

C. H. BICALKY.
PULLEY.

(Application filed Oct. 18, 1899.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

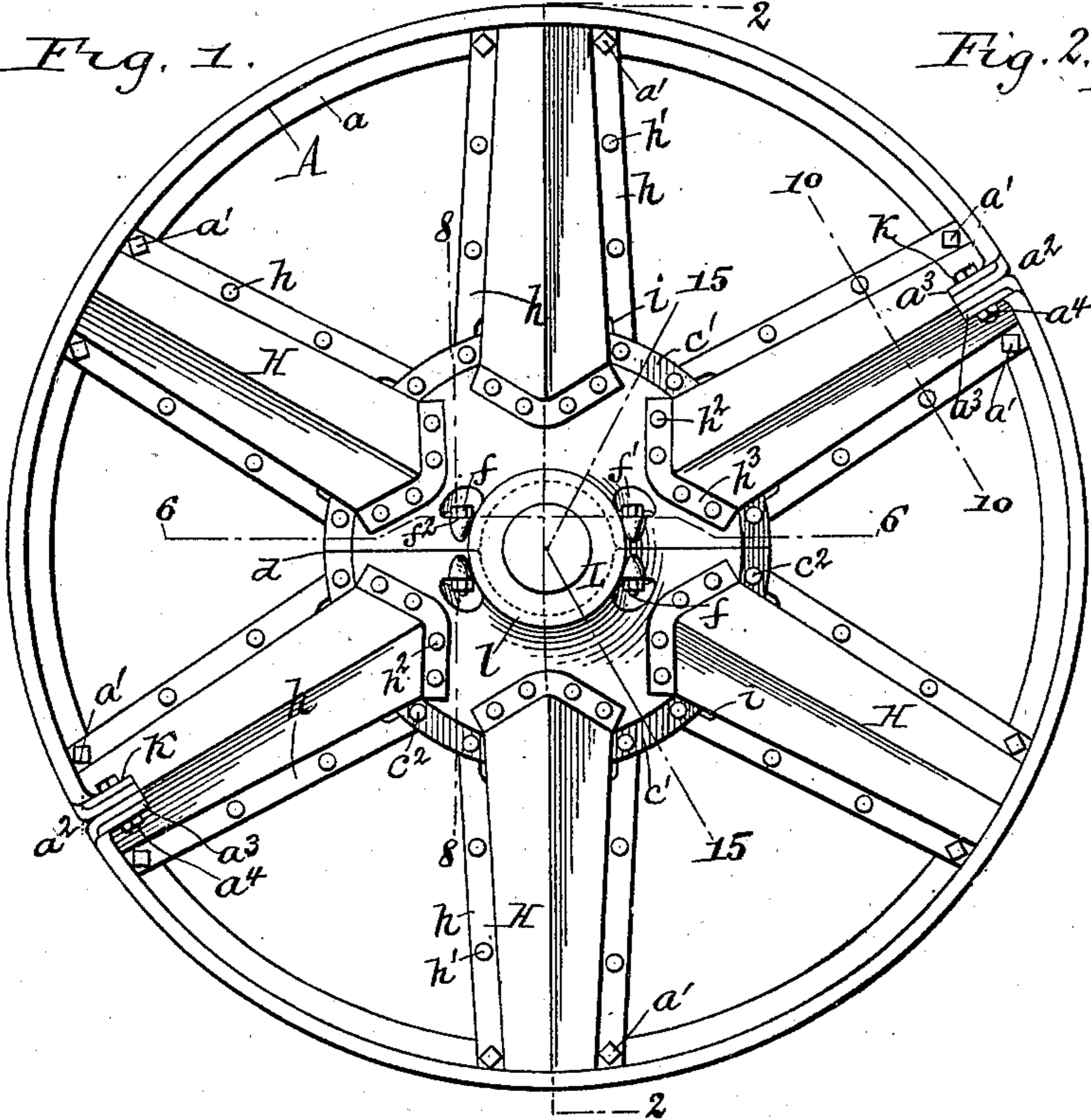


Fig. 2.

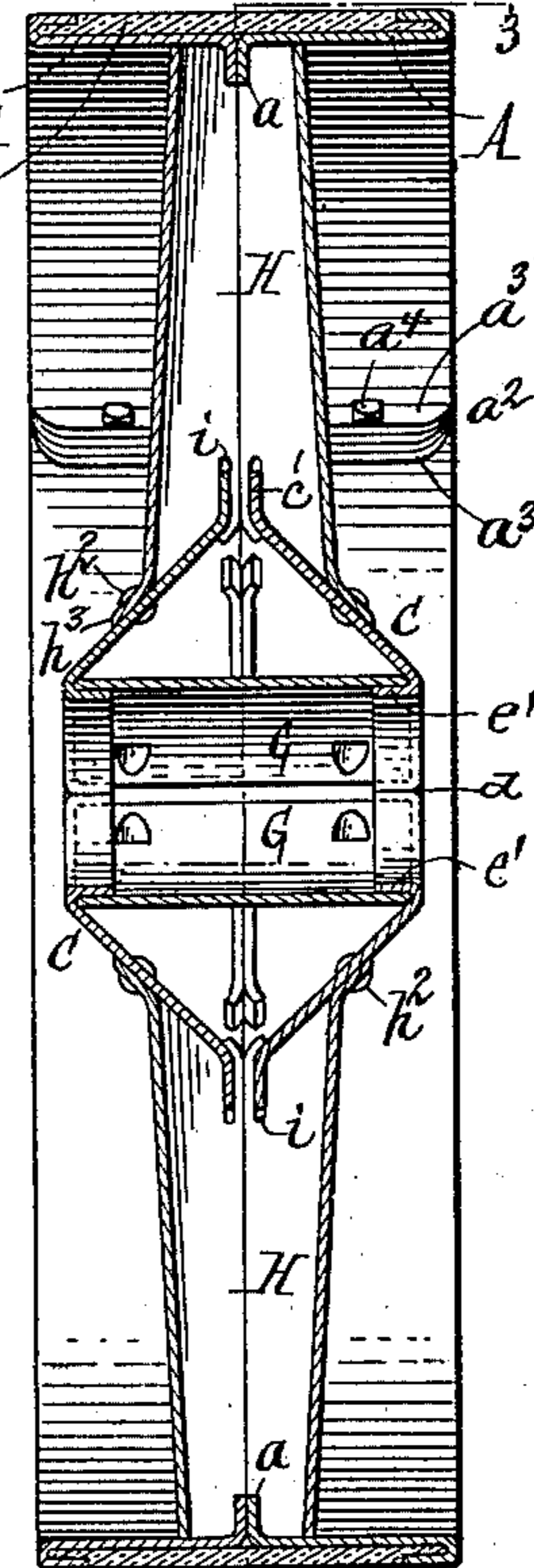


Fig. 3.

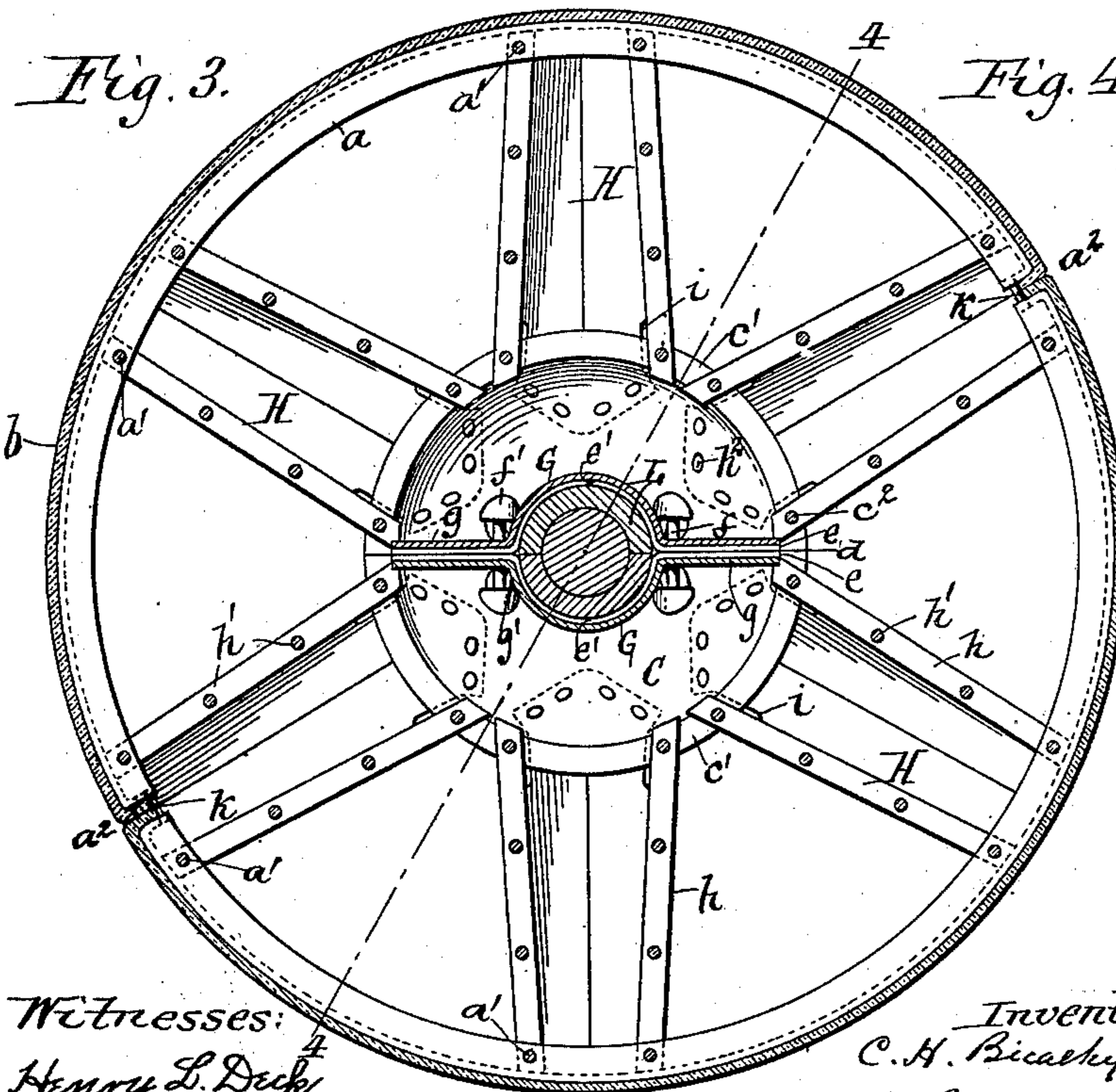
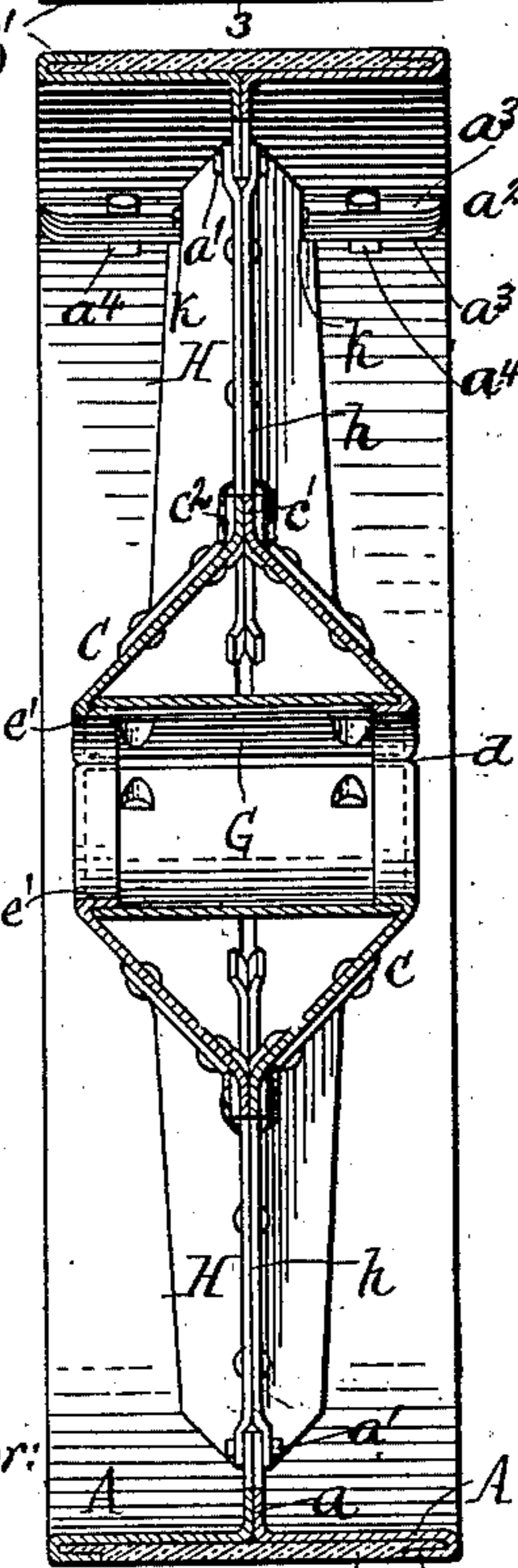


Fig. 4.



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(No Model.)

2 Sheets—Sheet 2.

Fig. 5.

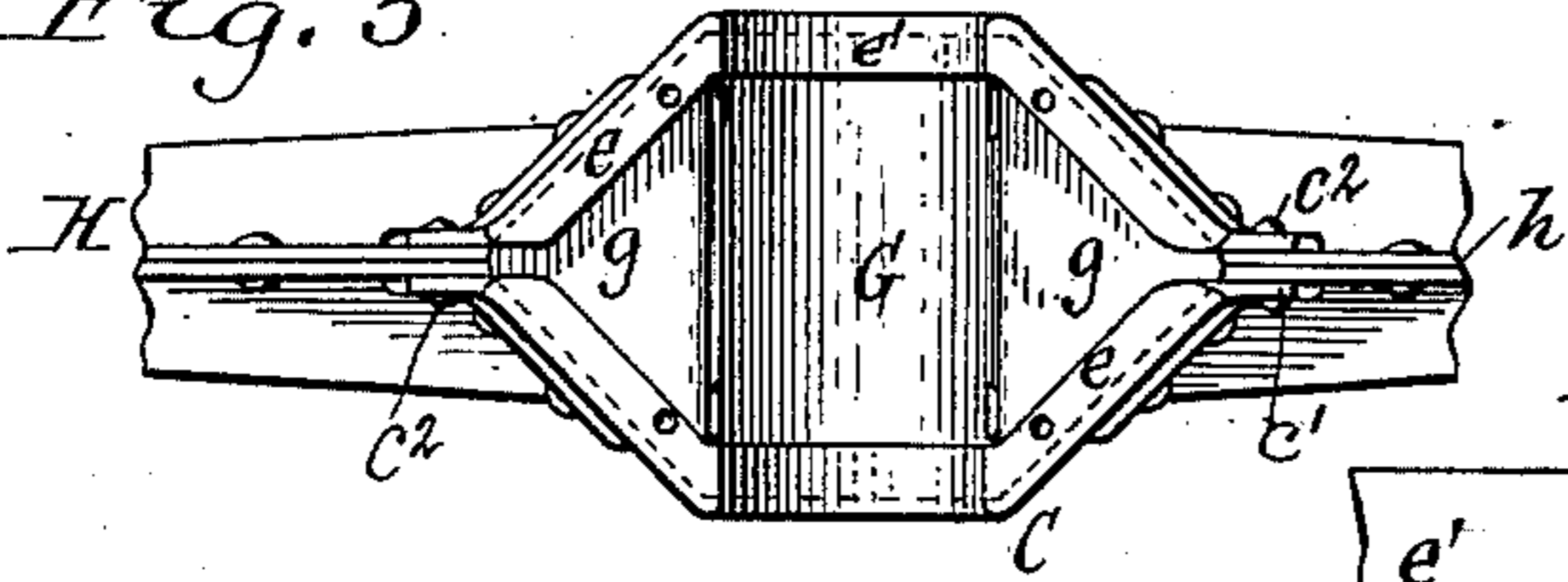


Fig. 6.

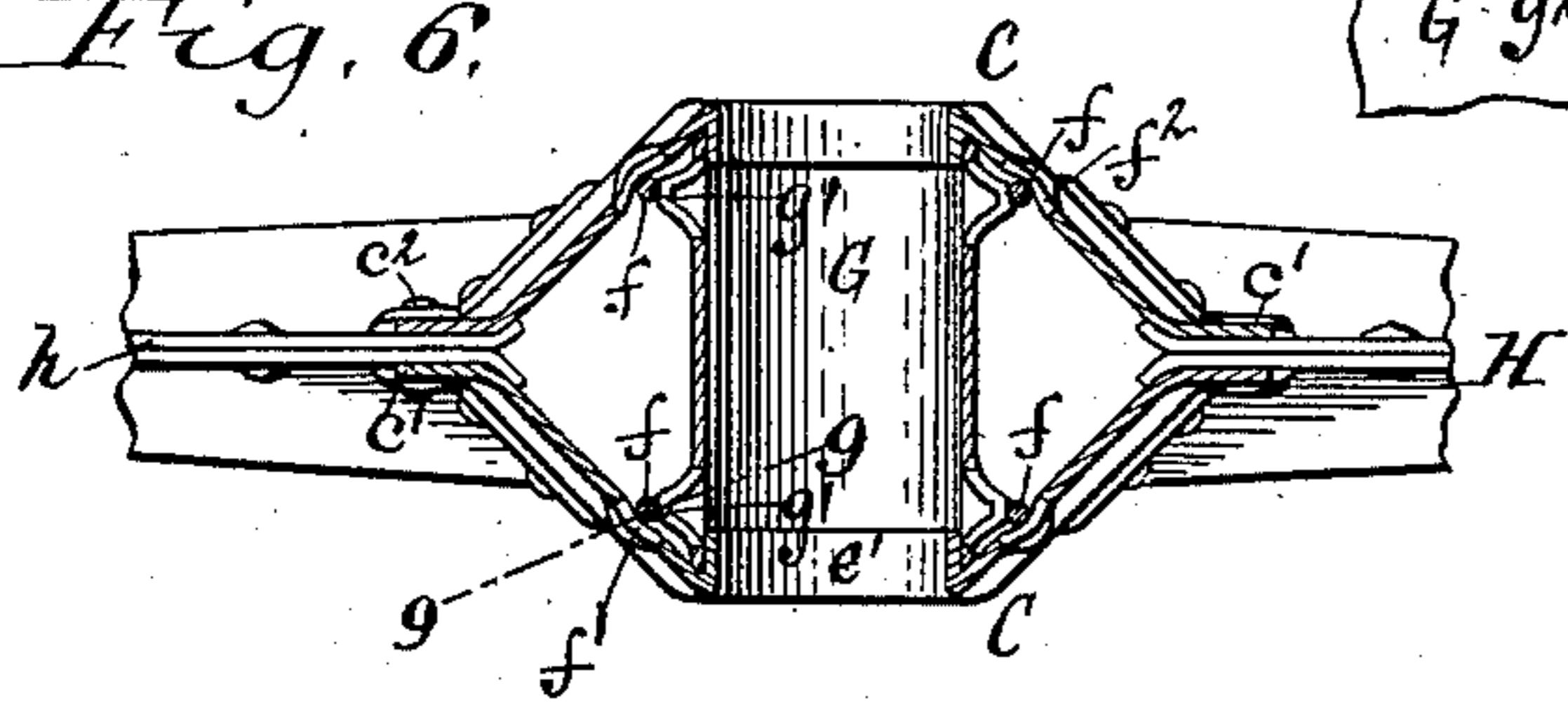


Fig. 7.

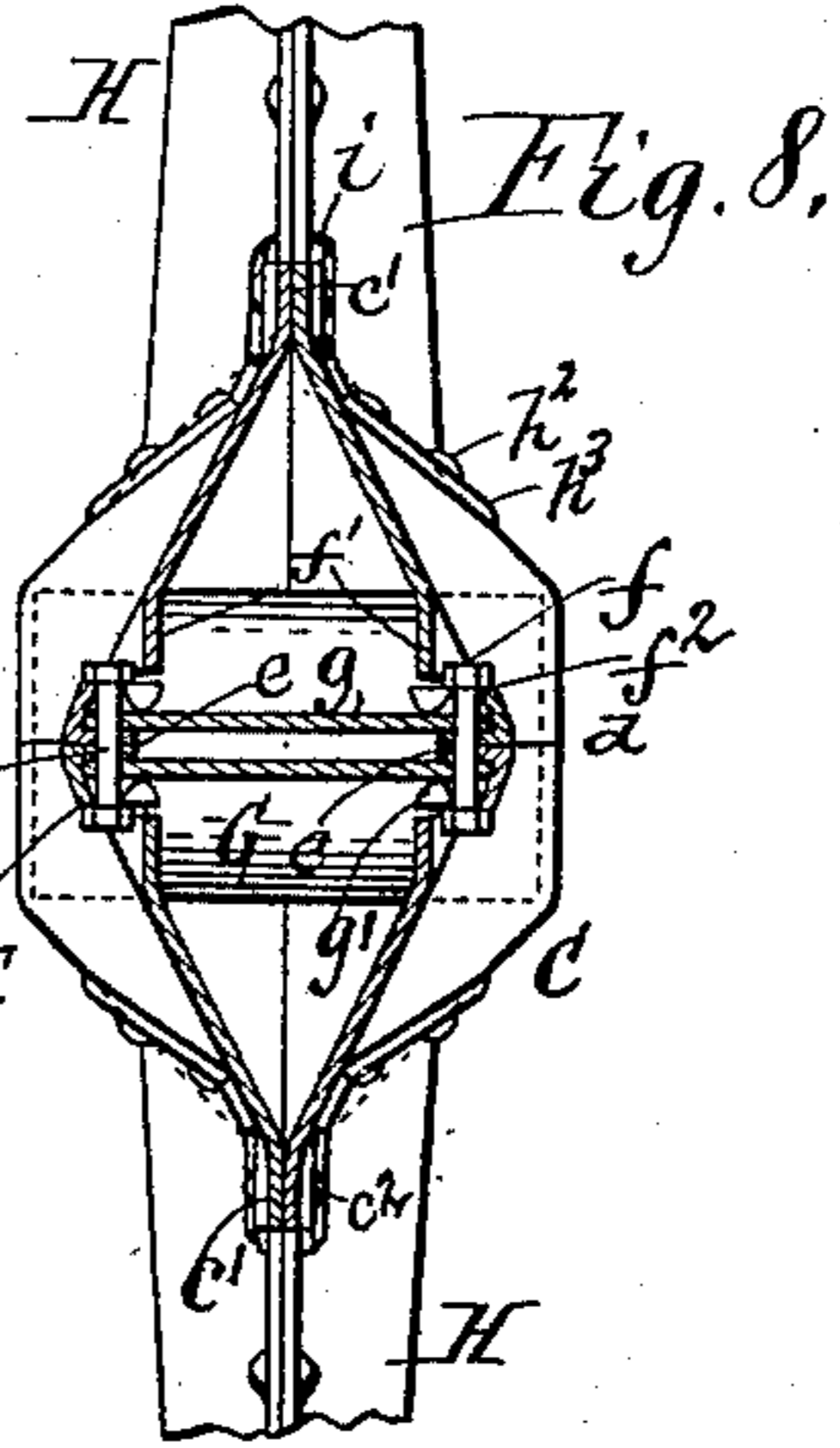
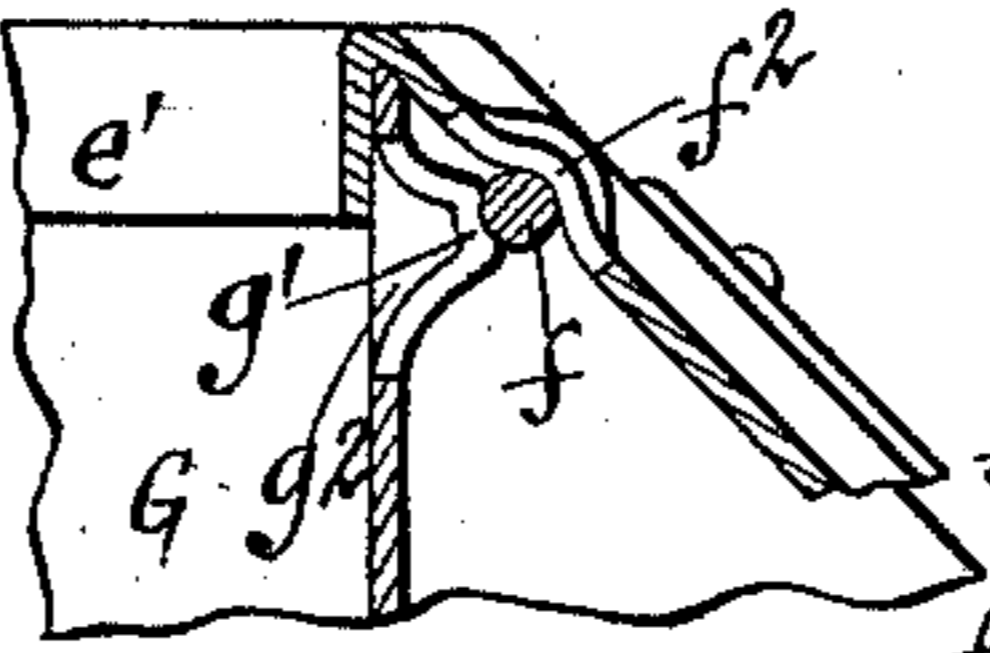


Fig. 9.

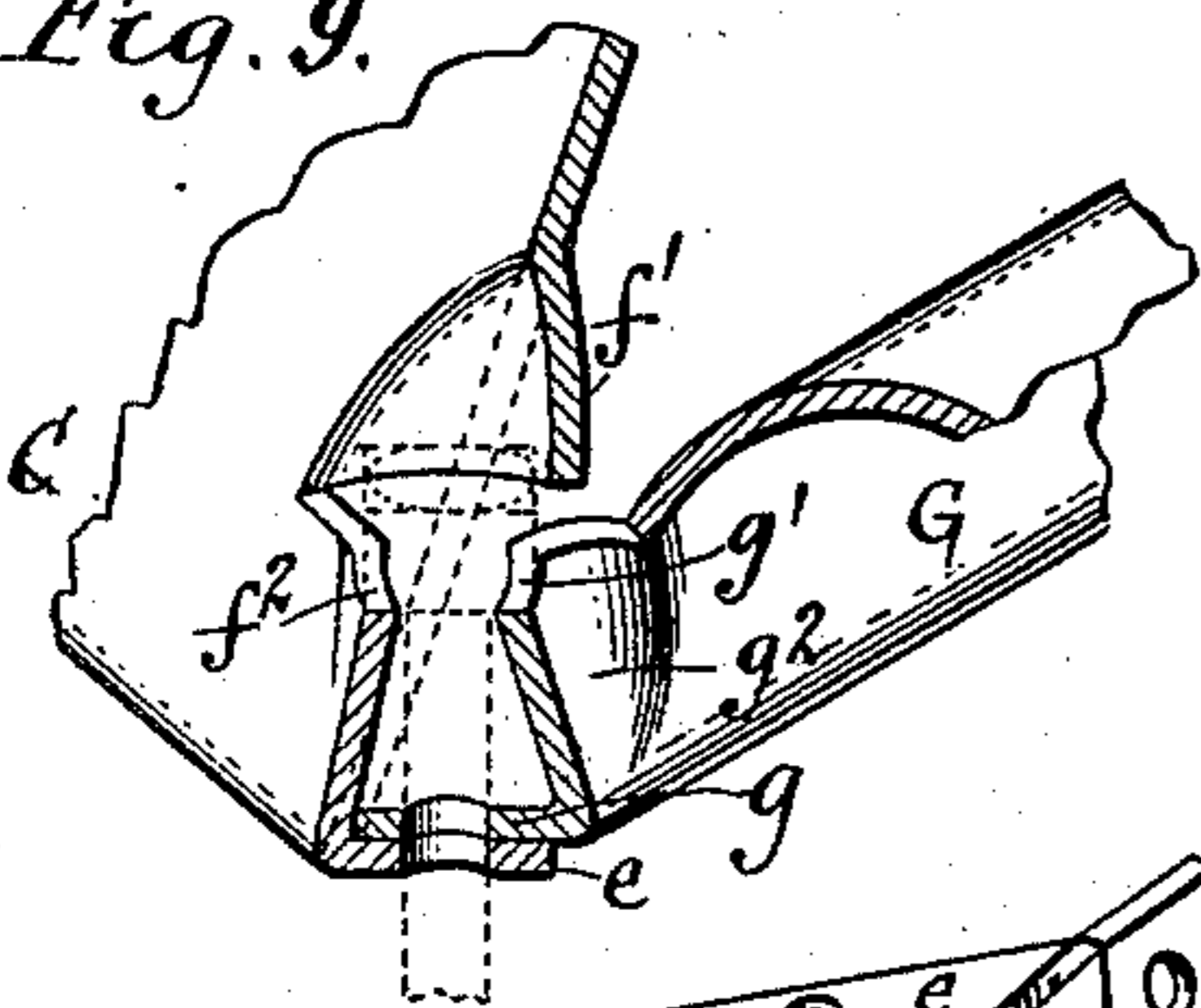


Fig. 11.

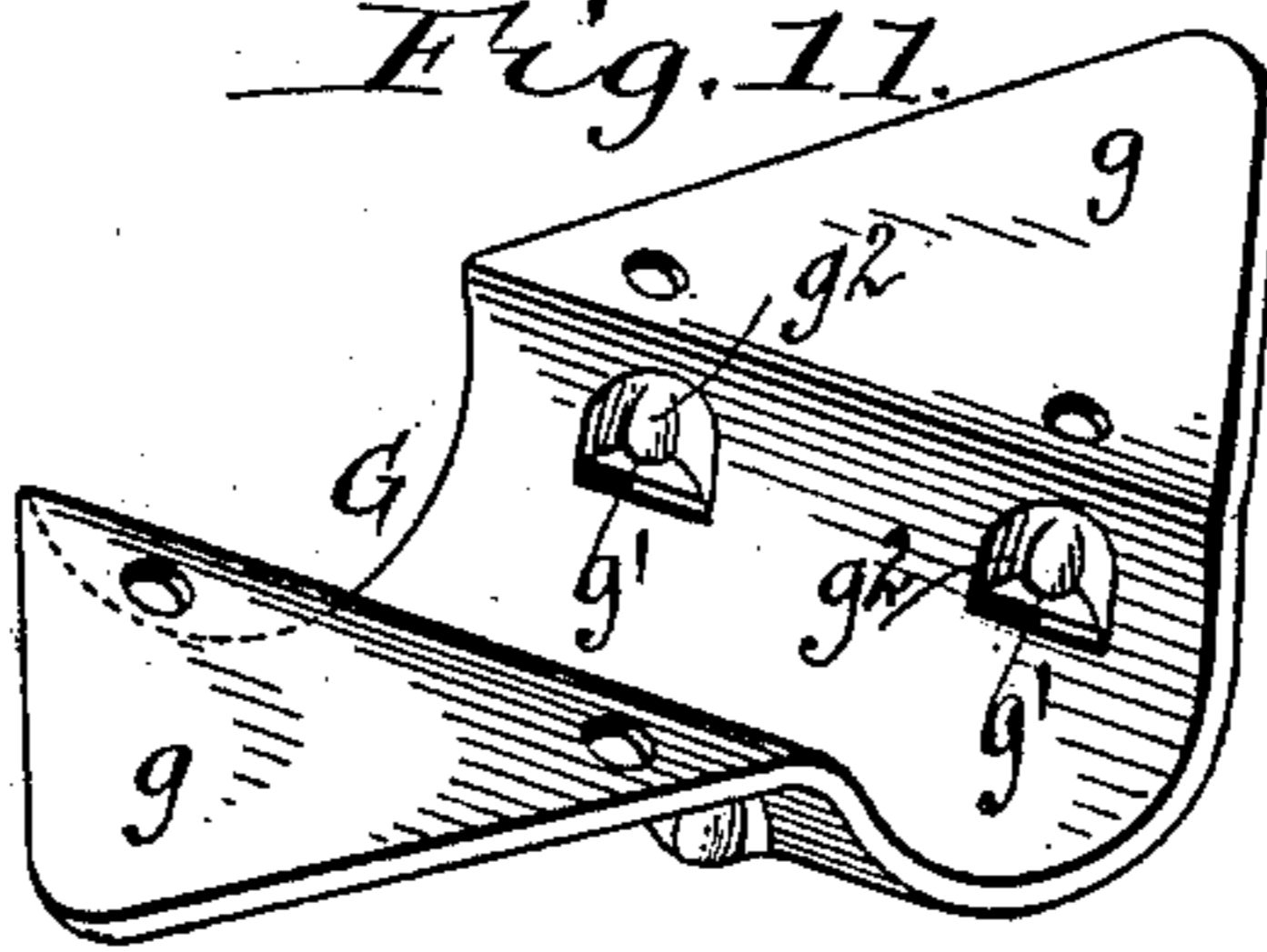


Fig. 10.

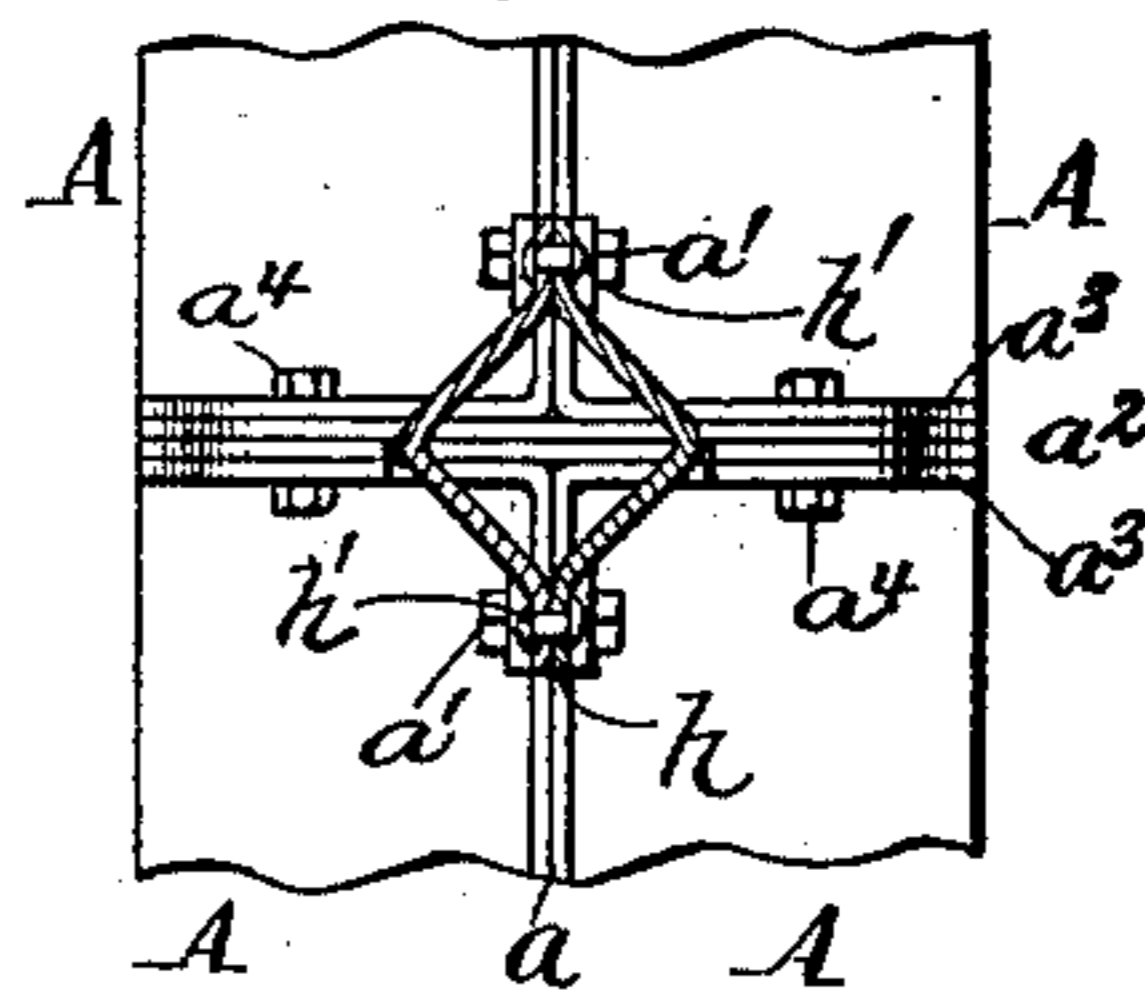


Fig. 12.

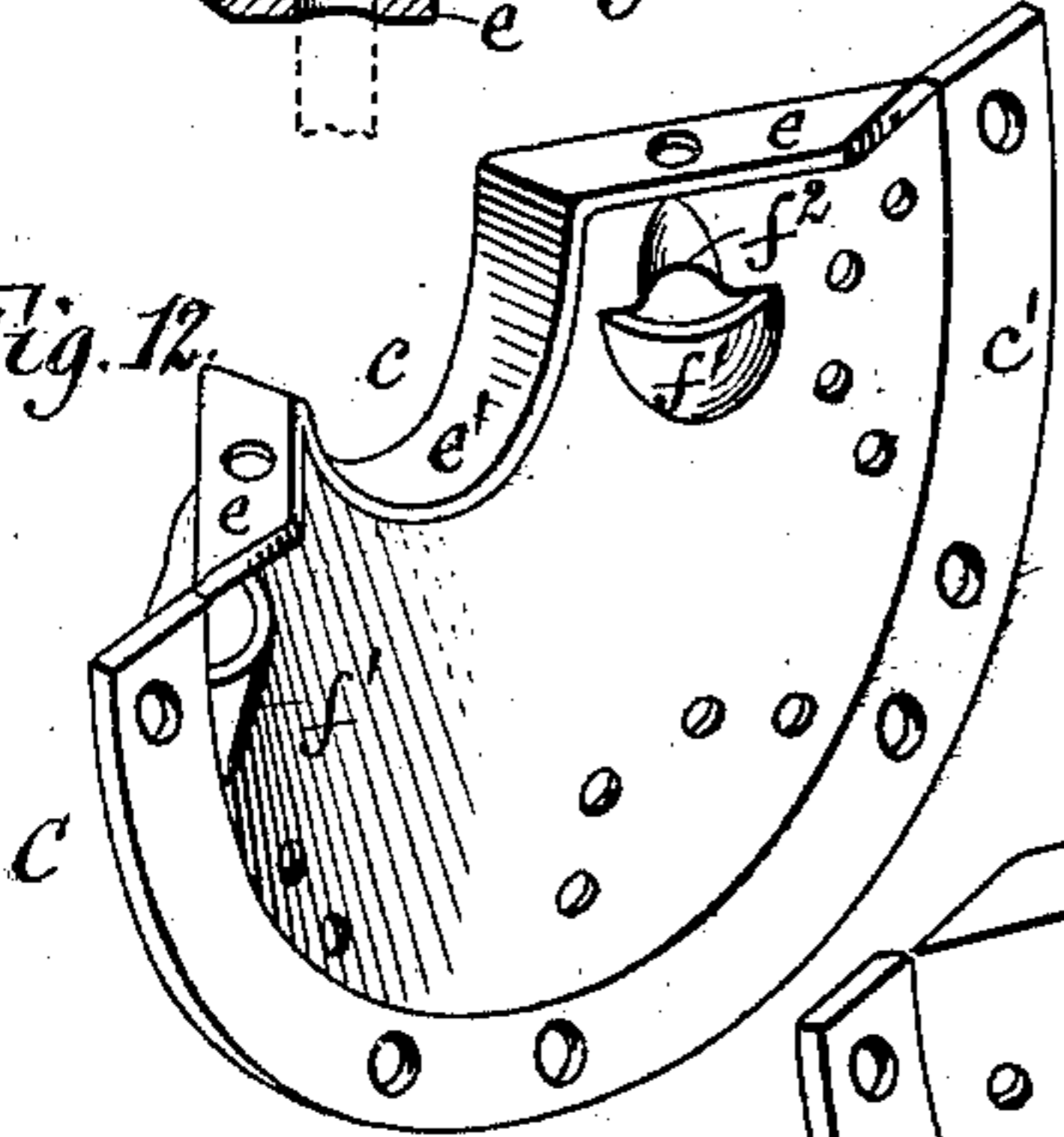


Fig. 13.

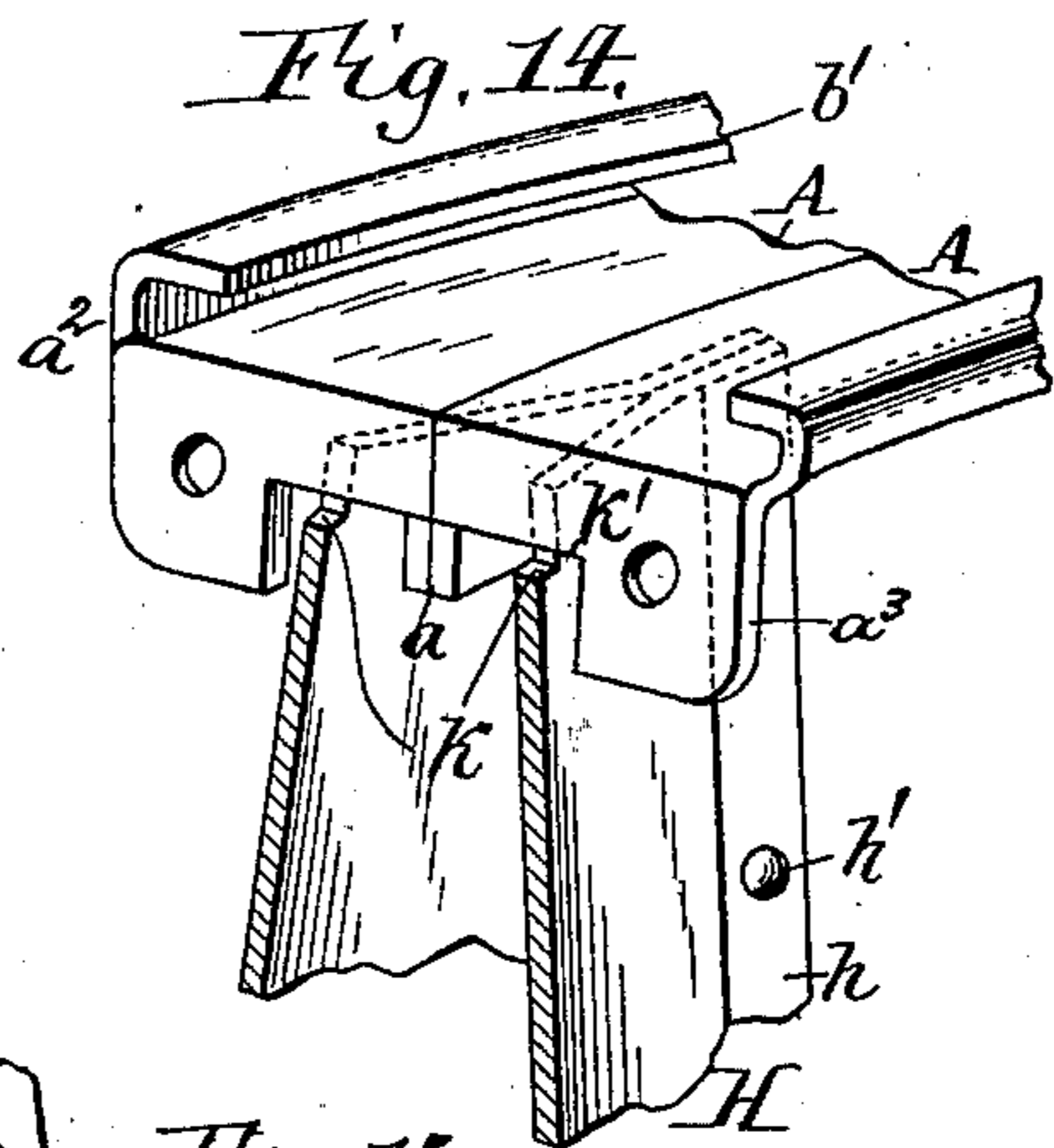
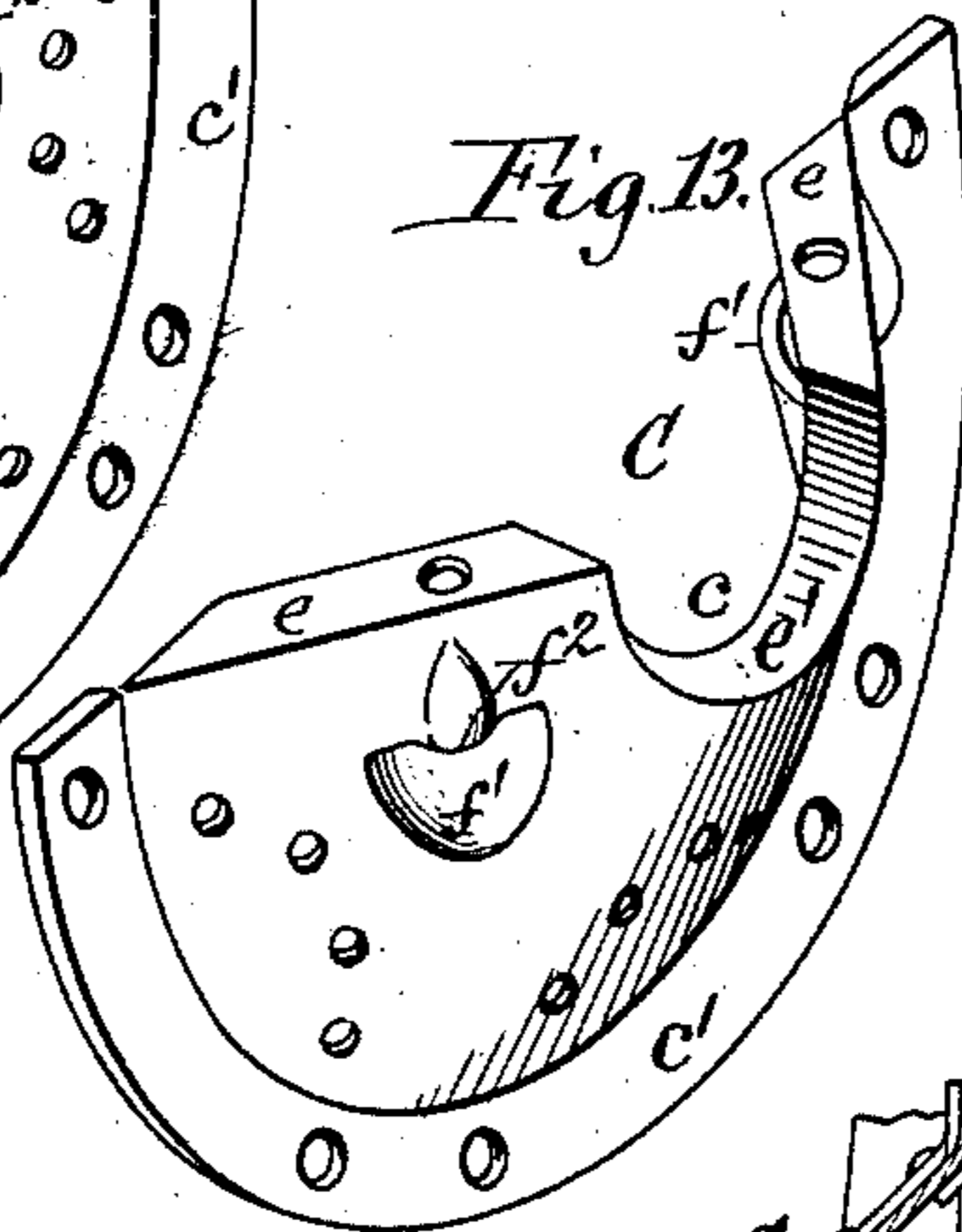


Fig. 16.

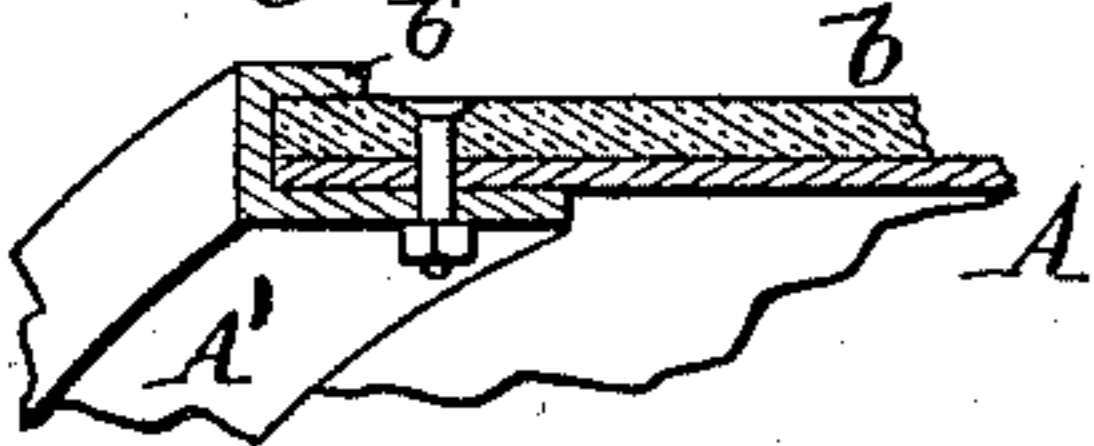


Fig. 17.

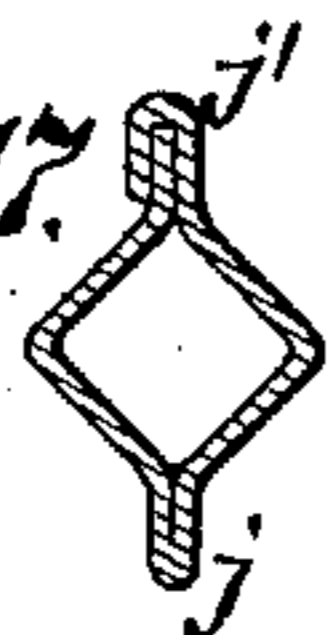
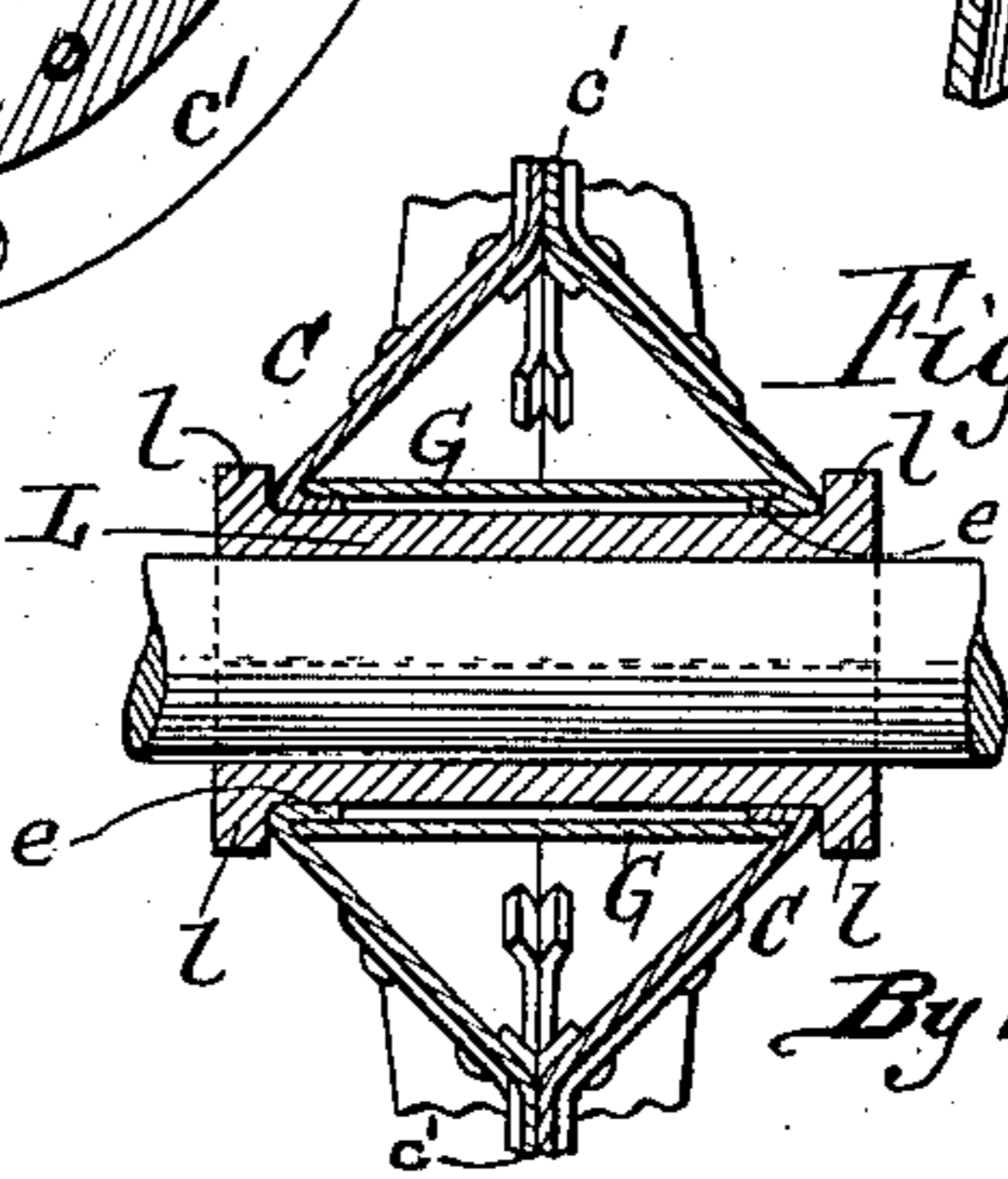


Fig. 15.



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PULLEY.

SPECIFICATION forming part of Letters Patent No. 656,339, dated August 21, 1900.

Application filed October 18, 1899. Serial No. 733,982. (No model.)

To all whom it may concern:

Be it known that I, CHARLES H. BICALKY, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented a new and useful Improvement in Pulleys, of which the following is a specification.

This invention relates to sheet-metal pulleys, and more particularly to a split pulley having its hub, rim, and arms constructed of sheet-steel.

The object of my invention is the production of a strong, light, and durable pulley of this kind which is sufficiently braced against lateral as well as radial strains and which is built up of comparatively-small pieces or sections of sheet metal which can be bent or stamped in small dies, thus reducing the cost of the pulley correspondingly.

In the accompanying drawings, consisting of two sheets, Figure 1 is a side elevation of my improved pulley. Fig. 2 is a transverse section thereof in line 2 2, Fig. 1. Fig. 3 is a central section of the pulley at right angles to its axis. Fig. 4 is a transverse section thereof in line 4 4, Fig. 3. Fig. 5 is a fragmentary inside view of one of the halves of the split pulley. Fig. 6 is a transverse section in line 6 6, Fig. 1. Fig. 7 is an enlarged fragmentary section of the same. Fig. 8 is a transverse section in line 8 8, Fig. 1. Fig. 9 is a sectional perspective view, on an enlarged scale, in line 9 9, Fig. 6. Fig. 10 is a cross-section in line 10 10, Fig. 1. Fig. 11 is a perspective view of one of the thimble-sections. Figs. 12 and 13 are perspective views of two opposing quarters of the pulley-hub. Fig. 14 is a fragmentary sectional perspective view of the rim and one of the arms. Fig. 15 is a transverse section in line 15 15, Fig. 1. Fig. 16 is a fragmentary sectional perspective view of the rim, showing a modified construction thereof. Fig. 17 is a cross-section of a modified construction of the pulley-arms.

Like letters of reference refer to like parts in the several figures.

The sheet-metal rim of the pulley is preferably divided, circumferentially, into similar bands or rings A A, which meet at the middle of the rim, and these rings are provided at their meeting edges with inwardly-extending annular flanges a , which abut against each

other and through which pass transverse bolts or rivets a' , whereby the halves or sections of the rim are firmly secured together. In order to form a split pulley, the rim is divided transversely into semicylindrical sections or halves, as shown at a^2 , and these sections are provided at their meeting ends with transverse inwardly-extending flanges a^3 , which are secured together by bolts a^4 , passing through the same. The rim is preferably provided with a facing b , of leather or other suitable non-metallic material, to reduce the slippage of the driving-belt on the pulley. This facing consists of two strips of material applied, respectively, to the halves of the split rim and having their meeting ends turned inwardly and clamped between the transverse flanges a^3 of said halves, as shown in Figs. 1 and 3. The facing is confined upon the pulley-rim by turning the edges of the latter outwardly and inwardly over the marginal portions of the facing, so as to form inwardly-extending lips or flanges b' on the face of the rim, which overlap the facing, as shown in Figs. 2, 4, and 14. These lips are preferably formed integral with the rim sections or rings A, as shown in the last-mentioned figures; but, if desired, they may be formed on separate rings A', which are bolted or otherwise secured to the margins of the main rings A, as shown in Fig. 16. In applying the facing to the pulley-rim the flanges of the rim-sections are engaged over the edges of the facing before the sections are secured together, and upon connecting the sections the facing is confined between the face of the pulley and said flanges. The flanges b' , in addition to retaining the facing upon the pulley-rim, also serve to stiffen the rim.

The hub of the pulley is lenticular in form and consists of two sheet-metal cones or concavo-convex sections C C, arranged base to base and provided with axial openings c for the passage of a shaft. These cones are provided at their inner or large ends with outwardly-extending base-flanges c' , which are connected together by transverse bolts or rivets c^2 . This sectional hub is split diametrically into similar halves or sections, as shown at d , to form a split pulley, and these sections break joint with the semicylindrical sections of the pulley-rim, or, in other words,

the diametrical joint d of the hub-sections C is arranged out of line with the transverse joint of said rim-sections, as shown in Figs. 1 and 3, by which arrangement the strength of the pulley is increased. The sections of the split hub are provided at their straight or diametrical edges with inwardly-extending flanges e , through which pass transverse bolts f , whereby the two sections are rigidly secured together, as shown in Figs. 1, 6, 7, and 8. These connecting-bolts are arranged on opposite sides of the shaft-openings c , as shown in Fig. 1. These bolts also preferably pass through the adjacent portions of the cone-bodies, as shown in Fig. 8, and the heads and nuts of the bolts are countersunk, so as to leave the outer faces of the cones smooth and avoid the formation of projections, which are liable to catch the clothing of persons. The openings in the cones which receive the connecting-bolts f may be formed by cutting slits in the cones parallel with their diametrical joint and bending the metal on the outer side of each slit inwardly to clear the bolt head or nut, as shown at f' in Figs. 8, 9, 12, and 13, and bending the metal on the inner side of the slit outwardly out of line with the general plane of the cone-surface, so as to form a shoulder f^2 , against which the portion of the bolt head or nut on the outer side of the bolt-body bears. The inwardly-extending flanges e of the split-hub sections also bound or extend along the edges of the semicircular recesses which form the shaft-opening c , as shown at e' in Figs. 2, 4, 12, and 13.

The hub-sections are reinforced and braced by an axial thimble or sleeve which is split lengthwise into two semicylindrical sections or halves G , which correspond to the sections of the split cones C , so that the joints of the cones and the split thimble coincide, as shown in Fig. 3. Each half of the thimble G is provided at its straight edges with outwardly-extending flanges or wings g . This thimble is fitted between the two cones C of the hub and abuts at its ends against the inner side thereof, and the semicircular flanges e' of the cone-sections extend into the ends of the thimble and bear against the inner surface thereof, as shown in Figs. 2, 4, and 15, while the flanges g of the thimble-sections bear against the inner sides of the straight flanges e of the cone-sections and are secured thereto by the same bolts f which connect said sections, as shown in Fig. 8. The wings g form radial bracing webs or partitions between the periphery of the thimble G and the inner side of the hollow hub, which aid in stiffening the hub. The thimble-sections are provided on their outer sides, adjacent to the heads and nuts of the bolts f , with projecting lugs or shoulders g' , against which the portions of the bolt heads or nuts on the inner side of the bolt-body bear, as shown in Fig. 8, by which construction these bolts serve not only to connect the cone-flanges e and

thimble-flanges g , but also draw the thimble-sections firmly together. The lugs g' of the thimble-sections may be formed by cutting a slit in the section parallel with the flanges g and bending the metal below the slit outwardly beyond the general surface of the section, as shown at g^2 in Figs. 9 and 11. The edges of the lips or shoulders f^2 of the cone-sections C are recessed to clear the adjacent bolt head or nut, as shown in Figs. 6, 7, and 9, and these lips or shoulders bear against the opposite sides of the bolt-body. By bending the opposing lips or shoulders g' and f^2 in the manner described they converge toward the head or nut of the bolt, as shown in Fig. 9, and mutually brace each other, thereby preventing the same from being bent out of place upon tightening the bolts.

H represents the arms of the pulley, which are constructed of sheet metal. Each of these arms is composed of two similar sections or halves, which meet in a longitudinal joint arranged at right angles to the axis of the pulley. The arm-sections are preferably substantially V-shaped in cross-section, so that when the sections are brought together with their apexes or ridges projecting outwardly they together form an arm of substantially diamond-shaped cross-section, as shown in Fig. 10. When the arms are made of this cross-section, their flat angular sides brace each other and form comparatively-sharp ridges or ribs, which resist bending or indenting of the arms. If desired, the arms may be made of elliptical or other suitable cross-sections. The sections of each arm are provided at their longitudinal edges with outwardly-projecting flanges h , which bear against each other and through which pass rivets or bolts h' , whereby the sections are firmly secured together. The V-shaped or salient body portions of the arm-sections extend inwardly beyond the periphery of the hub-cones C and straddle opposite sides of the hub, as shown in Figs. 1, 2, 4, and 8, the arm-sections being secured to the hub-sections by rivets or bolts h^2 , which pass through flanges h^3 , formed at the inner ends of the arm-sections. The inner portions of the longitudinal flanges h of the arm-sections are separated from the body of the sections by intervening slits i and are clamped between the base-flanges c' of the cone-sections C by the adjacent connecting-rivets c^2 of said sections, as shown in Figs. 1, 2, 3, and 6. The flanges h extend inwardly beyond the base-flanges of the hub-cones C and are bent or clenched outwardly against the inner sides of said sections to lock the same within the hub. By this construction the arms are securely tied to the hub and the rivets at the inner ends of the arms are relieved from shearing strains. The outer ends of the arm-sections abut against the inner side of the pulley-rim and embrace the annular flanges a of the rim-sections and they are secured to the rim by the transverse bolts a' , which pass through

the marginal flanges of the arms and the annular flanges a of the rim-sections, as shown in Figs. 1, 3, and 4. By arranging the sections of the pulley-arms so as to straddle the conical sections of the hub and riveting these parts together, as shown, the parts are rigidly tied together and the sections of the arms firmly brace each other, enabling the pulley to effectually withstand lateral as well as radial strains.

Those arms H which are arranged opposite the transverse joints of the rim-sections are provided in their outer ends with slots or notches k , which receive the meeting flanges a^3 of said sections, as shown in Figs. 1, 3, and 14, thereby interlocking the ends of the rim-sections with said arms. The arms with which the rim-sections are thus interlocked are arranged on opposite sides of the line in which the pulley-hub is split, so that each half of the pulley carries one of said arms. By this arrangement each half of the split pulley carries one of the rim-sections, and one end of each rim-section is detachably interlocked with an arm on the opposite half of the pulley. The rim-sections themselves thus form a connection between the two halves of the pulley, which partly relieves the connecting-bolts a' from strain and which alone connect the halves in case said bolts become lost.

When it is desired to separate the pulley-sections for applying the same to a shaft, the connecting-bolts f of the hub-sections are removed, the flanged ends of the rim-sections are disconnected by removing the bolts a^4 , and one end of each section is detached from the slotted arm opposite said flanged ends by removing the adjacent bolts a' . The flanged ends of the rim-sections can now be sprung out of the slots k in said arms for separating the halves of the pulley. After placing the two sections of the pulley against opposite sides of the shaft the flanged ends of the rim-sections are again sprung into the slots of the aforesaid arms and the fastening-bolts a' are replaced. In order to reduce the extent to which the ends of the rim-sections must be sprung to detach them from said slotted arms, the portions of the end flanges of the sections which engage in the slots of the arms are recessed or cut away from their inner edges to about the middle thereof, as shown at k' , Fig. 14.

If desired, each of the sheet-metal arms of the pulley may be bent up from a single blank, as shown in Fig. 17, in which case the arms have a fold j at one edge and a seam or joint j' at the other edge.

The hub of the pulley is preferably provided with a split bushing L . In the construction shown in the drawings this bushing is provided at its ends with outwardly-projecting flanges l , which confine the bushing in the central opening of the hub. When the pulley is to be tightened on the shaft, the sections of the bushing are so constructed that their straight edges do not meet when

the halves of the pulley are drawn together by their clamping-bolts f , so as to tightly clamp the pulley to the shaft, while when the pulley is to be loose on the shaft the sections of the bushing are constructed to meet before impinging against the shaft, so as not to clamp the pulley to the shaft.

By making the arms of the pulley diamond-shaped in cross-section they are greatly stiffened and they present sharp edges which readily cut the air, while the V-shaped ridges on opposite sides of the arms withstand lateral strains and resist indenting.

By locating the clamping or connecting bolts f at the apexes of the conical hub or between the inner side of the cone-sections and the outer side of the thimble-sections G , as shown in Figs. 6, 7, and 8, the draft of the bolts is brought closely to the surface of the sections, where they are most effectively united.

My improved pulley is made up of small parts or pieces of sheet metal which can be bent or stamped in small inexpensive dies, and the pulley can therefore be produced at small cost. As the hub, rim, and arms are all constructed of sheet metal, the pulley, while possessing great strength, is comparatively light.

While I have herein shown and described my improvements as applied to a pulley, it is obvious that the construction of the hub and the connections between the hub and the arms are applicable to other wheels—such, for instance, as fans or blowers.

I claim as my invention—

1. The combination with a hub, of arms projecting from the hub and provided in their outer ends with transverse notches or recesses, and a transversely-split rim having its sections provided at their meeting ends with inwardly-extending lips which engage in said notches or recesses, substantially as set forth.

2. The combination with a transversely-split rim having its sections provided at their meeting ends with inwardly-extending flanges which are provided in their inner edges with notches or recesses, of arms connecting the hub and the rim and provided at their outer ends with transverse notches which receive the notched portions of said rim-flanges, substantially as set forth.

3. The combination with a hub composed of two hollow conical or concavo-convex sections secured together base to base, of arms provided in their inner ends with V-shaped recesses which receive the peripheral portion of the hub, the portions of each arm which are separated by said recesses bearing against the conical sides of the hub and terminating in flanges which are secured to the hub, substantially as set forth.

4. The combination with a hub composed of two hollow conical sections arranged base to base, of arms provided with longitudinal flanges and having their inner portions divided and secured to opposite sides of the hub

and the inner portions of their flanges secured between the base portions of the conical hub-sections, substantially as set forth.

5 5. The combination with a hub composed of two hollow conical sections arranged base to base, of hollow arms composed of sections provided at their meeting edges with connecting-flanges having their inner ends clamped between said conical hub-sections, substantially as set forth.

10 6. The combination with a hub composed of two hollow conical or concavo-convex sections secured together base to base, of arms extending outwardly from the marginal portion of the hub, substantially as set forth.

15 7. The combination with a rim and a hollow hub composed of conical or concavo-convex sections secured together base to base, of connecting-arms which are hollow throughout their length and which abut at their outer ends against the inner side of the rim, substantially as set forth.

20 8. The combination with a hub composed of two hollow conical or concavo-convex sections secured together base to base, and provided with axial shaft-openings, of a transverse bracing sleeve or thimble bearing against the inner sides of said hub-sections and coinciding with their shaft-openings, substantially as set forth.

25 9. The combination with a hub composed of two hollow conical or concavo-convex sections secured together base to base and provided with axial shaft-openings, of a transverse, axial bracing-sleeve bearing against the inner sides of said hub-sections, and radial bracing webs or partitions extending from the outer side of said sleeve to the surrounding wall of the hollow hub, substantially as set forth.

30 10. A wheel-hub composed of similar conical sections having axial shaft-openings and each provided around the edge of its opening with an inwardly-extending collar or flange,

and a thimble arranged between said conical sections and surrounding said collars or flanges, substantially as set forth.

11. The combination with a wheel-hub composed of two divided conical sections which are provided at their straight edges with inwardly-extending flanges, of a divided thimble arranged axially between said conical sections and having its sections provided at their straight edges with outwardly-extending wings or flanges which bear against the inner side of the flanges of said conical sections, and fastening bolts or rivets passing through the flanges of said hub and thimble sections, substantially as set forth.

12. The combination with a split, hollow wheel-hub composed of similar conical or concavo-convex sections placed base to base and provided with axial shaft-openings, of a bracing-sleeve arranged axially between said sections, and connecting-bolts passing through the adjoining portions of said hub-sections and arranged between the outer side of said sleeve and the inner side of said hub-sections, substantially as set forth.

13. The combination with a wheel-hub composed of divided conical sections placed base to base and provided at their apexes with bolt-holes and shoulders, of a divided thimble arranged axially between said hub-sections and having its sections provided opposite said bolt-holes with external lugs or shoulders, and connecting-bolts passing through the holes of said hub-sections and bearing with their heads and nuts against the shoulders of said hub and thimble sections, substantially as set forth.

Witness my hand this 16th day of October, 1899.

CHARLES H. BICALKY.

Witnesses:

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JNO. J. BONNER.