

(No Model.)

B. F. ROUNDS.
ARTIFICIAL LIMB.

No. 567,774.

Patented Sept. 15, 1896.

Fig. 1.

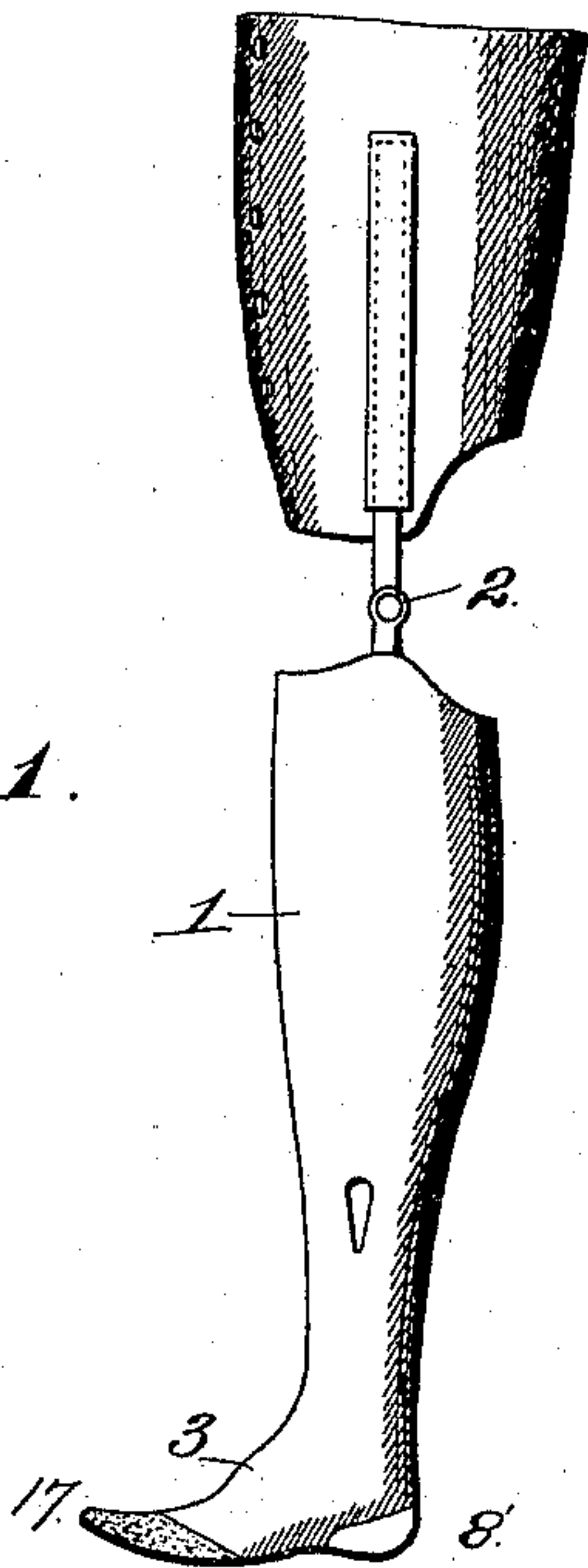


Fig. 2.

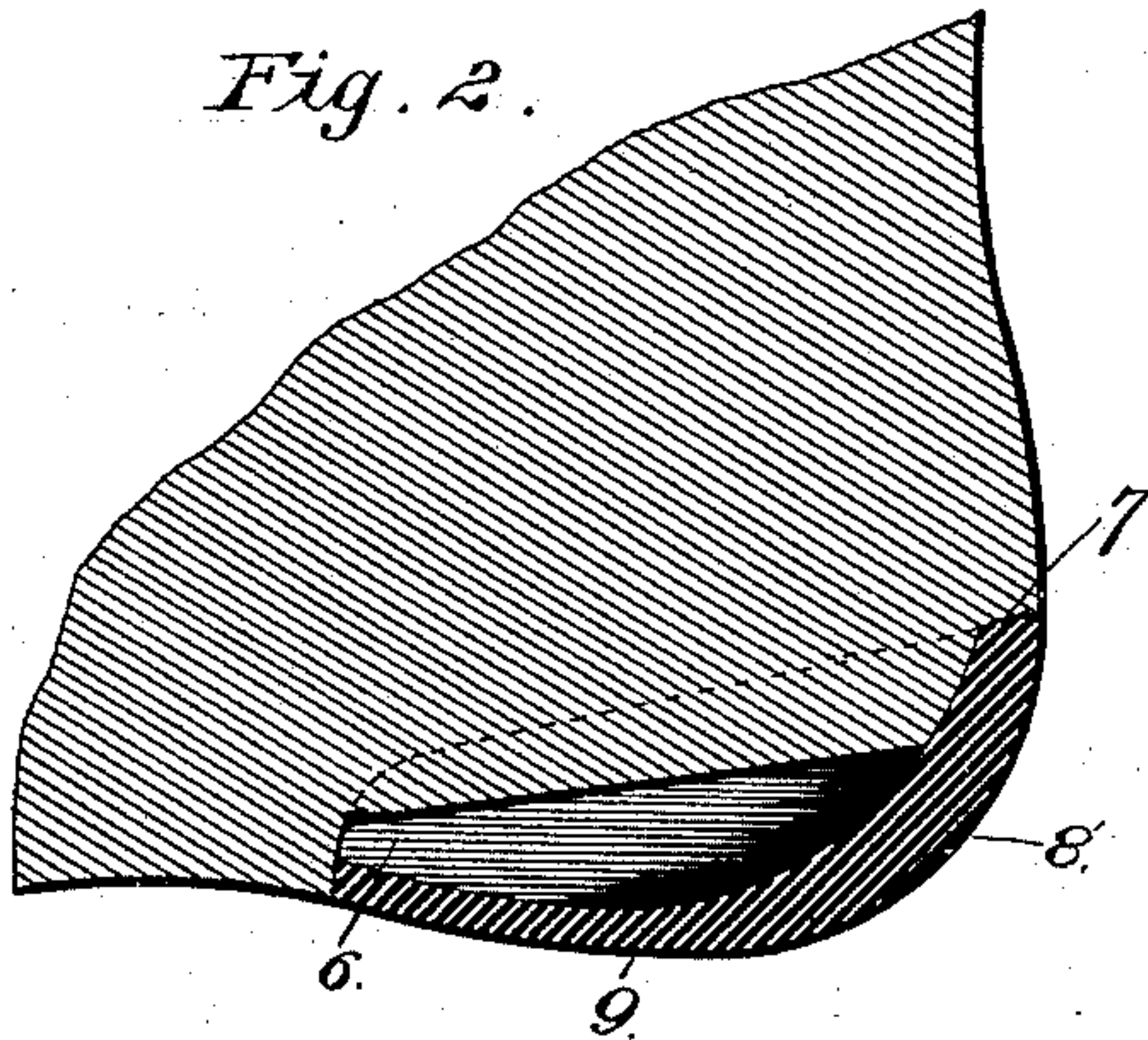


Fig. 3.

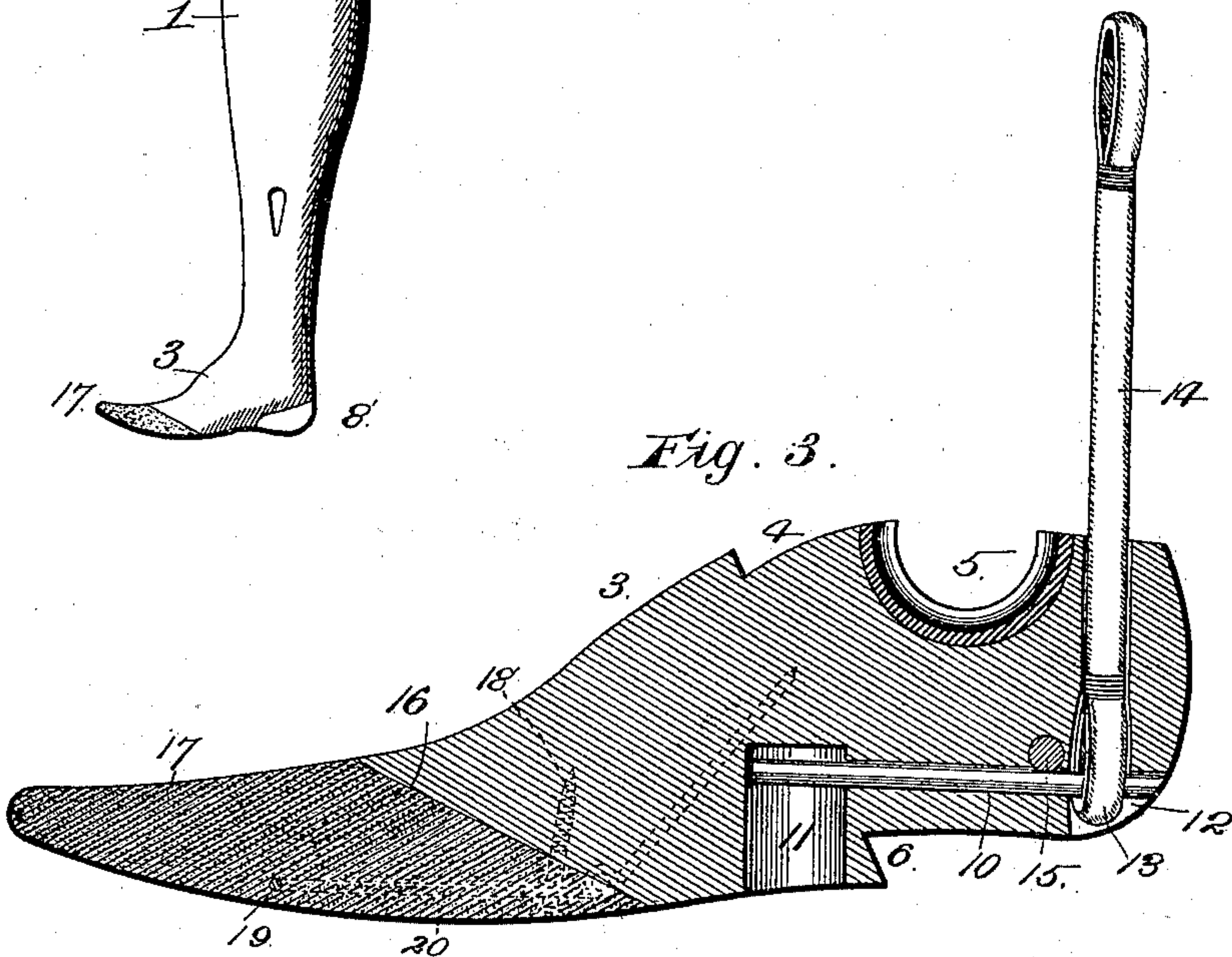
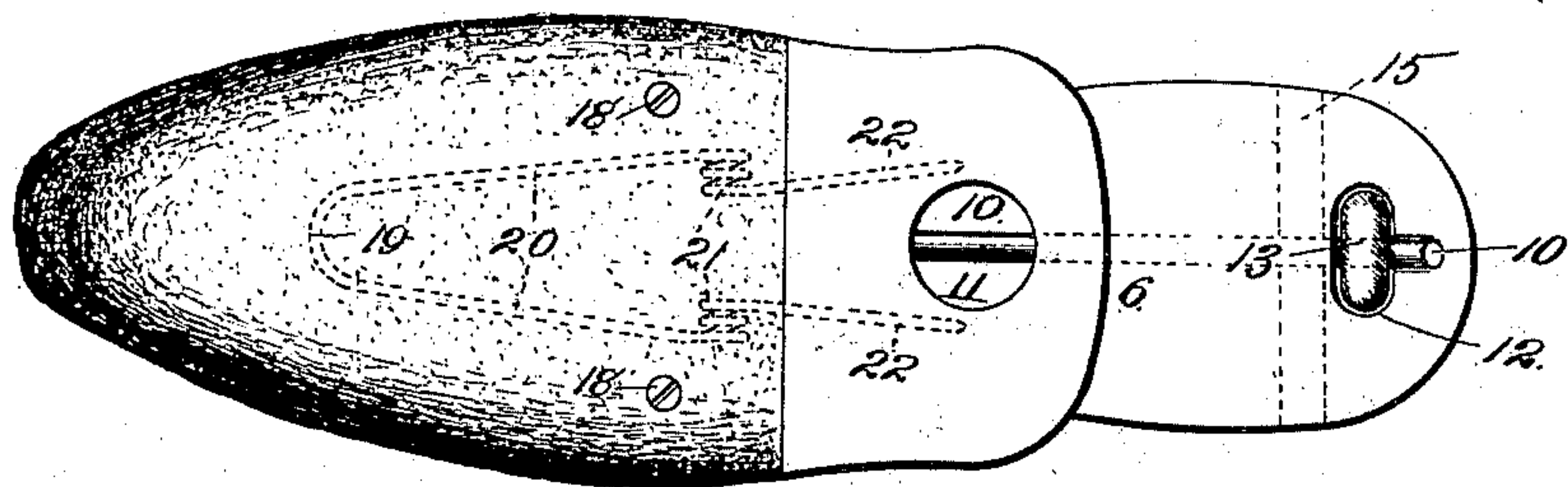


Fig. 4.



WITNESSES:

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UNITED STATES PATENT OFFICE.

BENJAMIN F. ROUNDS, OF KANSAS CITY, MISSOURI.

ARTIFICIAL LIMB.

SPECIFICATION forming part of Letters Patent No. 567,774, dated September 15, 1896.

Application filed March 4, 1896. Serial No. 581,848. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN F. ROUNDS, of Kansas City, Jackson county, Missouri, have invented certain new and useful Improvements in Artificial Limbs, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part thereof.

My invention relates to artificial feet, and its prime object is to produce an artificial foot provided with a flexible front portion which will act under all circumstances precisely like the natural foot at such point, that is, will yield at the point commonly known as the "ball" of the foot under the pressure applied in the action of the foot immediately preceding the taking of a step; and to this end principally the invention consists in certain peculiar and novel features of construction and arrangement of parts, as will be hereinafter described, and pointed out in the claims hereto annexed.

In order that the invention may be fully understood, I will proceed to describe it with reference to the accompanying drawings, in which—

Figure 1 represents in side elevation an artificial limb provided with a foot portion embodying my invention. Fig. 2 represents, on an enlarged scale, a vertical section of the heel portion of the same. Fig. 3 represents, also on a large scale, a vertical longitudinal section of a foot constructed in accordance with my invention. Fig. 4 represents an inverted plan view of the same.

In the said drawings, 1 designates an artificial limb, comprising an upper and a lower portion connected by a hinge or knee joint 2, as shown, or in any other suitable manner. The construction or configuration of said limb is immaterial in this connection, as my present invention contemplates an improvement only in the foot portion 3 of the limb. Said foot portion may be formed rigid with the limb, as shown in Fig. 1, or may be jointed to the same flexibly by an ankle-joint. For this purpose it will be recessed or cut away, as shown at 4, and provided with a semicircular cavity 5, wherein corresponding projections (not shown) on the lower end of the limb will fit. This construction, however, is old in the art and is immaterial.

The heel is cut away at its under side, as shown at 6, and is also grooved, as shown at 7, said groove following the contour of the heel to the front end of the cut-away portion 6, and secured rigidly in said groove at said margin, and bearing at its front end against the abrupt wall at the front end of the cut-away portion is a segmental heel 8, of rubber or any other suitable or equivalent material, said heel portion 8 being thus secured in order to provide the interposed chamber 9, and consequently a pneumatic heel. This heel is used, preferably, only in connection with a foot formed rigidly with the lower limb.

Referring now to Figs. 3 and 4, which illustrate a foot to be flexibly joined to the lower limb, 10 designates a metallic rod which extends longitudinally and centrally of the foot just above the recess 6. At its front end it protrudes into the upper end of a cavity or hole 11, formed in the bottom of the foot. The portion of the foot now referred to, as will be understood, is of wood or equivalent material. The rear end of the rod 10 projects into a recess 12, and engaging said rod and said recess is the lower looped end of a flexible cord 14, which extends through the foot and projects upwardly into and is connected to the lower limb (not shown) in the customary manner, so as to bind said foot firmly to the limb and yet at the same time permit of the necessary independent movement between these parts. As the strain of the pin 10 upon the foot would soon injuriously affect its operation by wearing the same away, owing to the fact that it is usually constructed of soft wood, I provide the cross-pin 15 as a contact-point for the rod 10, and said cross-pin is preferably of hard wood.

The wood portion of the foot at a point coincident with the front end of the instep is beveled upwardly and forwardly, so as to form the comparatively large downwardly-disposed bearing surface or shoulder 16, and the front portion 17 of the foot, which is of felt or rubber or any other suitable material, is correspondingly beveled and fits squarely against such bearing-surface 16 and is connected positively to the wood portion of the foot by means of the screws 18, which preferably are arranged near its rear end. In order to hold said front portion against the

front end of said inclined bearing-surface with a yielding pressure, I provide a spring constructed as follows: A spring-metal wire rod is bent at its middle, as at 19, to approximately V-form, to provide the rearwardly-diverging arms 20. Such arms at suitable points are then bent to form the coils 21 and the rearwardly and upwardly projecting arms 22, thus providing a stiff hinge-joint between the arms 22 and the V-shaped arm. The front or free end of this spring is embedded in a suitable manner in the flexible or front portion of the foot and is so arranged that its hinge-points 21 are coincident with the joint of said portion with the wood portion of the foot and with its arms 22 extending upwardly into said wood portion, as shown most clearly in Fig. 3.

By this construction it is apparent that as the foot is raised previous to taking a step the weight is transferred gradually from the rear toward the front end of the flexible front portion, which yields and bends to accommodate this movement in about the same manner as the corresponding portion of the natural foot, as will be clearly seen.

When the foot illustrated in Fig. 3 is employed, the whole ankle portion of the foot and the lower end of the limb to which it is connected is incased in a rubber ankle to make this connection additionally secure, and such rubber ankle customarily forms a yielding heel portion to engage the recessed or cut-away portion 6. This construction, however, is also old in the art, and for that reason is not herein illustrated.

To facilitate the removal of the pin 10, I have provided the cavity 11, into which may be inserted a screw-driver or other sharp instrument, which may be forced wedge-like between the front end of the pin and the wall of said recess, and fulcrumed at the lower end of the same, in order to force the pin longitudinally to the rear. It may then be easily removed and the foot quickly detached from the limb.

From the above description it will be apparent that I have produced an artificial foot which possesses the desirable features enumerated as the object of the invention, and also a simple means for attachment of the lower end of the cord 14.

It will also be apparent that I have produced a foot that is comparatively inexpensive and is simple and durable of construction.

Having thus described the invention, what I claim as new, and desire to secure by Letters Patent, is—

1. An artificial foot, comprising a rear portion of wood, having a downwardly and forwardly disposed beveled or inclined surface 16 at its front end, a front portion of flexible material having an upwardly and rearwardly disposed beveled or inclined surface at its rear end which corresponds to and fits squarely against said beveled surface 16 of the wood portion, screws 18, extending upwardly through the flexible portion and into the wood portion so as to bind the two firmly and reliably together, and a spring comprising a forwardly-projecting arm which is embedded in the flexible portion, and rearwardly-projecting arms which project into the wood portion and having the hinge or junction point of said arms coincident with said meeting beveled surfaces, substantially as shown and described.

2. In an artificial foot, a longitudinally-extending metallic pin protruding into an opening at its front end and into a recess at its rear end of the wood portion, a flexible cord extending down through the heel portion of the foot and attached to said pin, and a cross-pin of hard wood to form a bearing for said longitudinal pin, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

BENJAMIN F. ROUNDS.

Witnesses:

A. M. PERKINS,
G. W. PORTER.