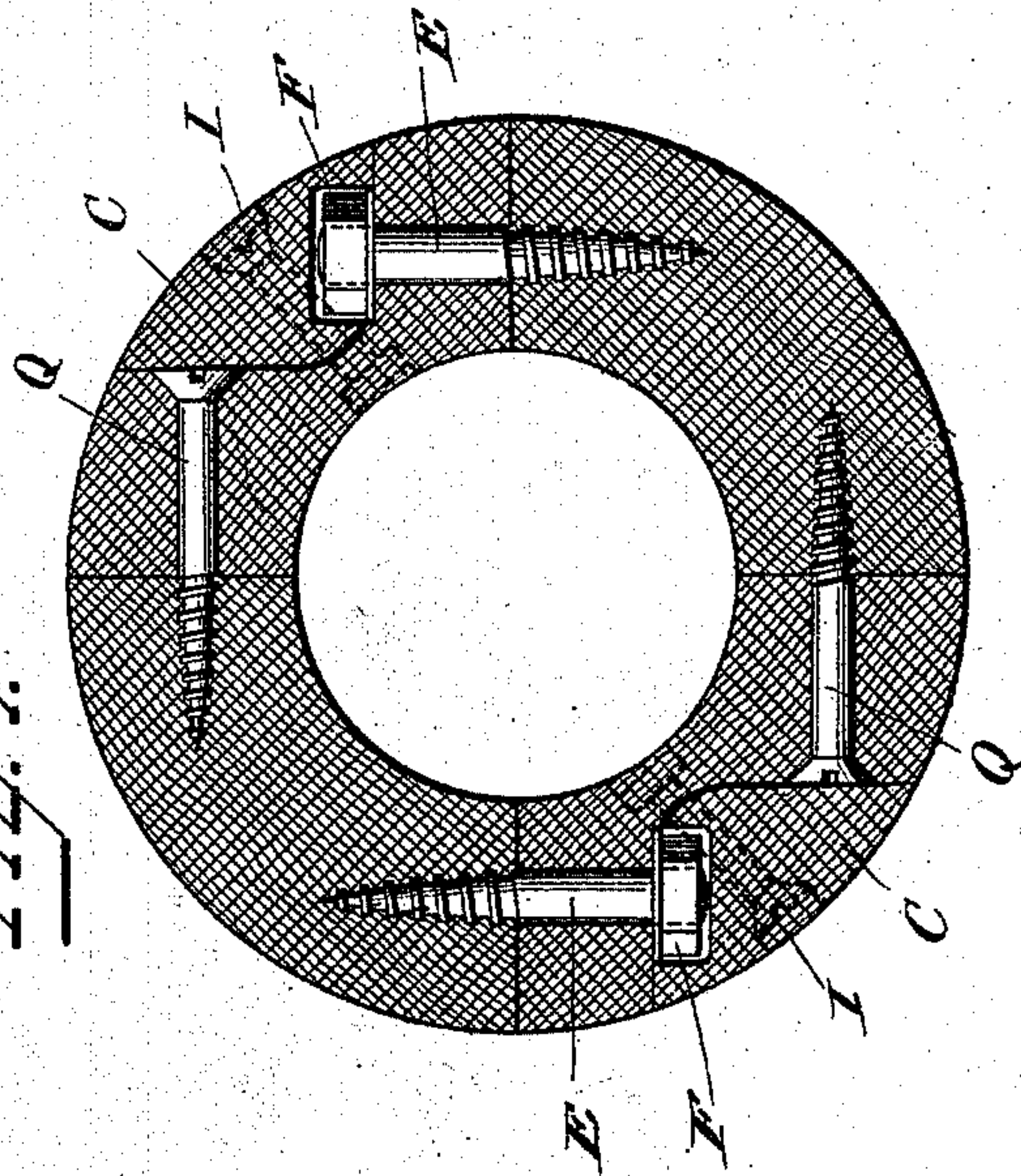
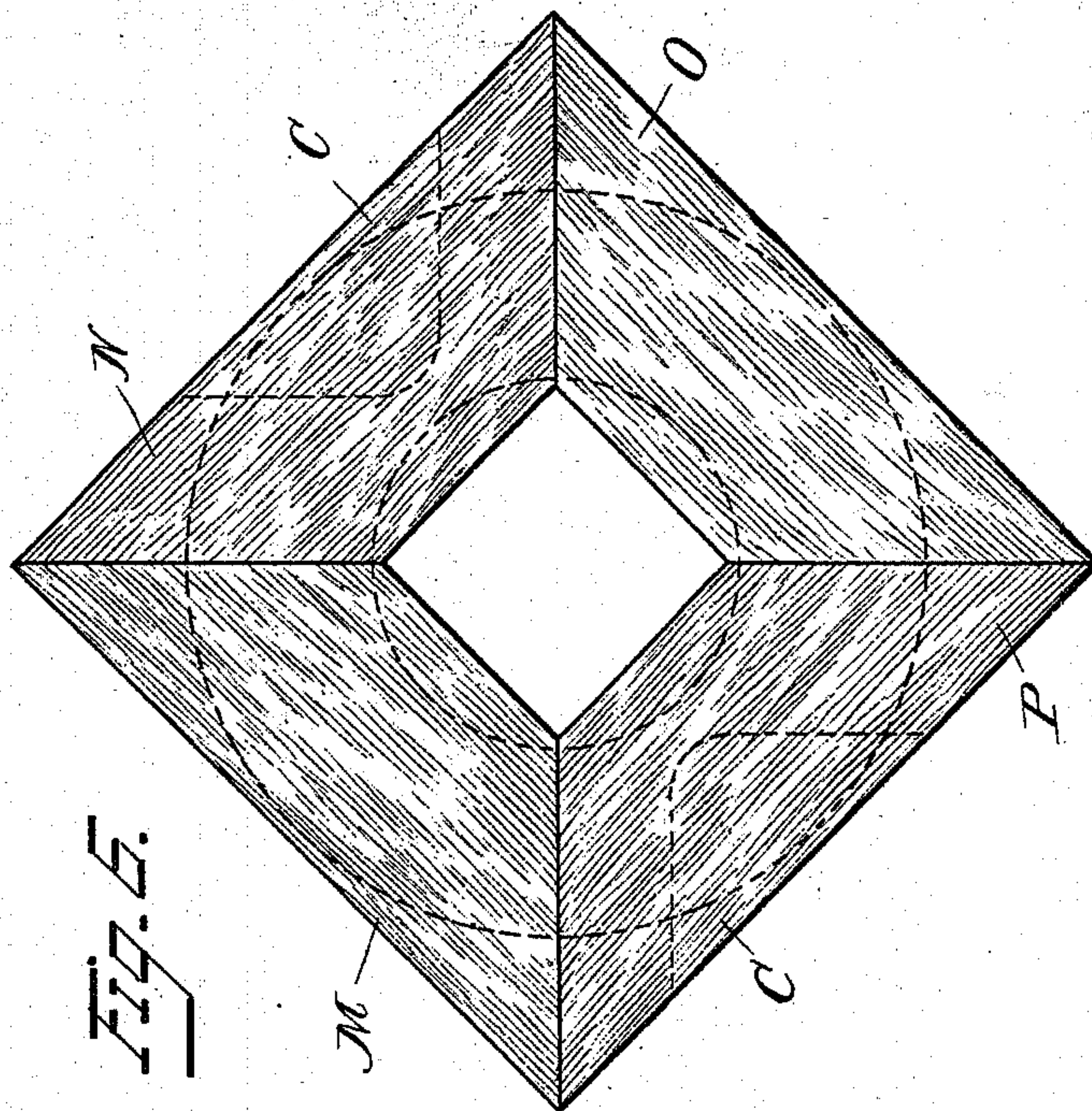


Fig. 6.



Witnesses  
Martin H. Olsen.  
R. B. Gaffray.

Inventor  
Henry J. Gilbert  
by Edward Reitor  
his attorney



(Model.)

3 Sheets—Sheet 3.

H. J. GILBERT.

WOOD PULLEY AND METHOD OF BUILDING SAME.

No. 527,965.

Patented Oct. 23, 1894.

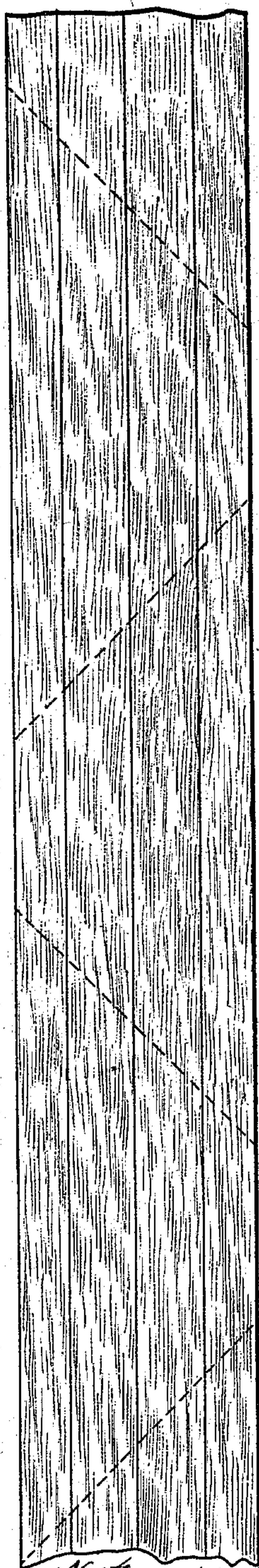


Fig. A.

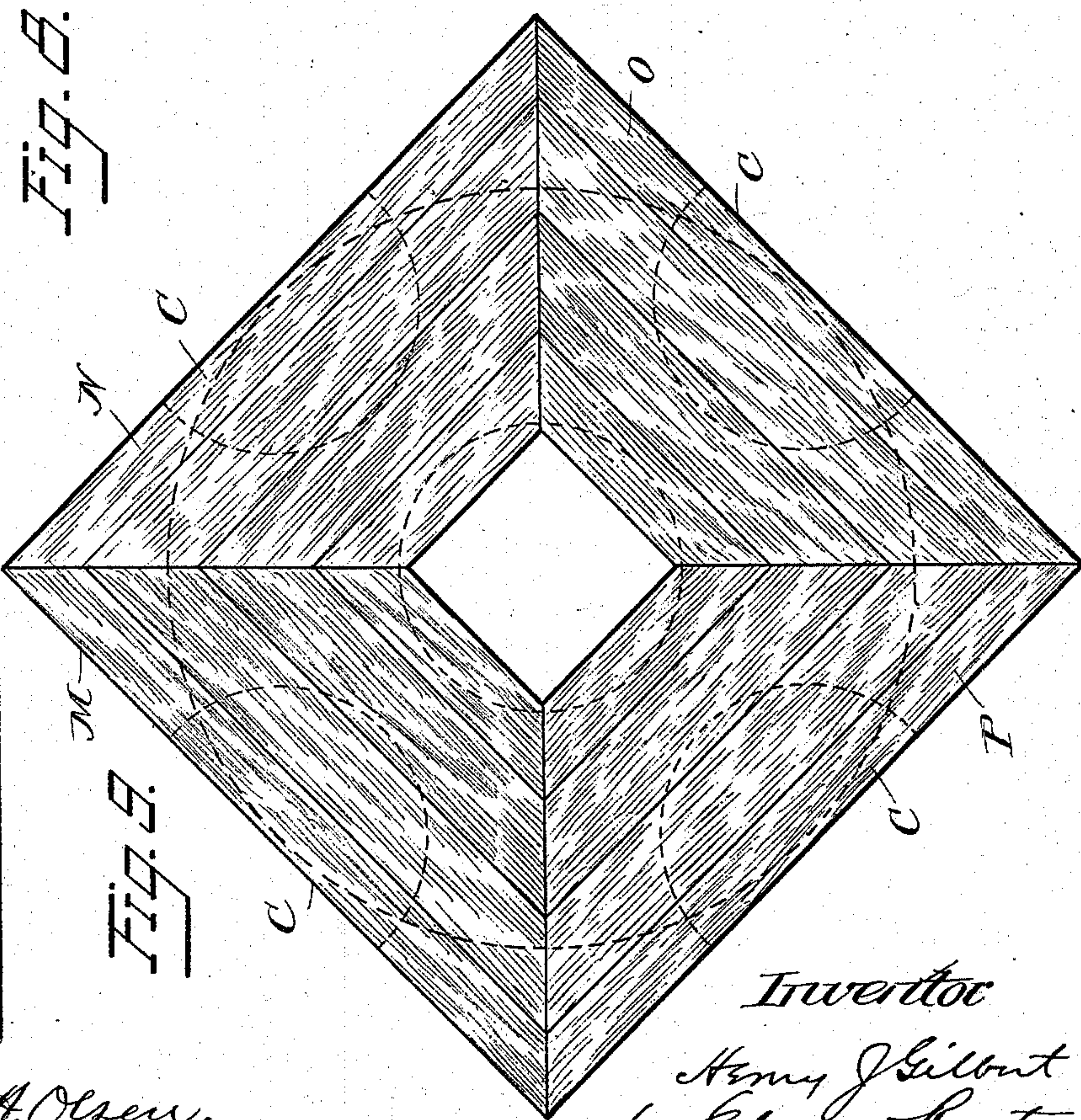


Fig. B.

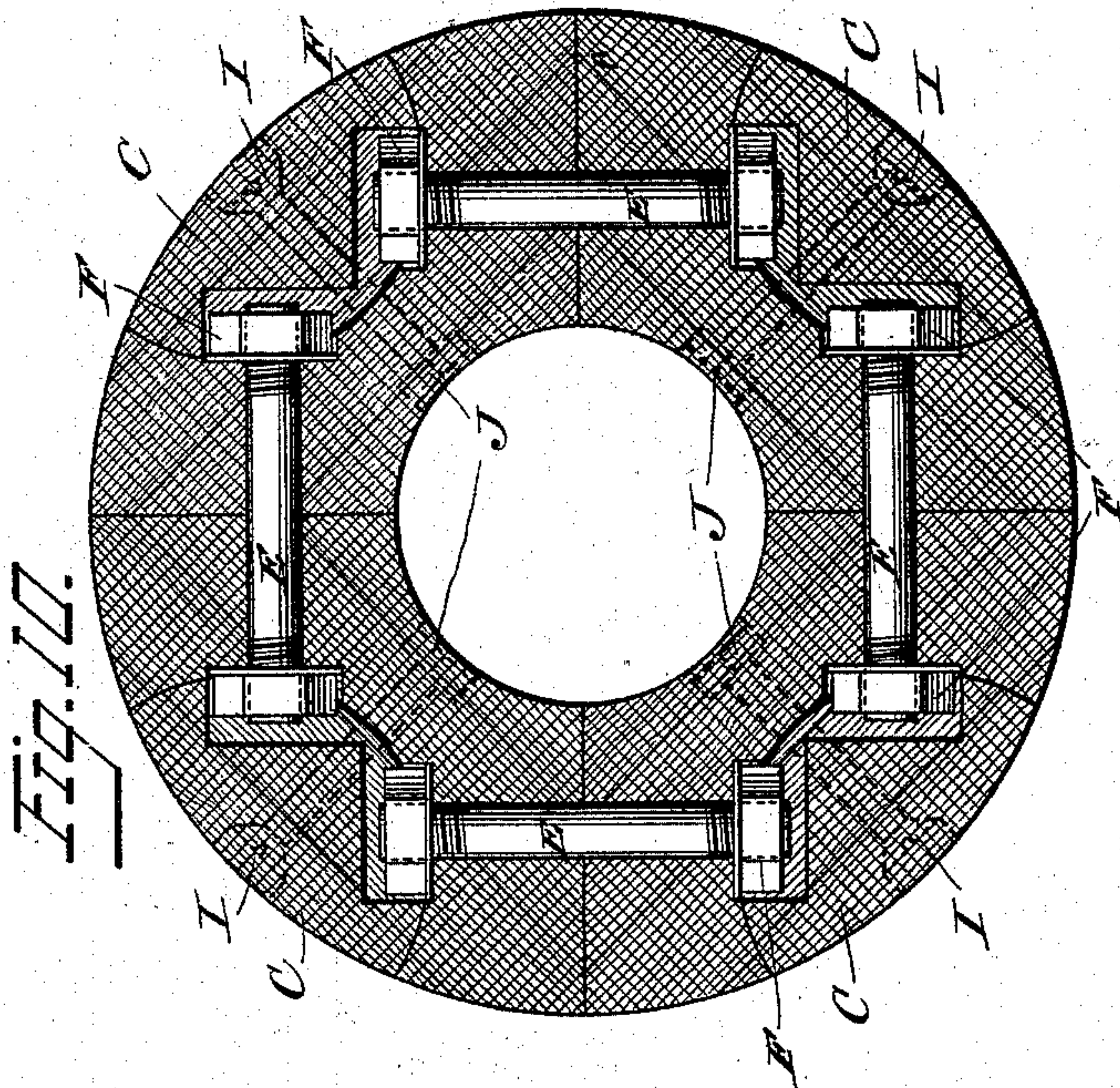


Fig. C.

Witnesses  
Martin A. Olsen.  
R. B. Caffray.

Inventor  
Henry J. Gilbert.  
by Edward Recker  
his attorney



# UNITED STATES PATENT OFFICE.

HENRY J. GILBERT, OF SAGINAW, MICHIGAN.

## WOOD PULLEY AND METHOD OF BUILDING SAME.

SPECIFICATION forming part of Letters Patent No. 527,965, dated October 23, 1894.

Application filed January 13, 1893. Serial No. 458,292. (Model.)

*To all whom it may concern:*

Be it known that I, HENRY J. GILBERT, a citizen of the United States, residing at Saginaw, in the county of Saginaw and State of Michigan, have invented a certain new and useful Improvement in Wood Pulleys and the Method of Building the Same, of which the following is a description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates more particularly to wood split pulleys, and to wood split pulleys which are secured upon the shaft by clamping devices accessible from the face of the pulley, as distinguished from pulleys which are secured upon the shaft by fastening devices accessible only from the side of the pulley. Pulleys of this class are often applied in large numbers to a single shaft and abutted one against the other, so as to completely cover the shaft for a considerable distance, in order that belting may be readily shifted along the shaft. It is therefore necessary in such cases that the devices by which the pulley is secured upon the shaft be accessible from the face of the pulley, in order that if any pulley becomes loosened it may be readily tightened up without displacing the pulleys at either side of it.

One of the difficulties heretofore experienced in the manufacture of pulleys of this character has been in producing a pulley of small diameter and relatively large bore.

My invention has for its object the production of a small pulley which shall have a relatively large bore and yet be of sufficient strength to withstand all the strains to which it will be subjected in practical use, and which shall also be of a satisfactory character in other respects in which pulleys now in use are objectionable.

It also has for its object the cheapening of the manufacture of this class of pulleys and the general improvement of their construction. Its novelty consists in the novel construction of the completed pulley itself, and also in a new method or process of building pulleys of this character; all as will be hereinafter set forth and more particularly pointed out in the claims.

In the accompanying drawings Figure 1 represents a cross-section through the middle

of one form of my improved pulley, showing the clamping bolts for securing the two faces of the pulley together; Fig. 2, a cross section of the same pulley in a plane adjacent to one end of the pulley, showing the two screws for securing the covering caps or sections in place; Fig. 3, a perspective view of the pulley with one of said caps or sections shown removed; Fig. 4, a view corresponding to Fig. 1, showing a modified arrangement of the clamping bolts; Fig. 5, an edge view of a piece of lumber from which the miter sections composing the pulley block shown in Fig. 6 are cut; Fig. 6, an end view of a pulley block formed from the miter sections cut from the piece of lumber shown in Fig. 5, the dotted lines indicating the pulley to be formed from the block; Fig. 7, a cross section of a pulley formed from the block shown in Fig. 6, showing the clamping bolts and fastening screws for holding the pulley together, the screws for holding the covering caps or sections in place being shown in dotted lines; Fig. 8, an edge view of a piece of stock corresponding to that shown in Fig. 5 and built up of a series of layers of wood glued together; Fig. 9, an end view of a pulley block built up of miter sections cut from the piece of stock shown in Fig. 8, the dotted lines indicating the pulley to be formed from the block; and Fig. 10, a cross section of a pulley cut from the block shown in Fig. 9, the clamping bolts being shown in full and the screws for holding the covering caps in place being shown in dotted lines.

The same letters of reference are used to indicate identical parts in all the figures.

As far as the first feature of my invention is concerned, which is directed to the production of a small pulley with a relatively large shaft opening, the pulley block from which the pulley is turned may be built up of separate layers of wood, glued together, or the pulley may be turned from a solid block.

As seen in the first four figures of the drawings the pulley is divided into equal halves, A, B, upon a line *a-a* transversely to the grain of the wood, but not at right angles thereto. In other words this line of division is diagonally transverse to the grain of the wood, as indicated by the drawings. From each half is sawed a longitudinal section C



extending the entire length of the pulley and, preferably of substantially the shape shown, to form a clamping or bearing surface D adjacent to and approximately parallel with the dividing line of the pulley.

In the construction shown in the first three figures of the drawings each half of the pulley has screwed into it at its side opposite its section C a clamping bolt E whose outer end extends through a hole in the adjacent part of the opposite half of the pulley and projects beyond the clamping surface D. Their ends projecting beyond the surfaces D are threaded to receive the clamping nuts F, washers G being interposed between the nuts F and surfaces D around the bolts. The sections C are provided on their inner surfaces abutting the clamping surfaces D with recesses H, Fig. 3, to accommodate the ends of the bolts E and nuts F. The sections C are themselves secured in place, after the two halves of the pulley have been clamped together, by screws or screw-threaded bolts I, which pass radially through the sections C and web of the pulley, their inner ends entering nuts J fixed in recesses in the surface of the shaft opening. The heads of the bolts are countersunk in the outer surfaces of the sections.

From the foregoing description it will be seen that, owing to the shape and location of the sections C, forming the clamping surfaces D adjacent to the dividing line of the pulley—that is, in planes approximately parallel with said line and intersecting the shaft opening—I am able to provide a very small pulley with a very large shaft opening, which has not been possible in pulleys as heretofore constructed, where the clamping surfaces for the bolts have been formed by simply cutting sections from the opposite faces of the pulley upon straight lines parallel with the dividing line of the pulley, and in which the clamping surfaces were therefore necessarily farther from the dividing line of the pulley than any parallel line intersecting the shaft opening.

The pulley illustrated in the first three figures of the drawings is a six-inch pulley provided with a three inch shaft opening, but I am able to construct on this plan a five-inch pulley with a three-inch shaft opening and yet preserve sufficient strength in the pulley to withstand all the strains of practical use.

I have before stated that the pulley is divided into halves on a line transverse to the grain of the wood, but not at right angles thereto, the purpose of which is as follows: It will be noticed that the weakest points of the pulley are at the inner surfaces or apices of the sections C, where the portion of the pulley between the section and the shaft opening is comparatively thin; but it will be seen that the dividing line of the pulley is such relatively to the grain of the wood that at these points the grain runs straight between the sections C and the shaft opening and the fibers of the wood are not severed, so that the greatest strength of the pulley is

preserved at these points and no opportunity given for the pulley to split. This feature of my invention is important and valuable in the construction of very small pulleys with very large shaft openings, but it is only one feature of my invention, and the other features are not dependent upon it and may be employed without it.

The sections C are cut from the pulley block before the pulley is turned, or else from the pulley before it is given its final turning and finishing. It is desirable that the outer surfaces of these sections should be flush with the face of the pulley and that their edges should form a close joint with the pulley face. To that end another feature of my invention consists in cutting the sections C in such a way that a slight open space is left between the section and its seat in the pulley between the points *b—b* adjacent to the face of the pulley. This may be accomplished by first running the band-saw, by which the sections C are cut from the pulley, from the face of the pulley at one side along the line of cut to a point adjacent to the face of the pulley at the opposite side of the section, and by then drawing the saw backward through the cut nearly to the point at which it entered, and advancing it through the cut again, and then on outward through the face of the pulley at the opposite side of the section, thereby severing the latter from the pulley. With this open space between the points *b—b*, when the section is replaced and clamped in position by the screws I, preparatory to giving the pulley its final turning down, the contact surfaces of the section and pulley are adjacent to the face of the pulley, so that the section can be clamped very tightly in place and a close joint at the face of the pulley effected. So, too, if when the pulley is clamped upon a shaft preparatory to use it yields slightly to the strain of the clamping, the cut-away spaces between the sections C and their seats in the pulley permit the latter to be tightened up by the screws I and close joints at the face of the pulley preserved. While this feature of my invention is an advantageous one, it will nevertheless be understood that the other features of my invention are not dependent upon it, and that, so far as they are concerned, sections C may be employed cut from the body of the pulley or pulley-block by a single cut, so that their entire inner surfaces will fit against their seats in the body of the pulley.

I am aware that it is not new to clamp the two halves of a wood split pulley together by bolts passed through the two halves, and cover the heads of the bolts with caps or sections cut from the body of the pulley and recessed to accommodate the bolt heads and nuts; but in the pulleys most nearly approximating mine which are now in use the sections are cut from the pulley on straight lines parallel with the division line of the pulley. Difficulty has been experienced in fastening



such sections in place and in preventing their edges from becoming mutilated and producing ragged joints with the pulley face.

The shape of the sections in my pulley is such that the strains applied to the pulley in practical use do not tend to displace them, while, as before explained, their edges form close joints with the pulley face and may be so maintained. Moreover, in pulleys in which the sections are cut from the opposite halves of the pulley on straight lines parallel with the division line of the pulley, and in which the surfaces against which such sections fit form the clamping surfaces for the bolts, it is not possible to provide the pulley with a shaft opening nearly so large, relatively to the diameter of the pulley, as can be done in my pulley.

I have illustrated in Figs. 1 to 3, and described above, the construction of pulley which I believe to utilize to their fullest extent the several features of my invention thus far described but these features of my invention are not restricted in their broader scope to that particular construction of pulley, and may be employed to advantage in others. For instance, it is not essential that the clamping bolts E should be screwed into or otherwise permanently fixed in the respective halves of the pulley, since, if desired, loose clamping bolts may be employed and arranged, for instance, as shown in Fig. 4, where each half of the pulley is provided with a bore K perpendicular to the division line of the pulley, the lower ends of which bores communicate with the bolt holes extending through the pulley to the opposite clamping surfaces D. The bolts E are passed through the bores K and bolt holes and their heads rest against the bottoms of said bores, while their opposite threaded ends project beyond the clamping surfaces D and receive the washers G and clamping nuts F. If desired the bores K may be filled with plugs L after the bolts E have been inserted. Again, it is not essential in all cases that the sections C C be cut from the opposite halves of the pulley, for in some instances, especially where the shaft opening is not so large relatively to the diameter of the pulley, and in pulleys built up of miter sections in the manner hereinafter described, both sections C C may be cut from the same half of the pulley.

So far as the features of my invention thus far described are concerned, the pulley block, as heretofore stated, may be built up in any suitable manner of separate layers of wood, or the pulley may be turned from a solid block; but I prefer to form the pulleys from blocks built up in a particular novel manner, and this new method of building up the pulley block constitutes an additional valuable feature of my present invention. It is illustrated in and may be explained by reference to Figs. 5 to 10 of the drawings.

Referring first to Figs. 5, 6, and 7, it will be seen that the pulley block shown in Fig.

6 is composed of four sections M, N, O, P, mitered and fitted together to form the square pulley-block. These miter sections may be cut from a single piece of lumber, of the proper thickness and width, Fig. 5, as indicated by the dotted lines, without waste of material. The four miter sections may be secured together with glue to form the pulley block, but where the block is to be used for a split pulley I prefer to glue together the respective sections M N and P O, to form the opposite halves of the pulley, and leave the joints between the sections M P and N O to form the dividing line of the pulley. Sections C, such as heretofore described, are cut from the miter sections N P and the two halves of the pulley-block secured together by clamping bolts and nuts E F, Fig. 7. If desired screws Q may be passed through the sections N P and into the sections M O respectively to more securely fasten those sections together. The shaft opening is then bored out, the pulley clamped upon a shaft, the sections C replaced and secured in position by the screws I, and the pulley turned down and finished. In this manner a small pulley of great strength may be very cheaply and easily constructed from a single piece of lumber, and it will be noticed that in the four miter sections of which the pulley is formed the grain of the wood in the opposite sections runs parallel, and at right angles to the grain of the wood in the intermediate sections. At the weak points of the pulley, between the sections C and shaft opening, the grain of the wood therefore runs straight between the sections and shaft opening and the greatest strength is thereby preserved at these points, as in the construction heretofore described. Owing to this fact, too, the sections C may both be cut from the same half of the pulley, if desired, one from the miter section N and the other from the miter section M, and the clamping bolts E be both screwed into the same half of the pulley, one into the section O and the other into the section P, without weakening the pulley, as will be readily understood. It will also be seen that, owing to the construction of the pulley from the four miter sections cut from the single piece of lumber, the end grain is chiefly between the joints of the four miter sections, and only a relatively small part of it is exposed upon the face of the pulley. For the purpose of constructing larger pulleys upon this plan the stock from which the miter sections are cut, instead of being a single piece of lumber, may be built up of separate layers, glued together, as seen in Fig. 8. In such case the four miter sections M, N, O, P, will be fitted together to form the pulley block shown in Fig. 9, the sections C cut from the block, the clamping bolts applied to secure the miter sections together, and the shaft opening bored out, after which the two halves of the block will be clamped upon a shaft, the sections C replaced and secured



in position, and the pulley turned down and finished. In constructing a large pulley upon this plan it will be found desirable to employ four clamping bolts E, instead of two, two for permanently securing together the miter sections M N and O P, which form the opposite halves of the pulley, and two for clamping the two halves upon the shaft. To form the proper clamping surfaces for these four bolts a substantially semi-circular section C is cut from each of the miter sections, and the bolts applied in the manner shown. This may be done without materially weakening the pulley, since in each of the four miter sections the grain of the wood runs straight between the sections C and shaft opening and there is no possibility of the pulley splitting at any of these four points.

By forming a pulley of miter sections cut from stock built up of separate layers of wood, in the manner described, I am able to employ the lumber to the greatest advantage and utilize pieces which have heretofore been wasted, and thereby materially cheapen the construction of this class of pulleys, and at the same time produce a pulley superior in construction to those heretofore in use.

While my invention in all its features relates more particularly to a split or two-part pulley, it will be evident that my novel method of building up a pulley block from miter sections may be advantageously employed in the construction of solid pulleys.

Having thus fully described my invention, I claim—

1. A wood split pulley having the two longitudinal sections C C cut therefrom to form clamping surfaces each located in a plane approximately parallel with the dividing line of the pulley, and the planes of which clamping surfaces intersect the shaft opening, for the purpose set forth, clamping bolts and nuts for securing the two halves of the pulley together, and means for securing the said sections C in place, substantially as described.

2. A wood split pulley composed of the two halves A B separated on a line diagonally transverse to the grain of the wood, the longitudinal sections C cut therefrom to form the clamping surfaces D, the planes of which intersect the shaft opening, leaving the grain of the wood running straight between the apexes of the said sections and the shaft opening, to preserve the greatest strength of the wood at those points of the pulley, bolts and nuts for clamping the two halves of the pulley together, and means for securing the said sections C in place, substantially as described.

3. A wood split pulley, composed of the two halves A, B, the sections C cut therefrom to form the clamping surfaces D, said sections having rounded apexes or inner parts, the bolts E fixed at one end in the respective halves of the pulley and extending at their other ends through the opposite halves and

projecting beyond the surfaces D, the clamping nuts F applied to the bolts E, and means, as the screws I, for securing the sections C in place, substantially as described.

4. A wood split pulley, composed of the two halves A, B, the longitudinal sections C cut therefrom to form the clamping surfaces D, said sections C having rounded apexes or inner parts and being slightly separated from their seats in the body of the pulley by the spaces between the points *b—b*, for the purpose described, bolts and nuts for clamping the two halves of the pulley together, and means for securing the sections C in place, substantially as described.

5. A wood split pulley, composed of the two halves A, B, separated on a line diagonally transverse to the grain of the wood, the longitudinal sections C, of approximately the shape shown, cut from the opposite halves of the pulley to form the clamping surfaces D, said sections C being slightly separated from their seats in the body of the pulley by the spaces between the points *b—b* for the purpose described, and leaving the grain of the wood running straight between them and the shaft opening, to preserve the greatest strength of the wood at those points in the pulley, bolts and nuts for clamping the two halves of the pulley together, and means for securing the sections C in place, substantially as described.

6. The herein described wood split pulley comprising four quadrant sections, said pulley having recesses, the longitudinal sections C fitting in said recesses, and means for securing the two halves of the pulley together and for securing the sections C in place, substantially as described.

7. The herein described wood split pulley having recesses and comprising four quadrant sections, each section consisting of two or more longitudinal layers of wood secured together, the longitudinal sections C C fitting in said recesses, and means for securing the two halves of the pulley together and for securing the said sections C in place, substantially as described.

8. The herein described steps in the method of building wood pulleys, consisting in cutting the pulley stock into miter sections, securing said sections together to form the pulley block, and turning the pulley from said block, substantially as described.

9. The herein described steps in the method of building wood pulleys, consisting in forming the pulley stock by gluing together two or more strips or longitudinal layers of wood, cutting said stock into miter sections, securing said sections together to form a pulley block, and then turning the pulley from said block, substantially as described.

HENRY J. GILBERT.

Witnesses:

E. M. JOSLIN,  
MARY C. FOWLER.