

No. 630,220.

Patented Aug. 1, 1899.

C. J. W. HAYES.
TRIPOD.

(Application filed Apr. 21, 1899.)

(No Model.)

Fig. 7

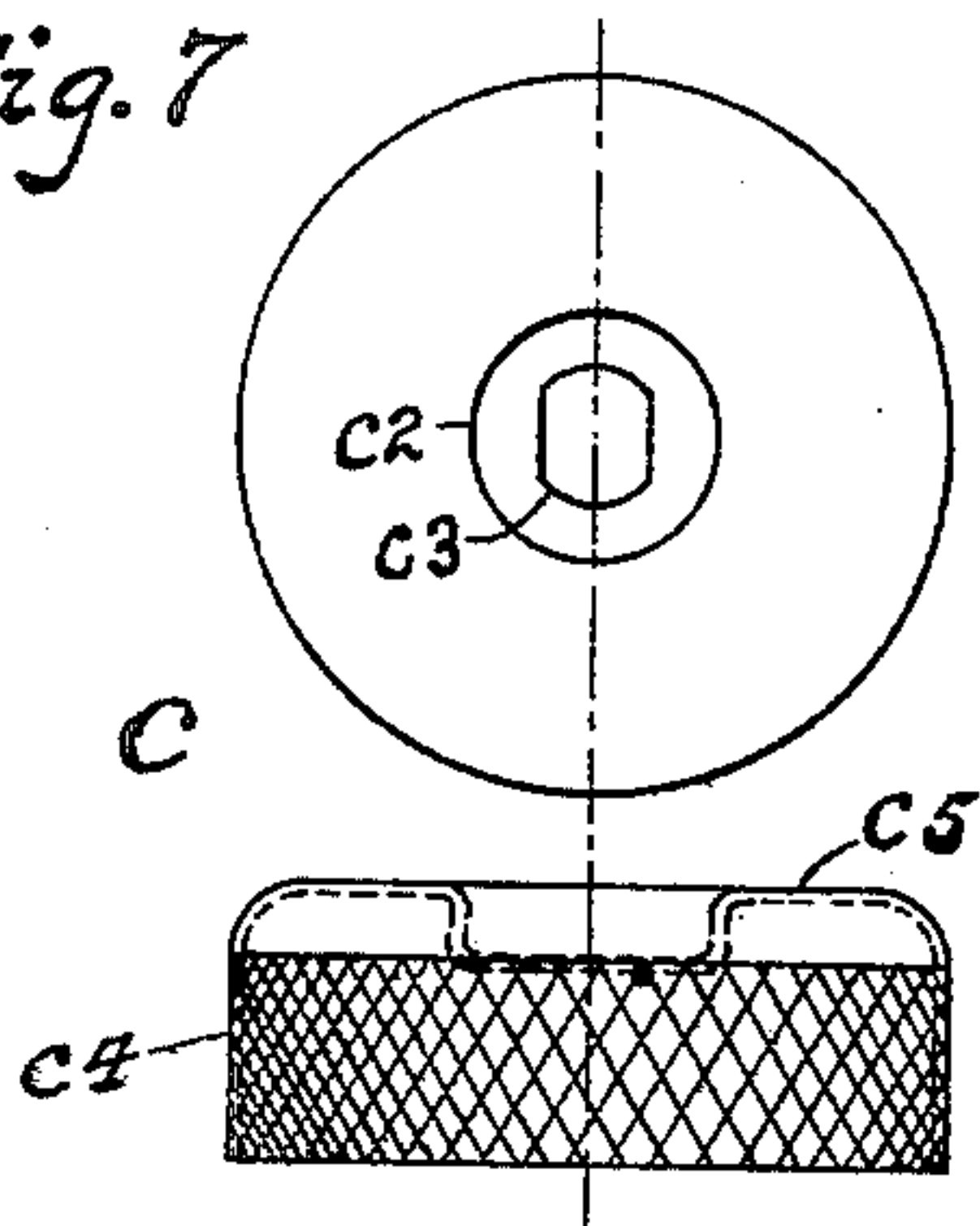


Fig. 8

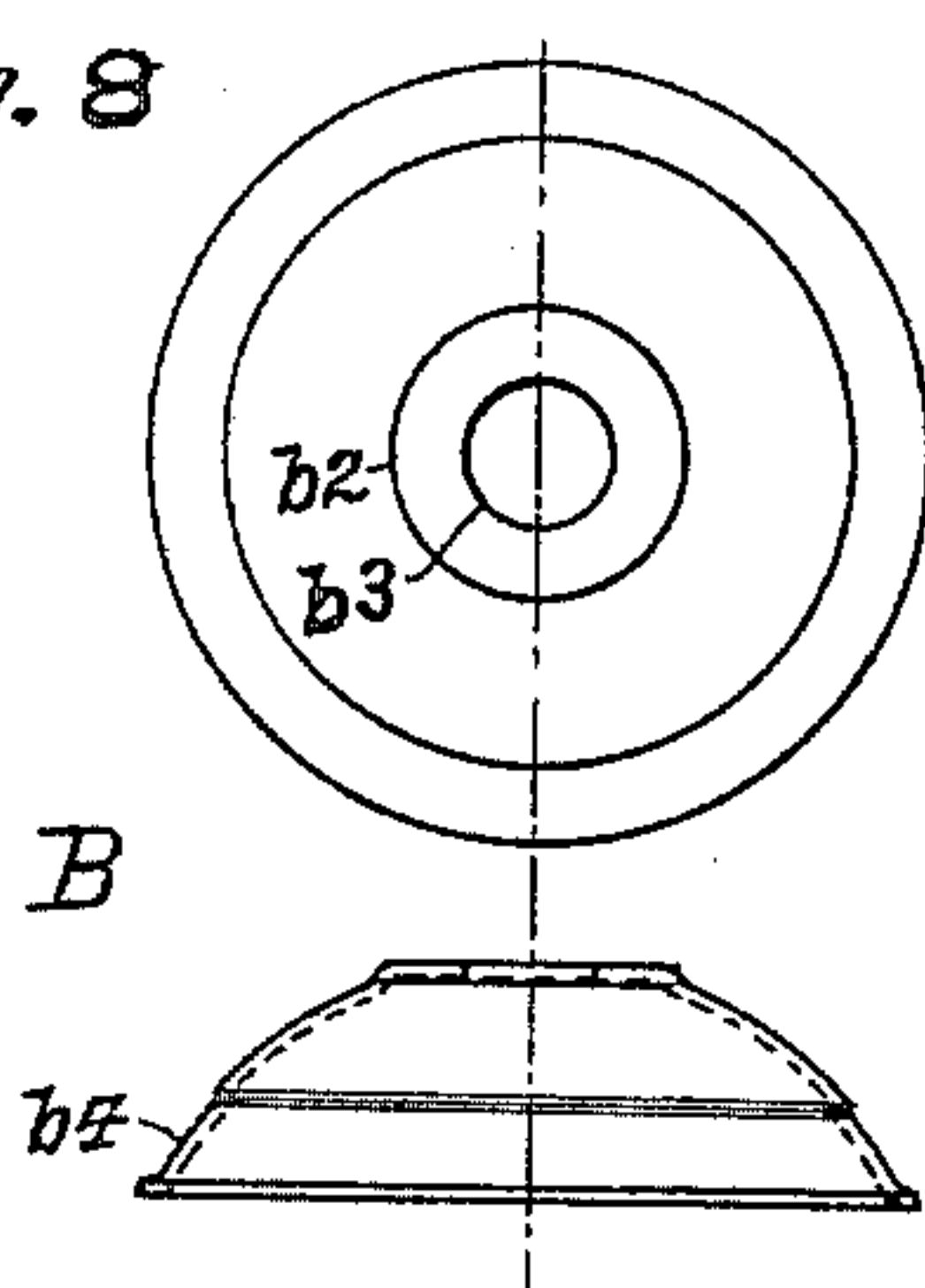
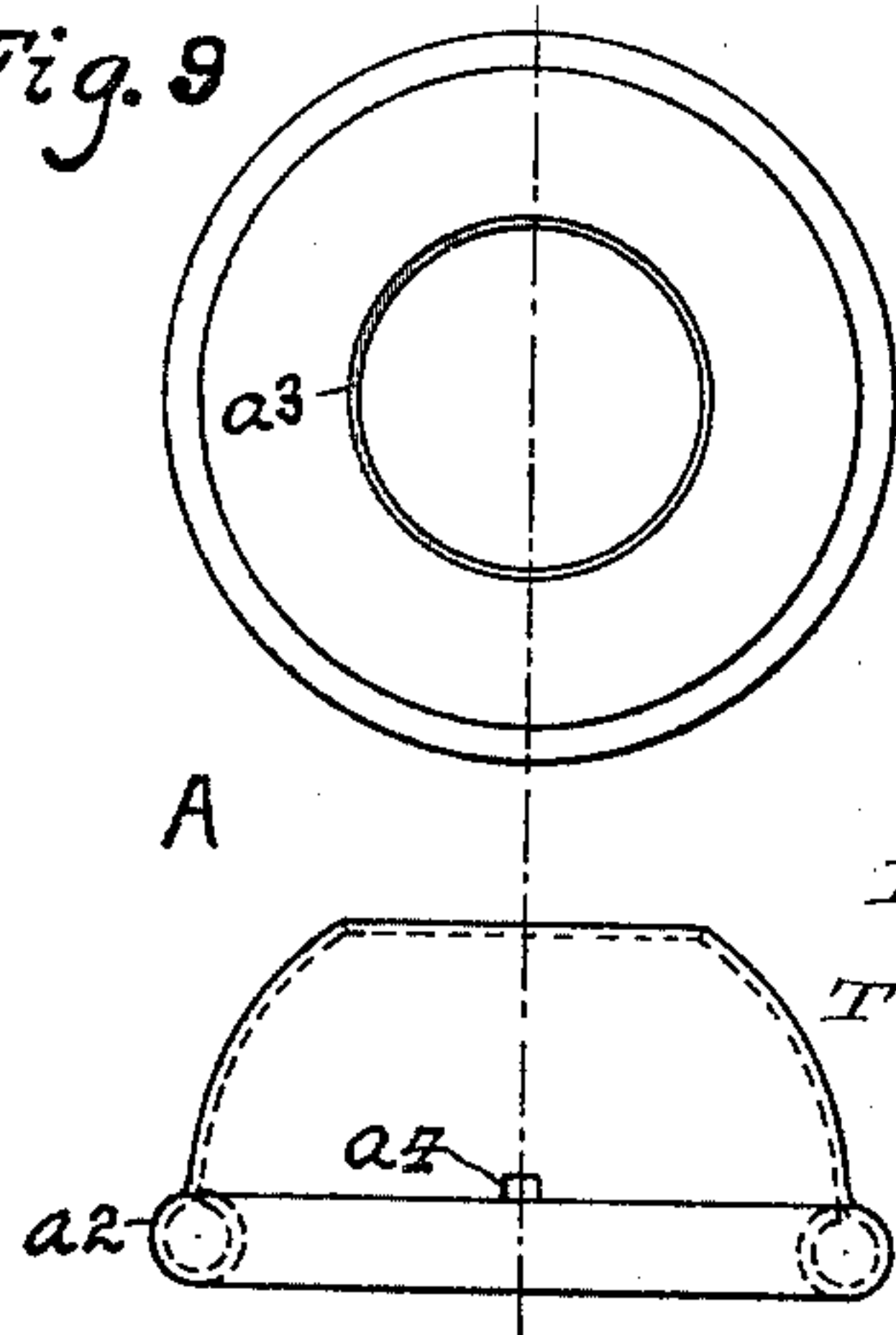


Fig. 9



WITNESSES.

Charles F. Burton
Ab. E. Kott.

Fig. 5

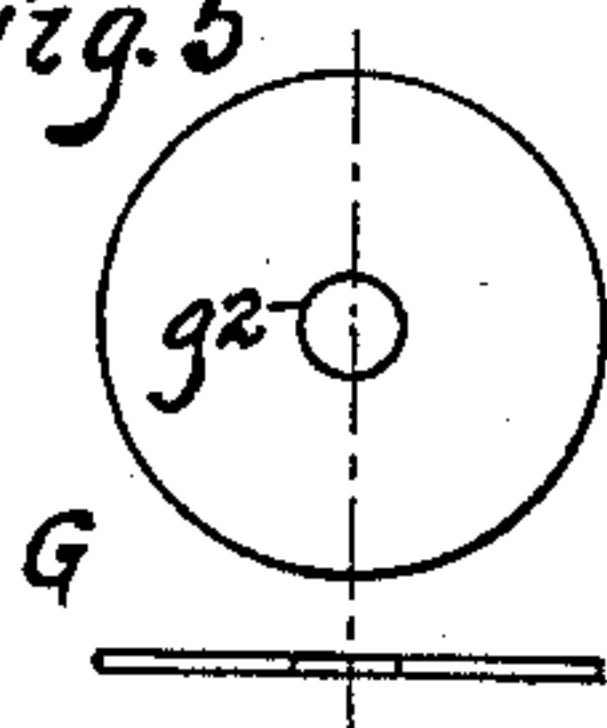


Fig. 1

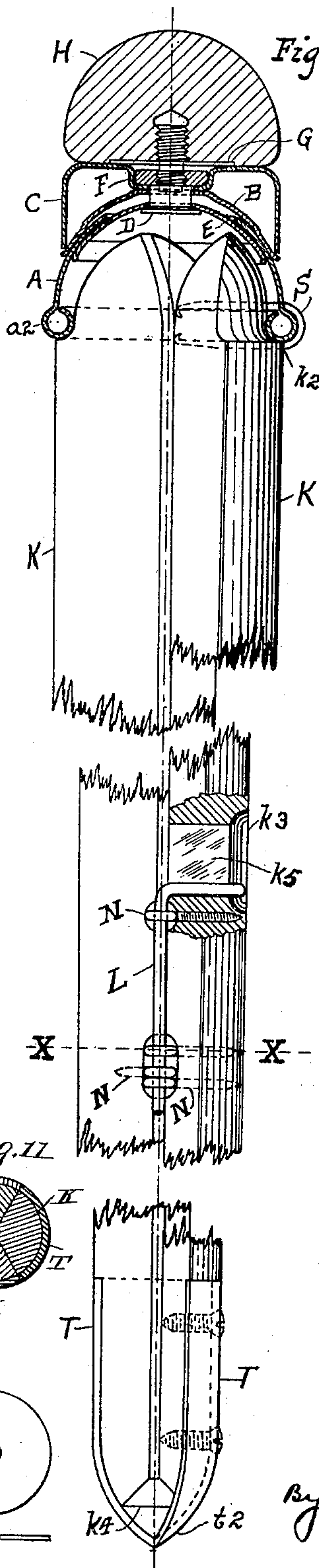


Fig. 6

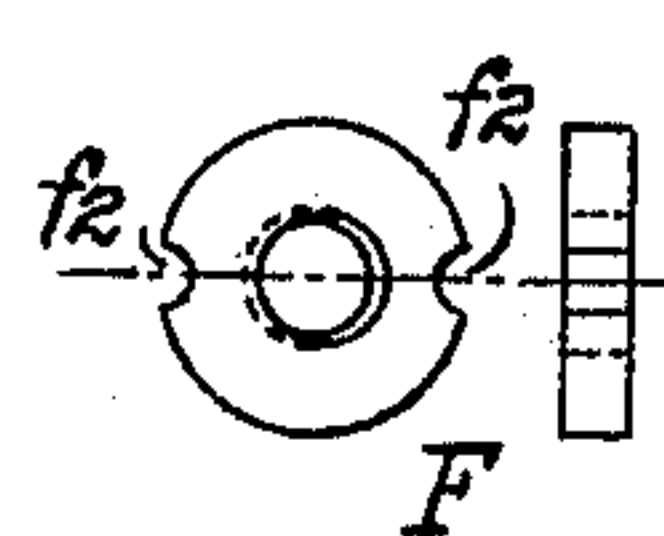


Fig. 2

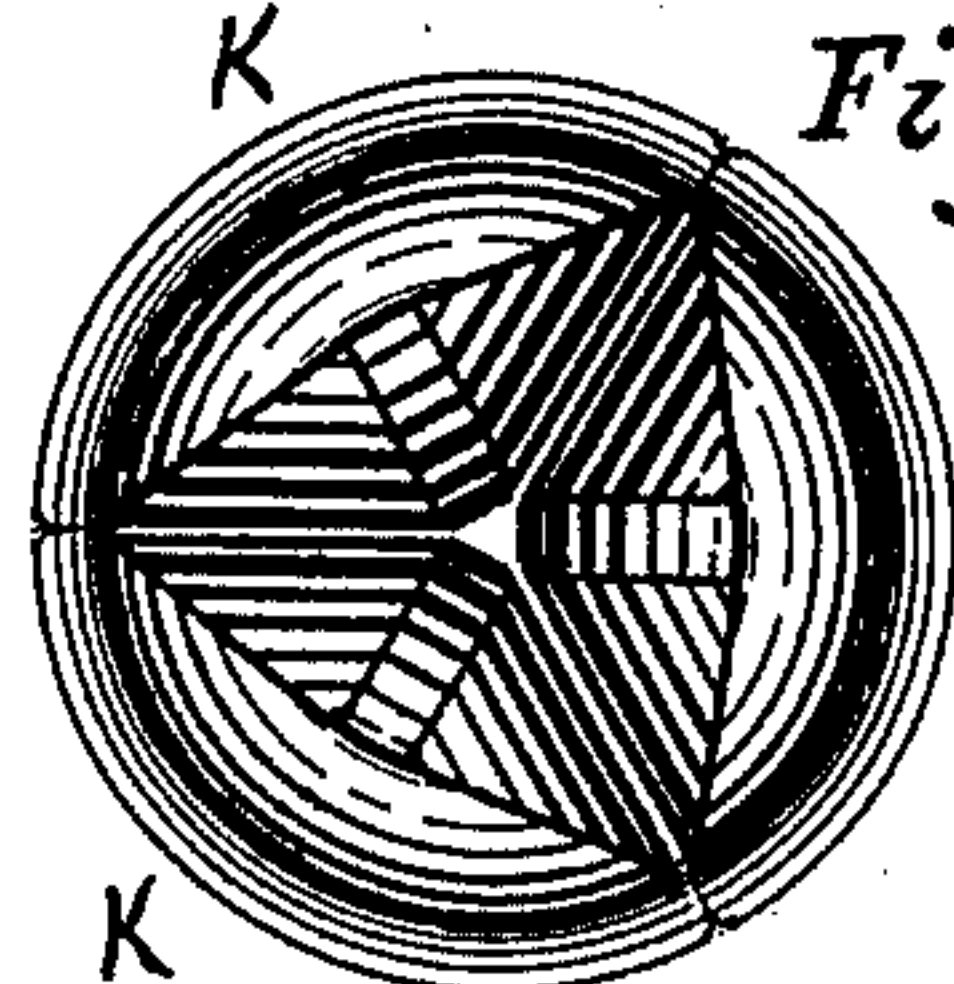


Fig. 10

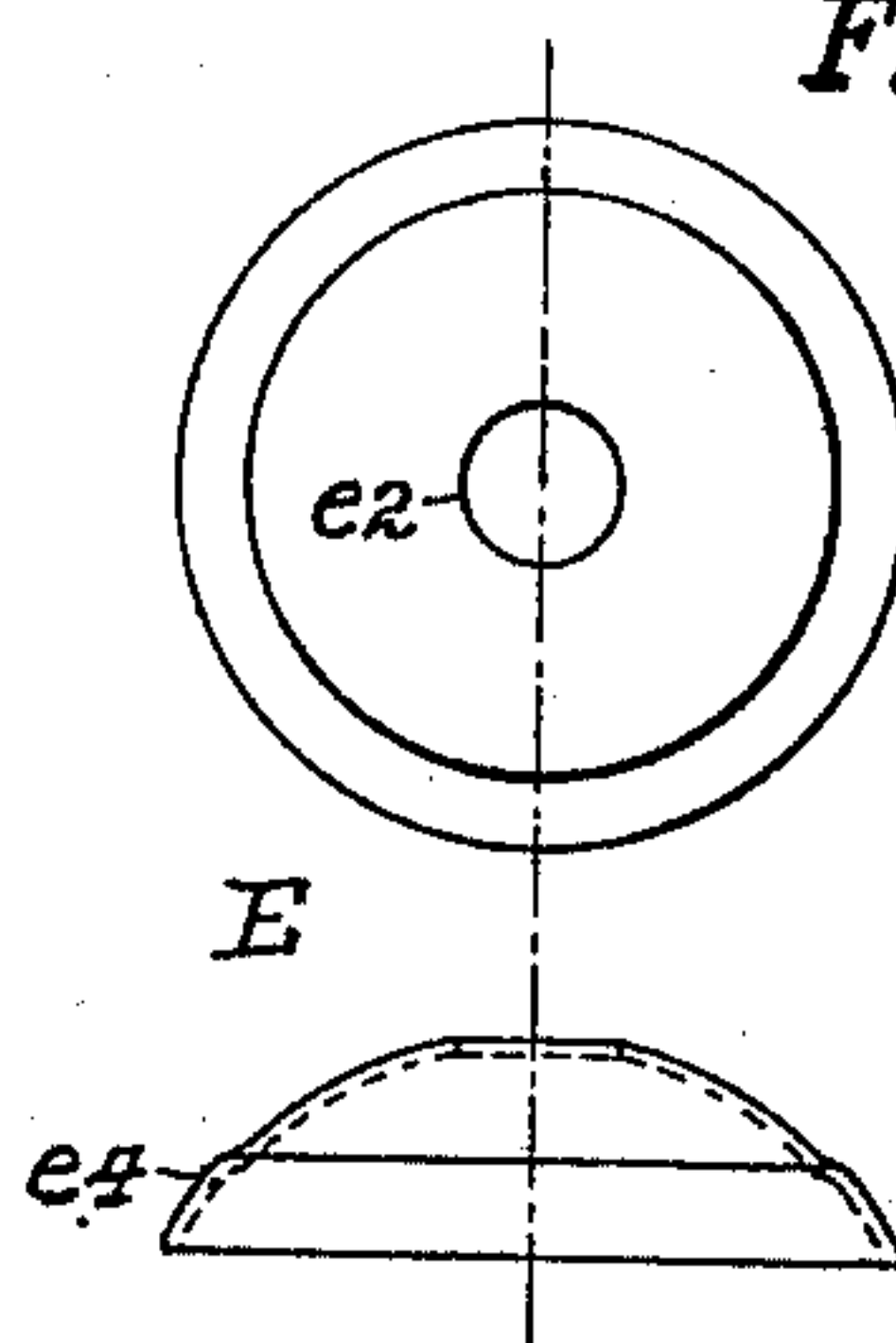


Fig. 3

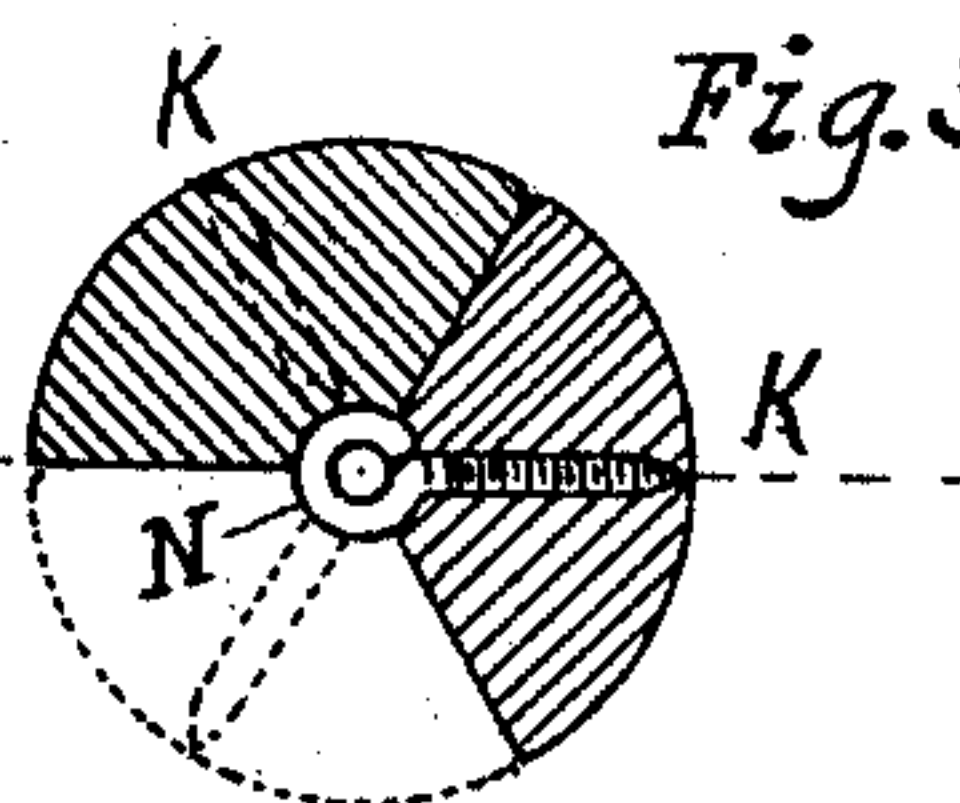
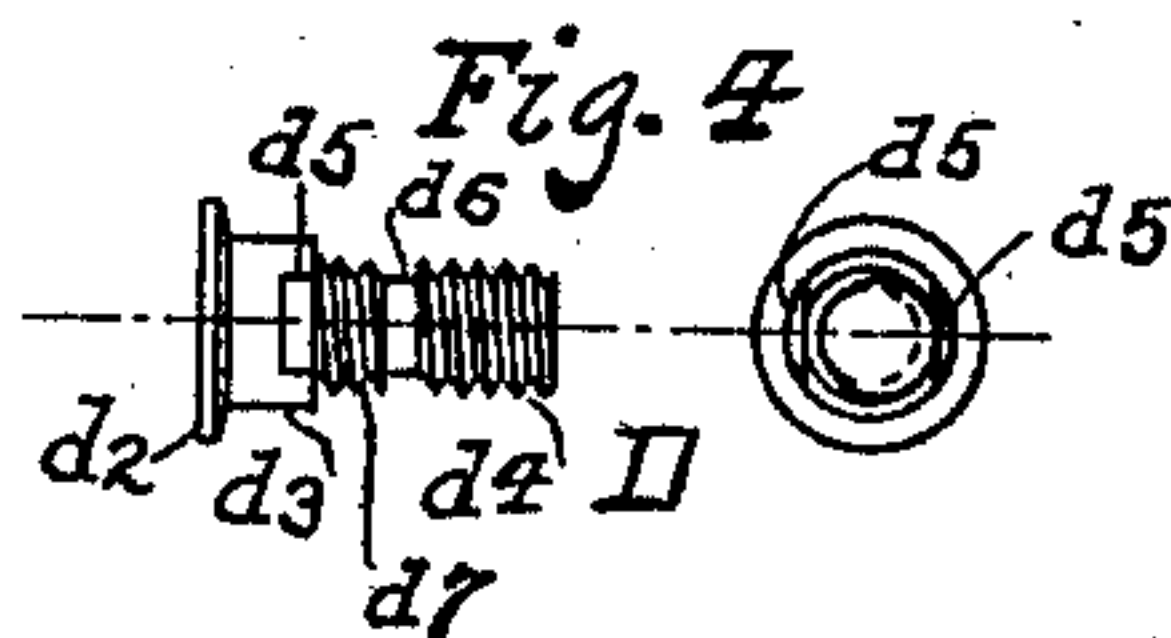


Fig. 4



INVENTOR.

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UNITED STATES PATENT OFFICE.

CHARLES J. W. HAYES, OF DETROIT, MICHIGAN.

TRIPOD.

SPECIFICATION forming part of Letters Patent No. 630,220, dated August 1, 1899.

Application filed April 21, 1899. Serial No. 713,853. (No model.)

To all whom it may concern:

Be it known that I, CHARLES J. W. HAYES, a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Tripods; and I declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

This invention relates to tripods, and has for its object an improved tripod and tripod-head. This tripod provides an improved ball-and-socket universal adjustment and as a whole is easily and cheaply constructed and in such a manner that when folded it presents the appearance of a staff or cane, the coupling or joint pieces at the head being round and symmetrical with no rough projections and the three leg members fitting closely together from top to bottom and locking together by an internal bolt and the three tips that form the terminals of the three legs at the bottom ends engaging closely together to form a common tip for the folded staff. When in this folded condition, the summit of the staff is terminated by the screw used to couple the tripod to the camera-box, and this may be covered by a cap, so that the extreme summit of the staff presents a round hemispherical appearance and is smooth to the hand.

In the drawings, Figure 1 represents the staff folded and capped. It is shown in elevation and partly in section and with one of the three legs removed. Fig. 2 shows a top or plan view of the three legs in their folded position. The socket-coupling has been removed in this view. Fig. 3 shows a cross-section of the folded staff at the line $x x$, Fig. 1. Fig. 4 shows a detail of the coupling-screw which binds the pieces of the ball-and-socket joint together and binds the staff or tripod to the camera-box. Fig. 5 shows a detail of a soft washer that engages over the screw of Fig. 4. Fig. 6 shows a detail of the nut which goes on the screw of Fig. 4. Fig. 7 shows in plan and in elevation the grip or screw-actuating part of the ball-and-socket coupling. Fig. 8 shows in plan and in ele-

vation the socket of the ball-and-socket coupling. Fig. 9 shows in plan and in elevation the ball-piece of the ball-and-socket coupling. Fig. 10 shows in plan and in elevation the inner washer which coacts with the socket. Fig. 11 is a sectional view across the assembled tip-pieces, showing that each tip-piece comprises a third part of a conically-ended tube.

The ball-piece A (shown in Fig. 9) is a hemispherical cup of thin metal, having the edge of the cup formed with a bead a^2 , running entirely around the cup. Through the apex of the cup is a hole a^3 large enough to allow the desired radial movement of the screw when the socket-pieces are adjusted over this cup, which may be considered the ball part of the joint. Through the walls of the cup, immediately above the bead a^2 , are three small holes a^4 , that are placed at equal distances around the cup and through which are inserted prongs of the staples S. On the inside of the cup engages a washer E, which is the shape of a section of a spherical shell, but is preferably somewhat enlarged at its mouth, so that the part of it which bears against the inside of the cup A is a narrow band e^4 . Through the center of this washer is a hole e^2 of a diameter proper to receive the neck of the screw D. Outside the cup and fitting over it is a socket-piece B, similar in shape to the washer E, except that the engaging band b^4 is drawn in or contracted, so that its spherical radius is less than that of the other part of the socket B. Through this socket is a central hole b^3 and around the central hole a tabular part b^2 . Above the socket B and bearing upon its tabular part b^2 is the screw-actuating piece C. This is cup-shaped, with a cylindrical part c^4 , knurled externally, and has an upper tabular face c^5 , that forms an annular ring around the depressed portion c^2 , which forms a suitable socket for the nut F. The bottom of the depression c^2 is tabular and provided with an oblong hole c^3 , into which engages a slabbed-off part of the screw D. The nut F engages on a threaded part d^7 of the screw D. The screw D is provided with a head d^2 and with a neck d^3 , which is partially slabbed off, presenting two parallel sides d^5 . Beyond the slabbed-off neck is a short threaded part d^7 and a short unthreaded

part d^6 of smaller diameter than the threads, and beyond this is a threaded part d^4 , having a proper thread to engage with the camera-box. On the reduced part d^6 of the screw is forced a soft washer G, which bears against C at c^5 and against the camera-box when attached and is held from becoming disengaged by the threaded part d^4 of D.

Each leg of the tripod is made with one curved side having an arc of one hundred and twenty degrees and with two meeting faces radial to this arc and having a divergence of one hundred and twenty degrees. At the extreme upper end of each leg the outer part is cut so that the three parts when assembled have a terminal hemispherical in shape; but the inner faces of each leg are cut away, so that when assembled there is a deep triangular hole converging to the center as it deepens. The inner face of each leg is cut on a curve struck from a point in the axis of the bead a^2 , with which the legs engage.

When the three legs are inserted in the cup A, they are secured in place, with the shoulder k^2 bearing against the bead a^2 , by staples S, which also act as hinges when the legs are thrown outward. The inner curved faces at the top of the legs remain constantly in engagement, although the lines of engagement may shift.

About midway of the length of each leg there is inserted into it from the inner side one or more screw-eyes N, so placed as to intermesh to prevent end movement and to be in line for the passage of the bolt into their eyes when the legs are closed together. Enough of the inner faces of the three legs is cut away to enable them to close together around the projecting eyes of the screw-eyes N. The bolt L is held to one of the legs by screw-eyes, and one end is bent over and projects through a slot k^5 to the outer surface of the leg-piece K. The cavity k^3 is formed in the leg-piece at this point, so that the operator may easily move the bolt L with his finger. A slight movement of the bolt when the legs are closed locks them together.

The tip T, which terminates the bottom of each leg, is a piece of sheet metal formed to conform to the curve of the outside of the leg. Each piece constitutes the third part of a conical-ended tube, and each piece terminates in a claw-shaped point t^2 . Attachment is made to the leg with screws or rivets. When the legs are closed, the individual tips assemble to form the large blunt-pointed tip of the staff. Each tip projects below the end k^4 of the leg a short distance, so that the extreme lower end of each tip forms a claw or point t^2 , adapted to take easily into the ground at any angle at which it may be used. The blunt terminal k^4 of the leg offers more resistance than the claw to penetration and serves to prevent the leg from sinking too deeply into the ground. The joint is made fast after adjustment as to position by turning the knurled piece C. This turns the screw D, drawing the camera

down upon the washer G, from whence the pressure is transmitted through C and B to A. The washer E is at the same time drawn up against the inside of A, thus clamping the parts upon A without turning the holding-pieces E, B, or A, the frictional resistance to revolving on the latter-named pieces being arranged at a greater distance from the center than the bearing of the parts c^2 and c^5 against B and G.

The operator easily clamps the parts by turning C with one hand in the way described, while the camera is held from revolving with the other.

What I claim is—

1. In a tripod-head, the combination of a piece for the attachment thereto of the tripod-legs, a binding-screw passing through said piece and having a threaded part above said piece adapted for engagement with a camera and provided with a part for the engagement and holding against rotation thereon of an actuating-plate having longitudinal movement on said screw, an actuating-plate located on the binding-screw above and extending out over the piece for the attachment of the tripod-legs and having a hand-grip periphery, and provided with bearing-surfaces near its center to receive the pressure of clamping, and means provided for holding the elements together, substantially as described.

2. In combination with a ball-and-socket-jointed tripod-head, a binding-screw threaded for engagement with the camera and carrying upon it and revoluble with it, while free to move longitudinally upon it, an actuating-plate covering the socket and bearing upon it near its center and having a flanged periphery adapted for a hand-grip and provided with a recess on its upper side surrounding the binding-screw, and means provided for retaining the actuating-plate upon the screw, substantially as described.

3. In a ball-and-socket-jointed tripod-head, in combination with legs, a cup provided with a beaded rim, and having perforations immediately above said rim and hinged pieces engaging through said perforations and around said beaded rim, substantially as described.

4. In a tripod, the combination of three legs fitting closely together and bearing near their upper ends against the inside of a band, each leg being provided with curved surfaces terminating the upper ends of the inner faces, said curved surfaces being arranged so that contiguous faces of adjacent legs bear against each other at whatever angle the legs are spread, substantially as described.

5. In combination with a cup, tripod-legs having their upper ends inserted in the hollow of the cup and bearing against the rim of the cup, and means for holding the legs to the rim, whereby their lower ends are arranged to spread outside of the cup while the upper ends are retained in the cup, substantially as described.

6. In combination with a cup forming the ball part of a ball-and-socket-jointed tripod-head and having on its head a bead, tripod-legs hinged on the bead of said cup and having their upper ends inserted in said cup and having the inner faces of said ends cut on circles the centers of which lie in the center of the bead of said cup, and with said upper ends engaging in any position of use, substantially as described.

7. In a tripod, the combination of leg-pieces folding closely together around a common center, locking-pieces attached to each leg-piece provided with openings, and so arranged that the opening in each locking-piece is concentric with the center of the assembled legs, a bolt adapted to engage through said openings and provided with an actuating part extending to the outside of the assembled legs, substantially as described.

8. In combination with the legs of a tripod,

tip-pieces each of which comprises the third part of a conical-ended tube, the incurved point of each part projecting below the end of the leg to which it is attached, substantially as described.

9. In a tripod, the combination of three leg-pieces folding triangularly together to form a staff, and one or more projections extending from one of the inner faces of each leg-piece, said projections being arranged to intermesh with the projections in contact one above the other, whereby longitudinal movement of the legs is prevented when the legs are folded, substantially as described.

In testimony whereof I sign this specification in the presence of two witnesses.

CHARLES J. W. HAYES.

Witnesses:

MARION A. REEVE,
MAY E. KOTT.