

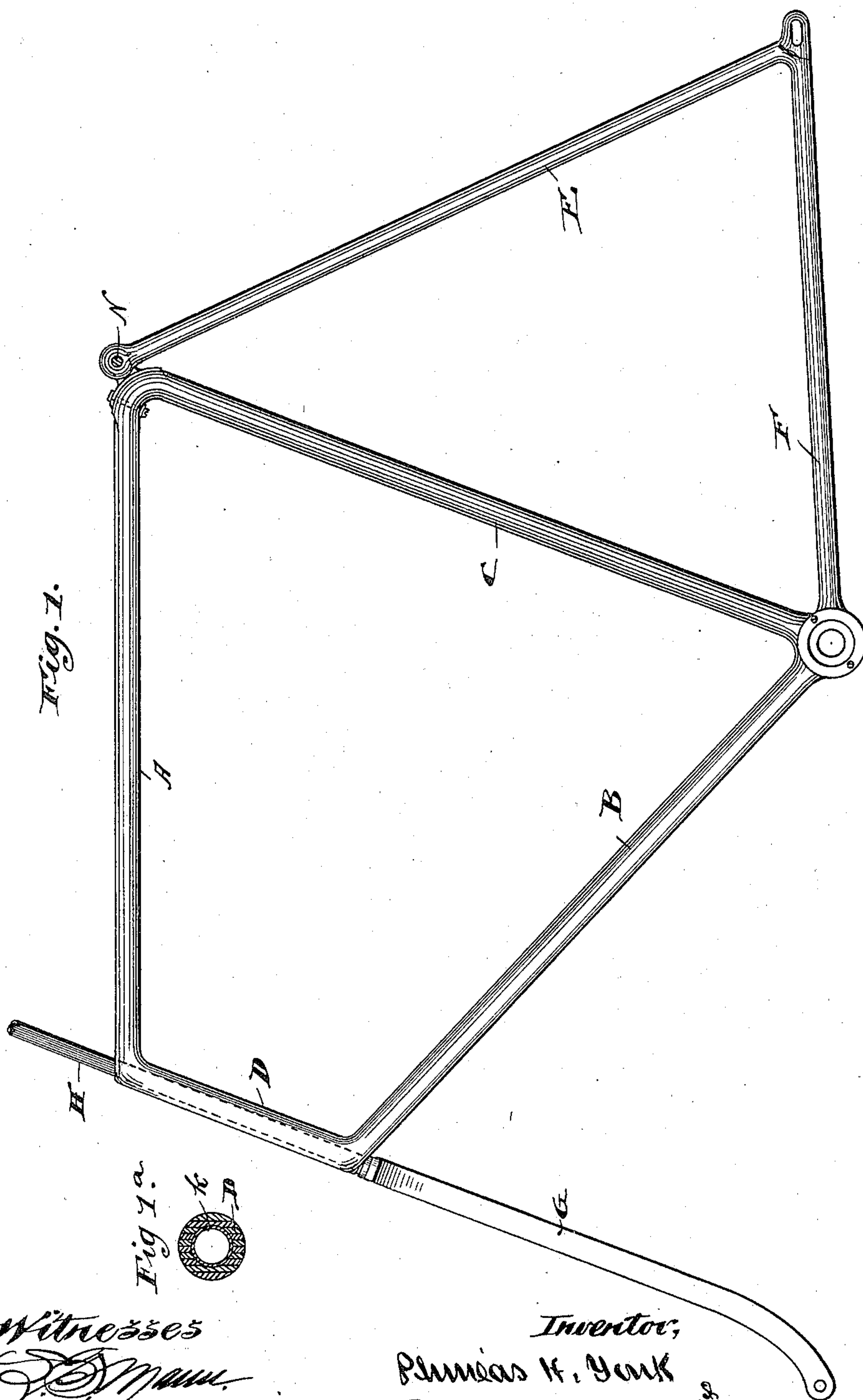
(No Model.)

4 Sheets—Sheet 1.

P. H. YORK.
BICYCLE.

No. 581,973.

Patented May 4, 1897.



Witnesses
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Frederick C. Goodwin

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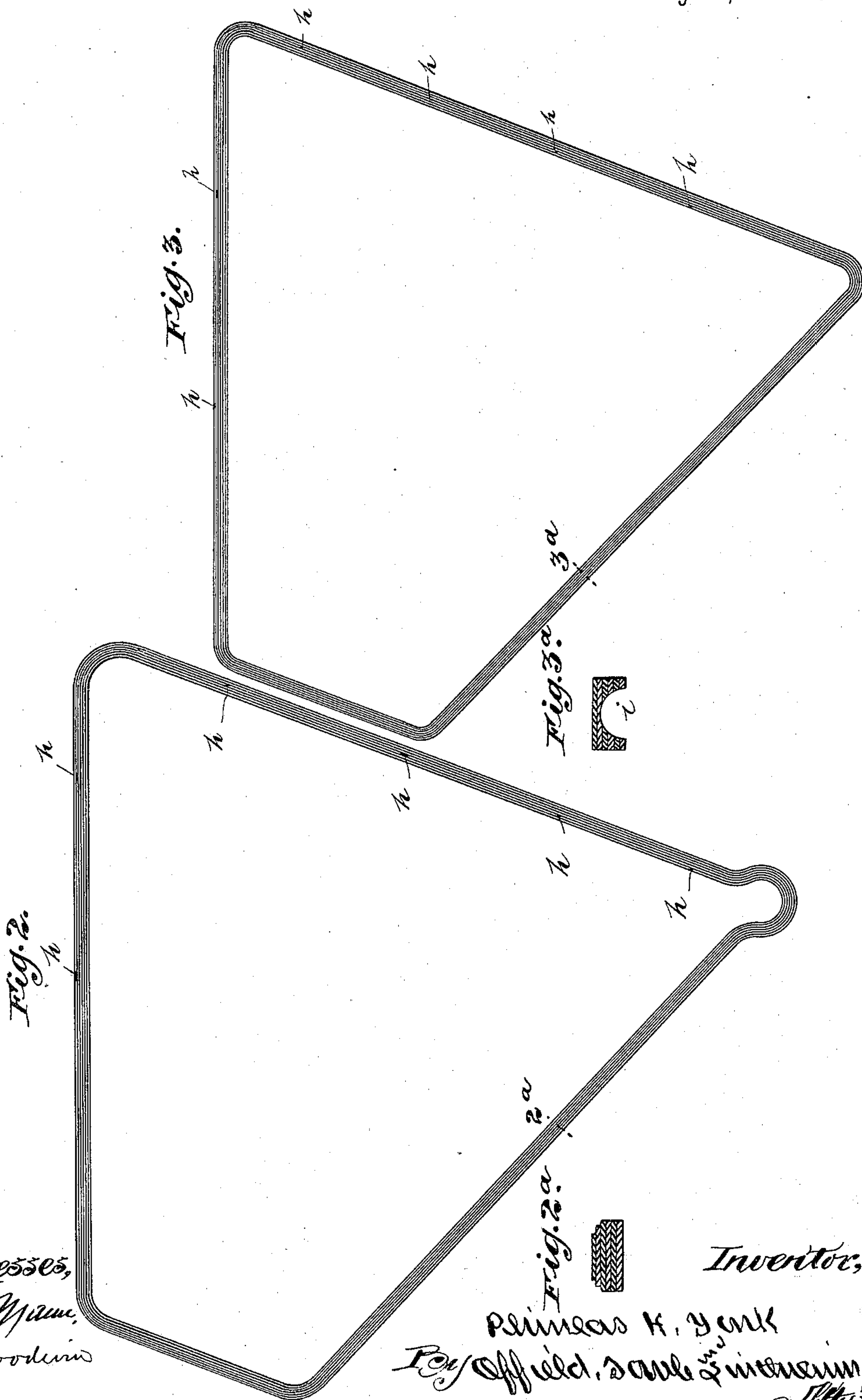
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4 Sheets—Sheet 2.

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4 Sheets—Sheet 3.

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Fig. 4.

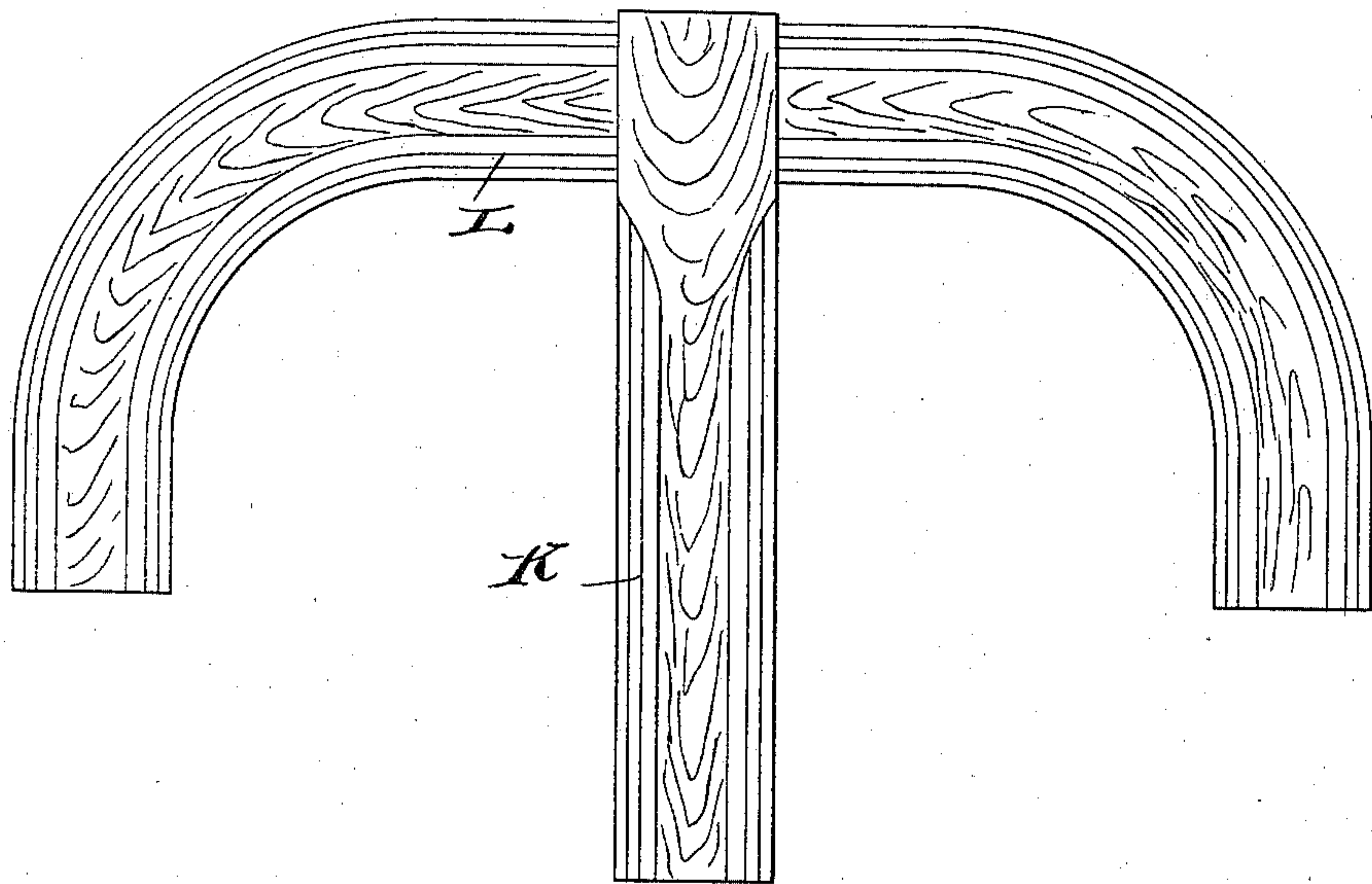


Fig. 5.

Fig. 8.

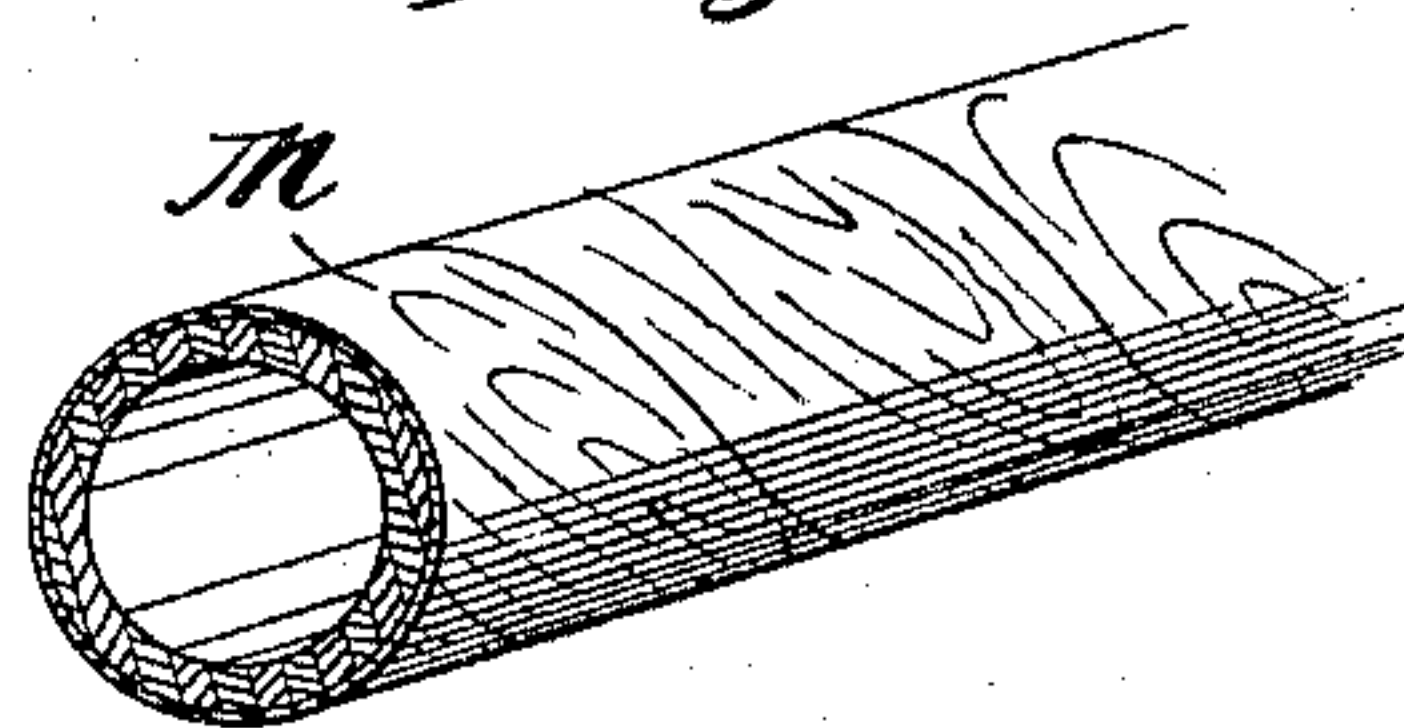
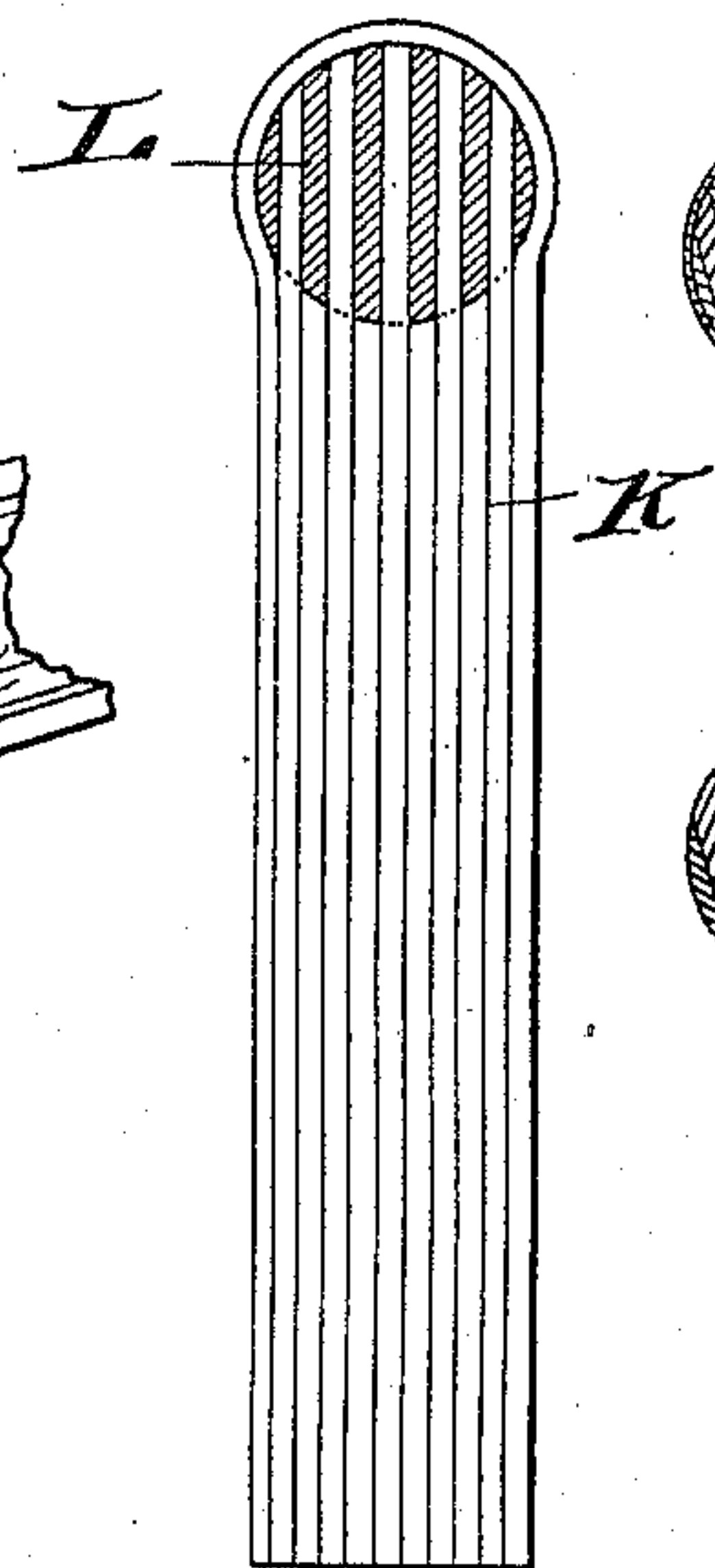
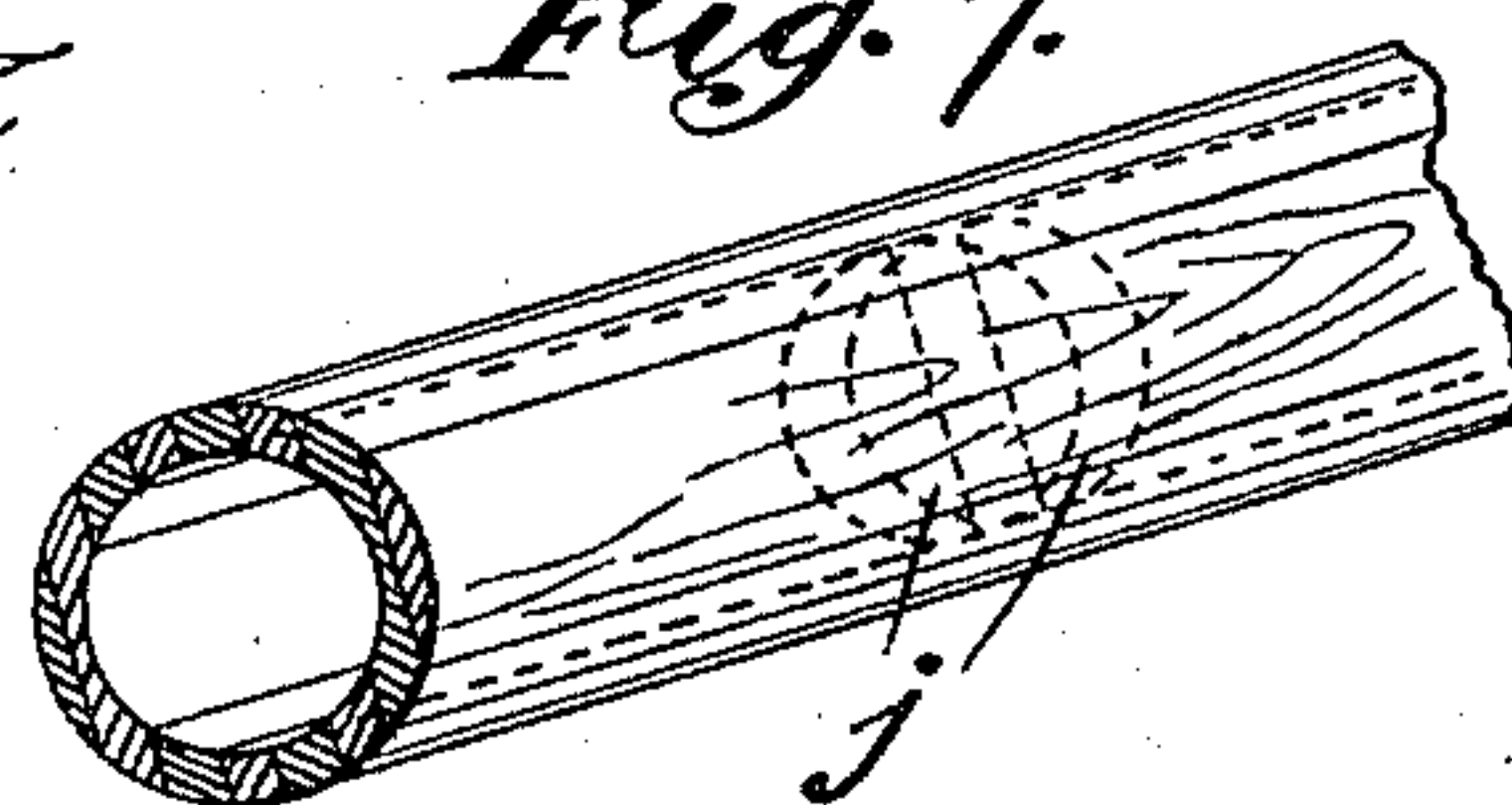
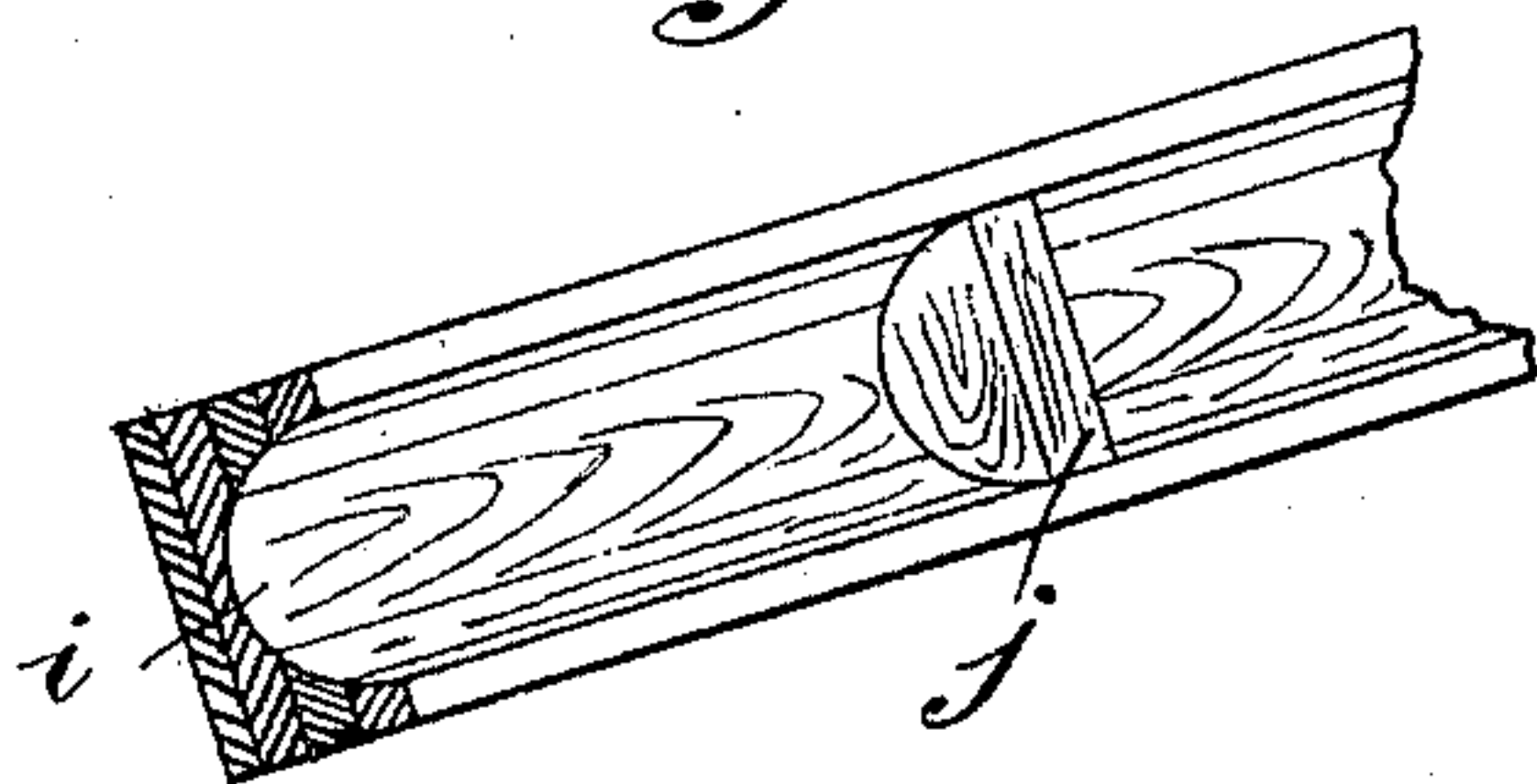


Fig. 6.

Fig. 7.



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4 Sheets—Sheet 4.

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Fig. 10.

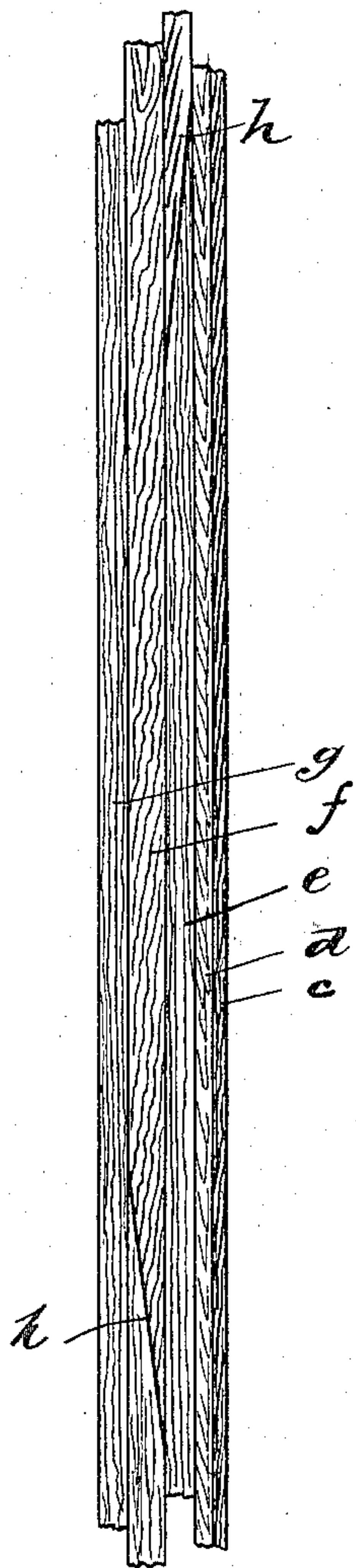


Fig. 9.

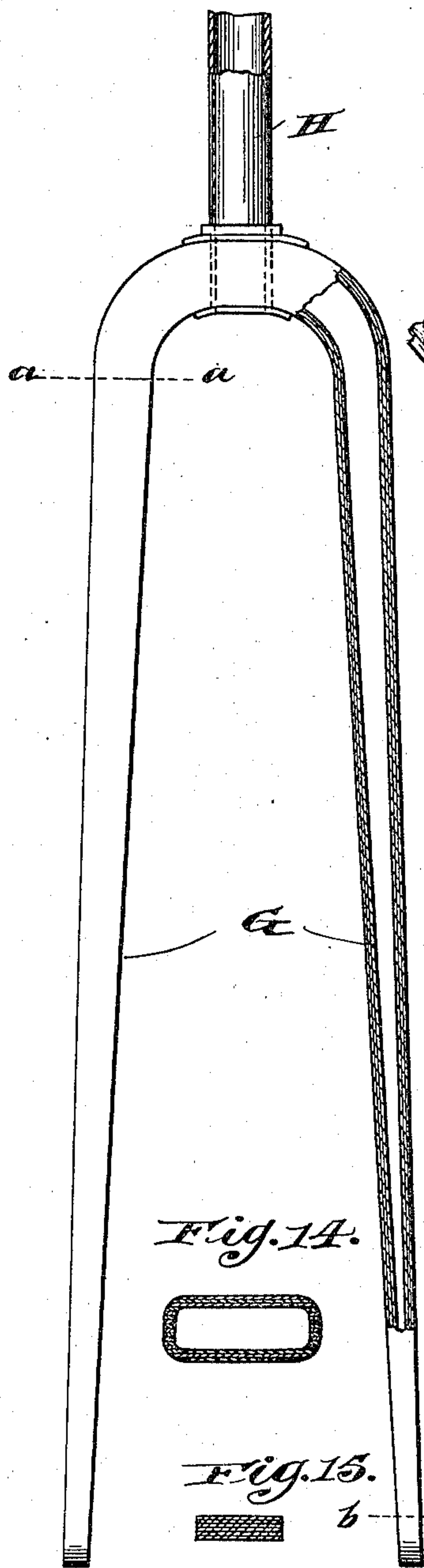


Fig. 11.

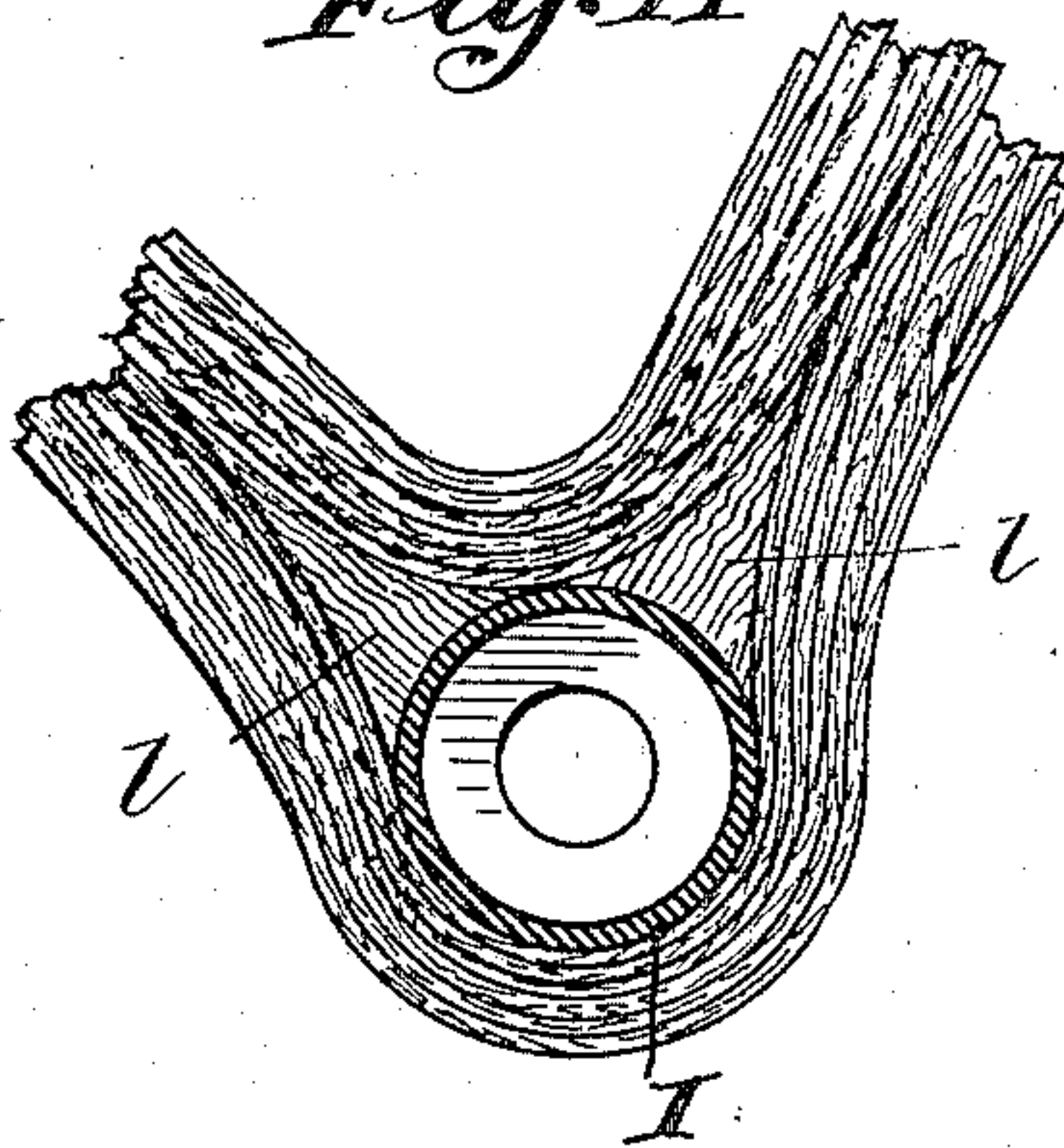


Fig. 12.

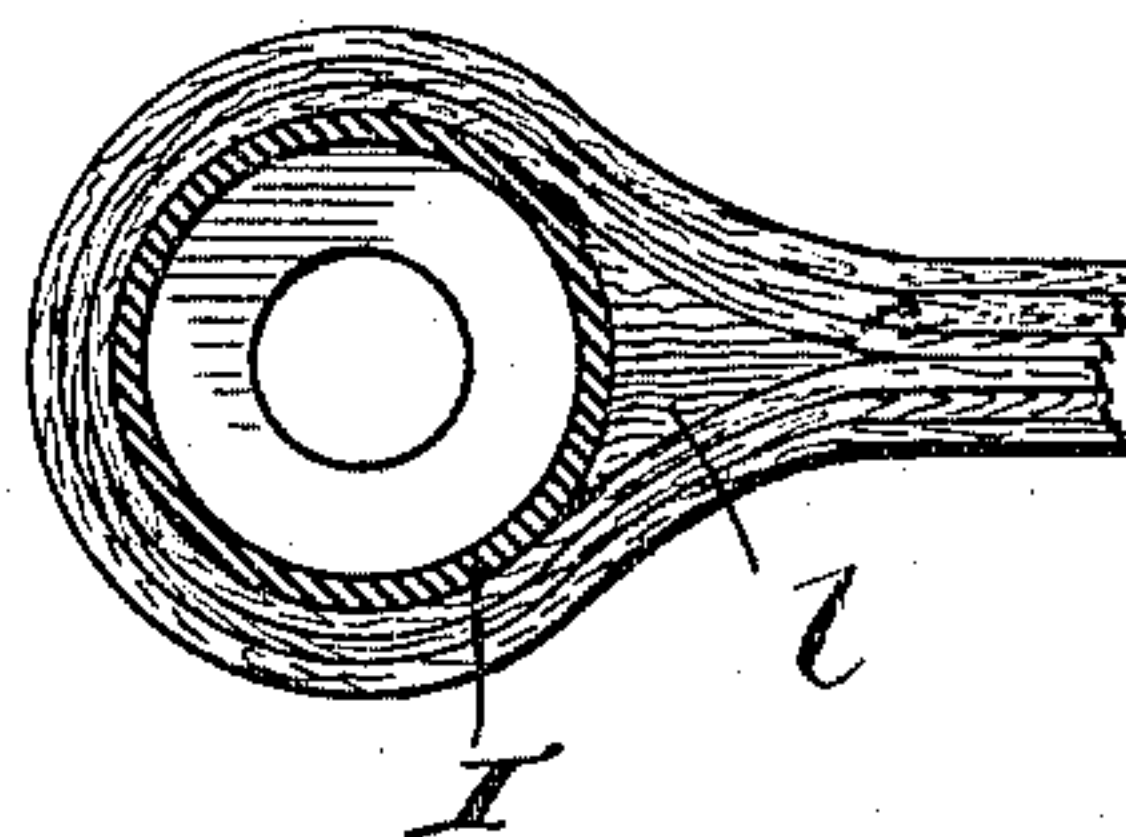


Fig. 14.

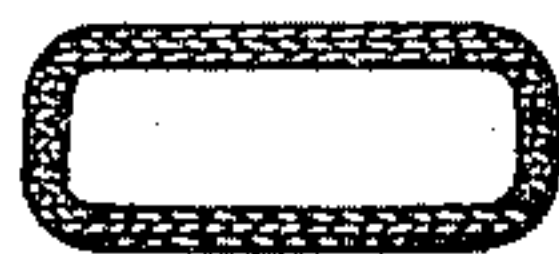
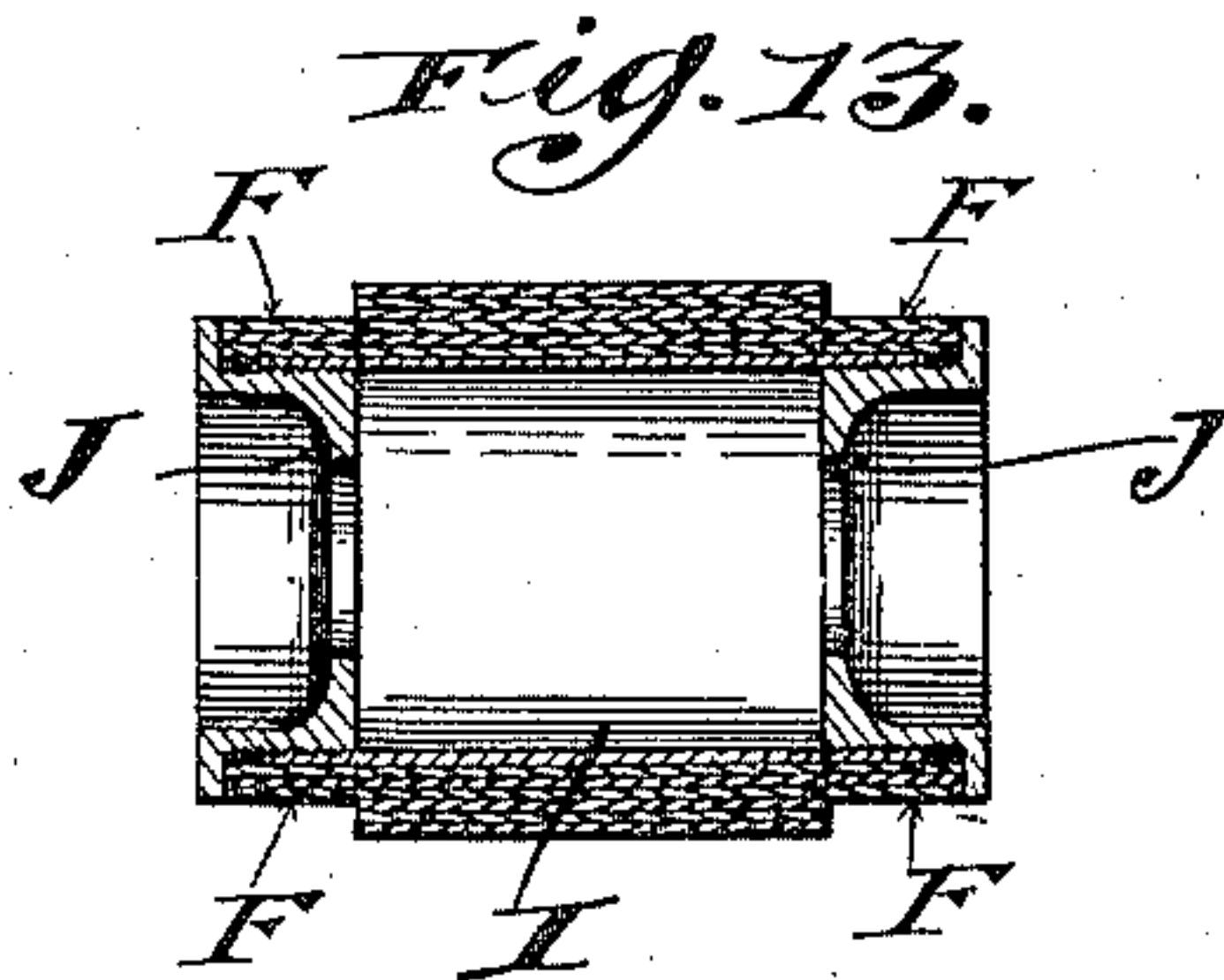


Fig. 15.



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UNITED STATES PATENT OFFICE.

PHINEAS H. YORK, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE TONK MANUFACTURING COMPANY, OF SAME PLACE.

BICYCLE.

SPECIFICATION forming part of Letters Patent No. 581,973, dated May 4, 1897.

Application filed September 9, 1895. Serial No. 561,981. (No model.)

To all whom it may concern:

Be it known that I, PHINEAS H. YORK, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Bicycles, of which the following is a specification.

My invention has for its object to decrease the weight, reduce the cost, to improve the quality, and promote the durability of bicycle-frames.

To this end my invention consists in certain features of construction of a bicycle-frame and of the front fork thereof. I preferably make the several frame members of wood veneers in laminated form and construct certain of the frame members integral which have heretofore been made with joints. I further prefer to make the several frame members hollow.

My invention consists in certain parts and combinations of parts hereinafter described, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a side elevation of a bicycle-frame, front fork, and steering-post, the latter broken away. Fig. 1^a is a sectional detail through the steering-head post. Figs. 2 and 3 are elevations of the two parts of the main frame separated from each other and showing an intermediate stage of the construction. Fig. 2^a is a sectional detail on the line 2^a of Fig. 2. Fig. 3^a is a sectional detail on the line 3^a of Fig. 3. Fig. 4 is an elevation of the handle-bar and handle-bar post. Fig. 5 is a cross-section through the handle-bar, showing the post in side elevation. Fig. 6 is a perspective view showing a broken section of one-half of one of the frame members with a portion of a strengthening-block therein. Fig. 7 is a similar view showing a broken section of a tubular frame member, the spacing-block complete being indicated by dotted lines. Fig. 8 is a perspective view showing a tubular frame member having an exterior spiral covering of veneer. Fig. 9 is a front elevation, partly in section and partly broken away, of the front fork, showing a tubular laminated construction of the former. Fig. 10 is an elevation showing the laminated stock and the manner of joining the ends of the veneer strips. Fig. 11 is an elevation of the knee or

bend of the main frame, showing a section of the sleeve and one of the cups of the crank-bearing. Fig. 12 is a similar view of one of the rear-fork members and showing the sleeve and one of the cups, as in the former figure. Fig. 13 is a longitudinal section through the sleeve and cups, showing the knee or lower rear angle of the main frame and extremities of the rear-fork members in section. Fig. 14 is a section through one of the fork members on the line *a a*, and Fig. 15 a similar section on the line *b b*.

In the drawings, A represents the top bar; B, the bottom bar; C, the seat-post bar, and D the steering-head post of a bicycle-frame of the ordinary diamond form.

E represents one of the rear-fork members, and F one of the bottom braces for the rear fork, it being understood, of course, that two of each of the parts E F are employed in the frame, as usual.

G represents the front fork, and H the steering-head, the latter being a metal tube.

In constructing the frame members I employ a number of strips of wood, which may be in the form of veneers, such as *c, d, e, f*, and *g*. These strips are of sufficient length so that they may be bent into the forms shown in Figs. 2 and 3, the joints being formed as shown in Fig. 10 and located as indicated at *h* in Figs. 2 and 3. When bent up into these forms, a cross-section thereof would be a rectangle, regular except as the outer layers of the veneer might vary slightly in width or in contour, as shown in detail Fig. 2^a. The main portion of the frame is thus constructed of two members. (Shown in Figs. 2 and 3, that shown in Fig. 3 being of sufficiently reduced size to fit accurately within the part shown in Fig. 2.) The part shown in Fig. 2 after being bent to the desired form is then routed out on its inner side, as shown in Fig. 3^a, so as to form a semicylindric cavity, while the part shown in Fig. 3 is routed out or grooved longitudinally on its outer side to form also a semicylindric cavity. When the part shown in Fig. 3 is fitted within that shown in Fig. 2, the cavities of the respective parts are joined to form a tubular chamber. Previous to fitting the members together, however, the cavities of each are provided at suitable intervals with semicylindric blocks

j, (shown in Fig. 6,) so that when the parts are joined they produce a cylindric block or disk, as indicated by dotted lines in Fig. 7. This frame, formed by the union of the two parts shown in said figures, is then finished by turning it off into the desired form, the cylindrical being preferred, and the steering-head post D is bored for the reception of the steering-head H, this longitudinal bore being provided with a bushing or lining *k*, as shown in the detail Fig. 1^a.

In order to provide a bearing for the crank-shaft, the knee or lower rear angle of the main frame is provided with a metal tube or lining I, as shown in Figs. 11, 12, and 13, and this tube is threaded interiorly at its ends to receive the cups J, which form part of the ball-bearings.

It will be observed that at its lower rear angle the member shown in Fig. 2 of the drawings is deflected to form a seat for the said bushing, and by reference to Fig. 11 it will be seen that the inner part has a gradual curve, thus leaving space for the bushing, the intermediate triangular spaces being closed by the filling-blocks *l*.

The front fork G is formed of wood veneers and may be made in two parts, one fitting within the other and hollowed in their proximate sides through the main portion of their length, the veneers being closed on each other toward the extremities of the parts, as seen in Fig. 15. The strips are continuous around the angle or bend of the fork, and therefore the crown and tines of the fork are integral. The outer and inner members or parts of this front fork may be formed similarly to the parts of the main frame, and hence their method of construction will require no further description.

My improved bicycle-fork is in itself sufficiently rigid to sustain the weight of the rider and to prevent undue swaying or lateral vibration and is at the same time sufficiently elastic, by reason of the material of which it is composed, to take up, cushion, or dissipate the shocks due to the passing of the front wheel over obstructions. It is well known that the vibrations caused by the passing of the front wheel over obstructions are communicated through the steering-head post and handle-bar to the hands and arms of the rider, producing disagreeable sensations which cause the rider involuntarily to more tightly grasp the handles, and this in turn produces a benumbing of the fingers and wrists. These tremors or vibrations, as well as more violent shocks or jars, are minimized by the employment of my improved fork.

The steering-head H will be secured to the front fork in any appropriate manner and will receive in its upper end a handle-bar post K, which is preferably made of veneer. The handle-bar is also made up of veneer and may have a longitudinal cavity or chamber, according to the method of construction previously described, but, as shown in Fig. 5, the

veneers of the handle-bar L alternate with those of the handle-bar post.

In order to further increase the strength of the construction, I may wind a layer of veneer, as M, spirally about the several hollow frame members. The rear-fork members E and F, if constructed integrally, may also be made up of veneer, the length of the pieces being sufficient to permit them to be turned around the bearing, as seen in Fig. 12, and to form a loop for the reception of a clamp-bolt N, as seen at the upper apex of the frame. Said rear forks could be made hollow if metal tips were applied at the junction of the members E F and at the upper extremity of the member E, and the method of construction in such case would be the same as in the making of the main frame members.

I prefer in building up the frame members to employ second-growth hickory as the material and to arrange the several layers so that the grain of the wood shall cross. I also prefer to make the main frame integral, or without joints at the angles, as by this means the strength of the frame is greatly increased. The purpose of making the several members hollow is of course to reduce the weight, the tubular construction being strong.

An important advantage accruing from the employment of wood in the construction of the bicycle-frame is in the elastic quality which is imparted to the structure. The frame may be made strong enough for all practical purposes and can with equal size of the parts be made as strong as metal tubing, but metal tubing has practically no elasticity, while the wooden frame will yield to vertical strains caused by riding over uneven surfaces, and when the strain is removed will regain its original form or shape. When a metal frame yields to vertical strain, it is likely to be permanently distorted, and when the tubes attain what is known as a "set," or become sprung, they cannot be brought back to their original shape without disconnecting and straightening the several parts.

While I do not wish to be understood as limiting my invention to exact details or modes of construction, still some of the features of the construction, and particularly in the manner of uniting the two parts of an integral frame by a longitudinal joint, form an element of my invention.

It may be found expedient to form the cavities in the proximate faces of the mating sections of the frame members at intervals only, and it is recommended that the formation of these cavities be omitted at the angles of the frame. The construction of the frame of two mating parts enables the bending of the frame upon the appropriate curves or short bends, whereas it would be impracticable to bend a frame constructed from a single stock of wood, whether in one piece or laminated.

A further advantage of the construction of the frame of two mating parts, one adapted to fit within the other, resides in the fact that

there are no joints in the line of greatest strain—i. e., vertically. The importance of this provision is well understood, and to attain it bicycle-frames have heretofore been constructed of seamless tubes, although in some instances it has been proposed to construct a frame of metal tubing made from dished plates and when united presenting a vertical joint. The last-named construction is very objectionable, not only on account of the weakness of the structure, due to the character of the joint, but also on account of the inherent weakness of a jointed metallic tube. On the contrary, it has been demonstrated that a wooden frame constructed in accordance with my invention has no such inherent weakness and is as strong at the joint as at any other place.

The foregoing description is intended to set forth the preferred construction of the several parts, but obviously the specified details of construction may be varied. The two mating parts of the frame members are hollowed out in order to reduce the weight of the frame, and for certain uses this tubular construction is preferable; but this provision may be dispensed with and a stronger and cheaper frame secured at the expense of a slight increase in weight. The mating parts of the frame members are each preferably made of a plurality of strips, but obviously each of these parts may be made of a single strip of wood bent to form, and the two parts when united constitute a continuous laminated frame, the sides of which are integral.

While I prefer to make the frame of two mating parts separately formed, it is within the scope of my invention to make the principal frame members—viz., the steering-head post, top and bottom bar, and seat-post or rear upright—of veneers of wood laminated and the laminations extending around the angles of the frame. Obviously this may be done by using a single form and building up the laminated frame as a whole instead of forming two mating parts separately and then uniting them. In the modified construction above described each strip of wood is of course separately bent.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is as follows:

1. A bicycle-frame member of polygonal form having two mating parts adapted to fit the one within the other, and each composed of laminated strips of wood bent to form the polygonal frame member, the sides of which are continuous, and said parts being hollowed upon their proximate sides and providing when united, a longitudinal cavity, substantially as described.

2. A bicycle-frame member of polygonal form, consisting of two mating parts adapted to fit the one within the other and each composed of laminated strips of wood and said parts being hollowed on their proximate sides, strengthening pieces or blocks located in said

hollow portions, and the parts when united forming a continuous polygonal frame member with longitudinal cavities, substantially as described.

3. A bicycle-frame member of polygonal form consisting of two mating parts adapted to fit the one within the other and each composed of wood veneers laminated and united to form a polygonal frame member, the sides whereof are continuous and integral, and an external veneer spirally wound around the frame members, substantially as described.

4. A bicycle-frame member composed of two mating parts, one of which is adapted to be fitted within the other, and each composed of laminated strips of wood or wood veneers hollowed on their proximate sides and the two when joined, constituting the steering-head post, top and bottom bars and a seat-post, which are continuous and integral, substantially as described.

5. In a bicycle-frame, a steering-head post, top bar, bottom bar and seat-post formed of strips of wood laminated and the laminations being continuous around the angles of the frame, substantially as described.

6. A bicycle-frame whereof the steering-head post, the top and bottom bars and the seat-post are constructed integrally with each other from strips of wood laminated and the laminations extending continuously around the angles, and the joints thereof being arranged between the angles, substantially as described.

7. A bicycle-frame whereof the steering-head post, top and bottom bars and seat-post are constructed integrally with each other from strips of wood laminated and the laminations being continuous around the angles of the frame and provided with suitable bearings and with a longitudinal cavity, substantially as described.

8. A bicycle-frame whereof the steering-head post, the top and bottom bars and seat-post are constructed integrally with each other from wood veneers, the laminations whereof are continuous around the angles of the frame and said frame having at its lower rear apex a bushing embraced by the laminations, substantially as described.

9. A fork for bicycles composed of strips of wood laminated and the laminations being continuous or integral around the bends or angles of the fork, substantially as described.

10. In a bicycle-frame constructed of wood veneers, the combination of the main frame having a bushing to provide a bearing for the crank-axle and rear-fork members through which the bushing also extends and said bushing being threaded, and cups having a threaded engagement with the bushing and adapted to clamp the parts together, substantially as described.

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