

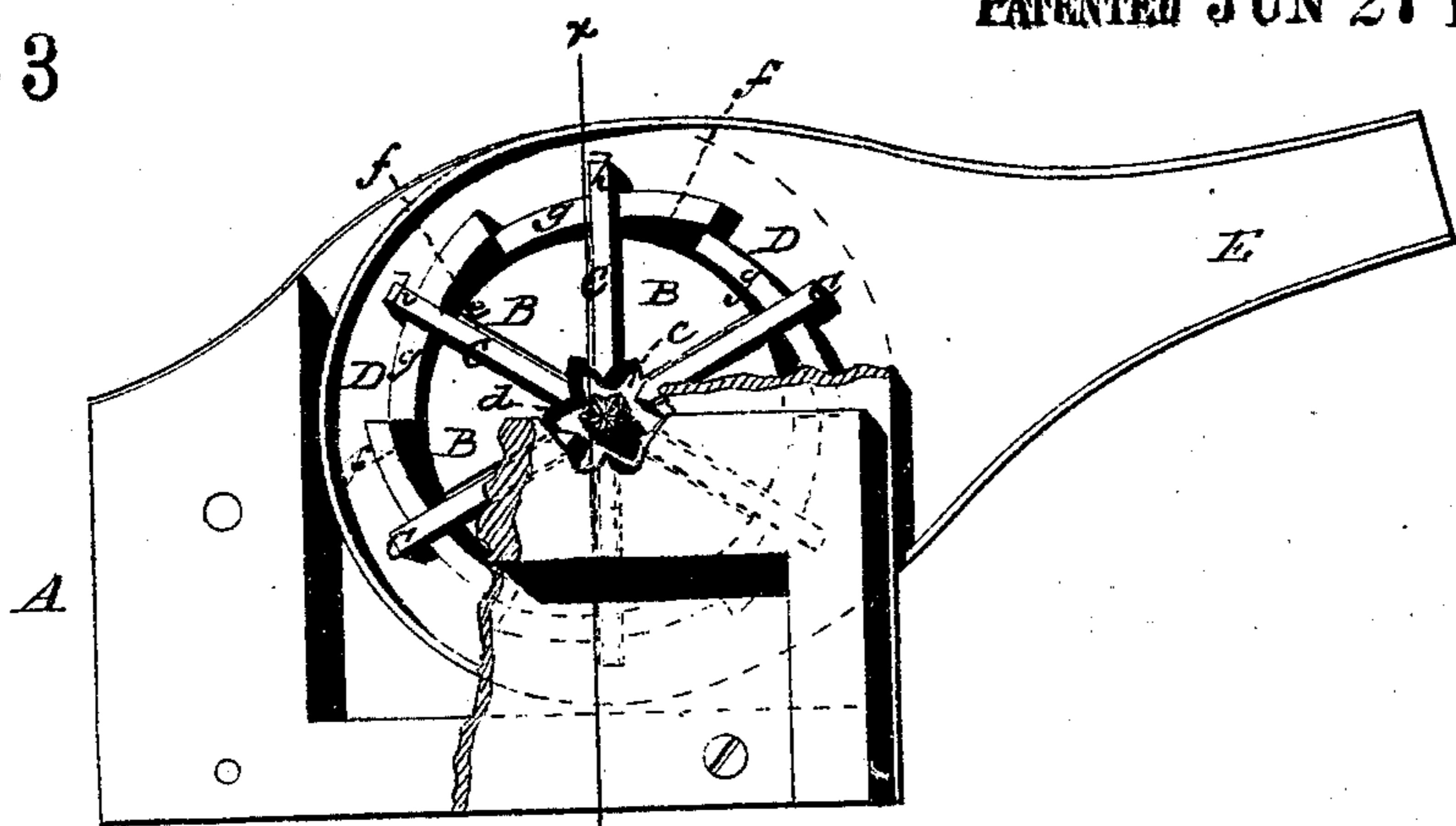
**G. S. KNAPP.**

*Dies for Constructing Lightning  
Rods.*

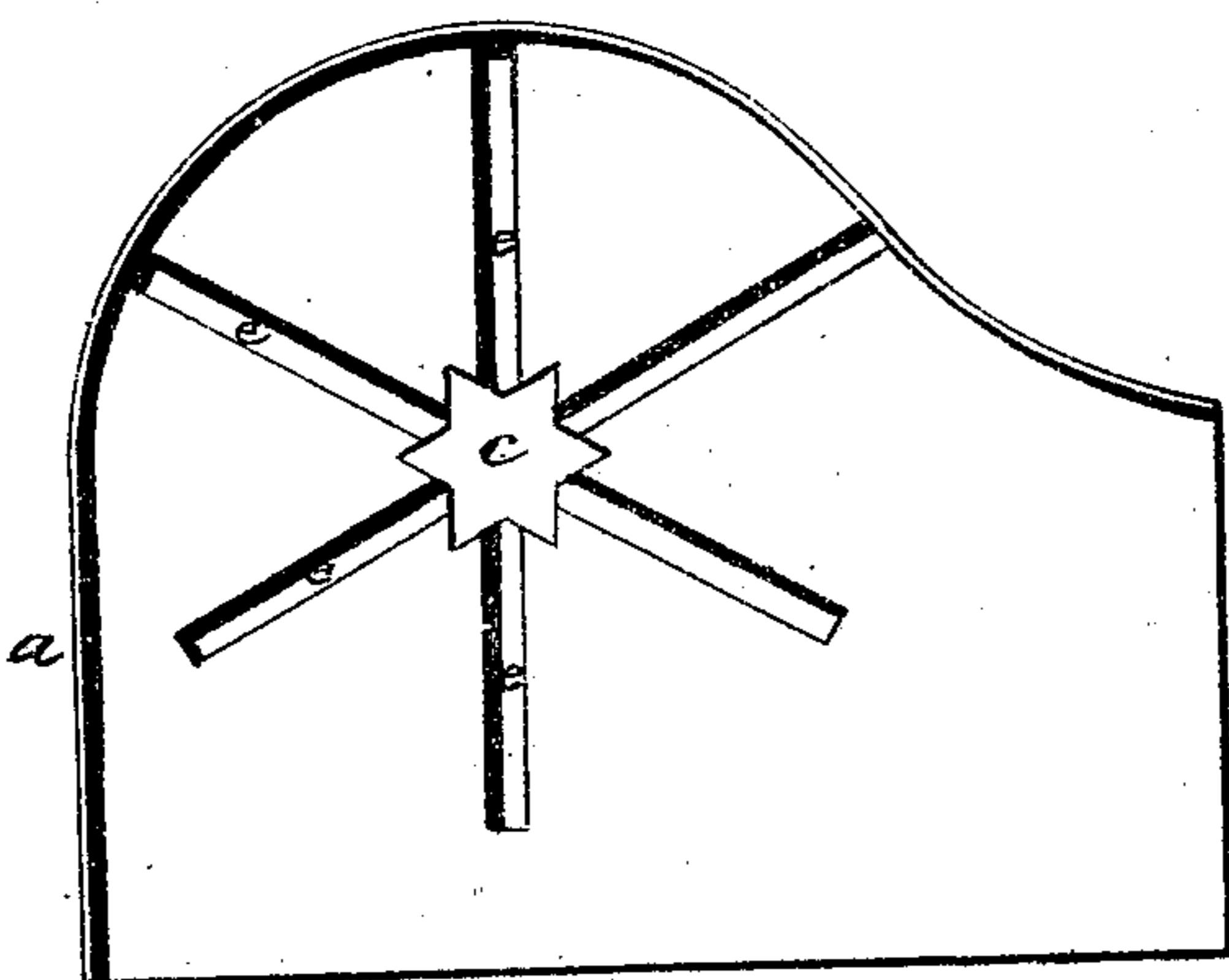
*Fig. 1*

PATENTED JUN 27 1871

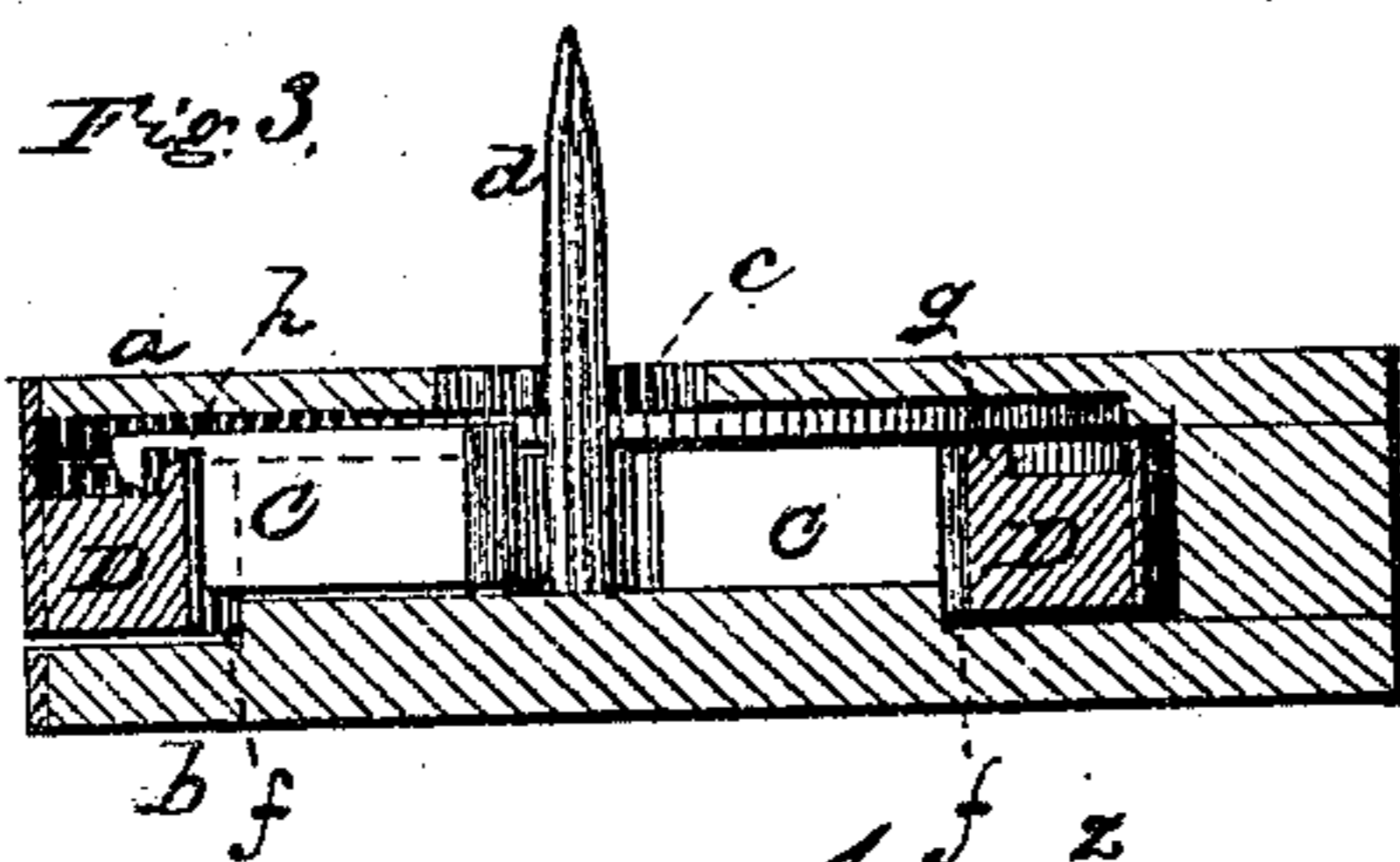
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*Fig. 2.*



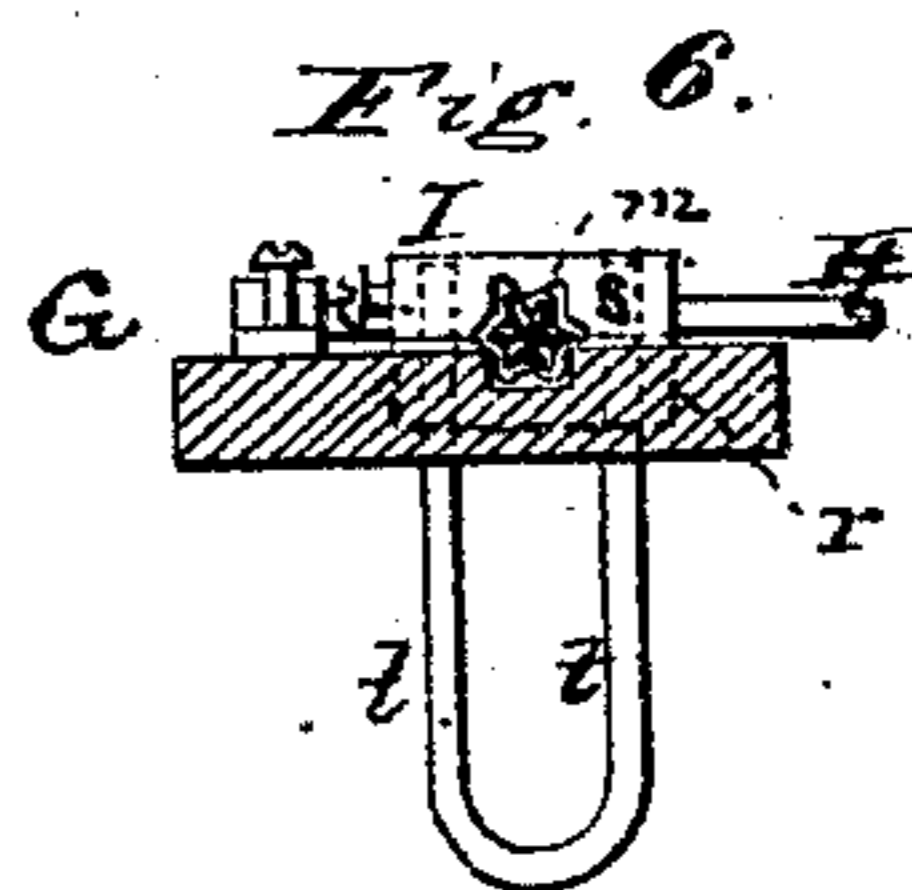
*Fig. 3.*



*Fig. 5.*

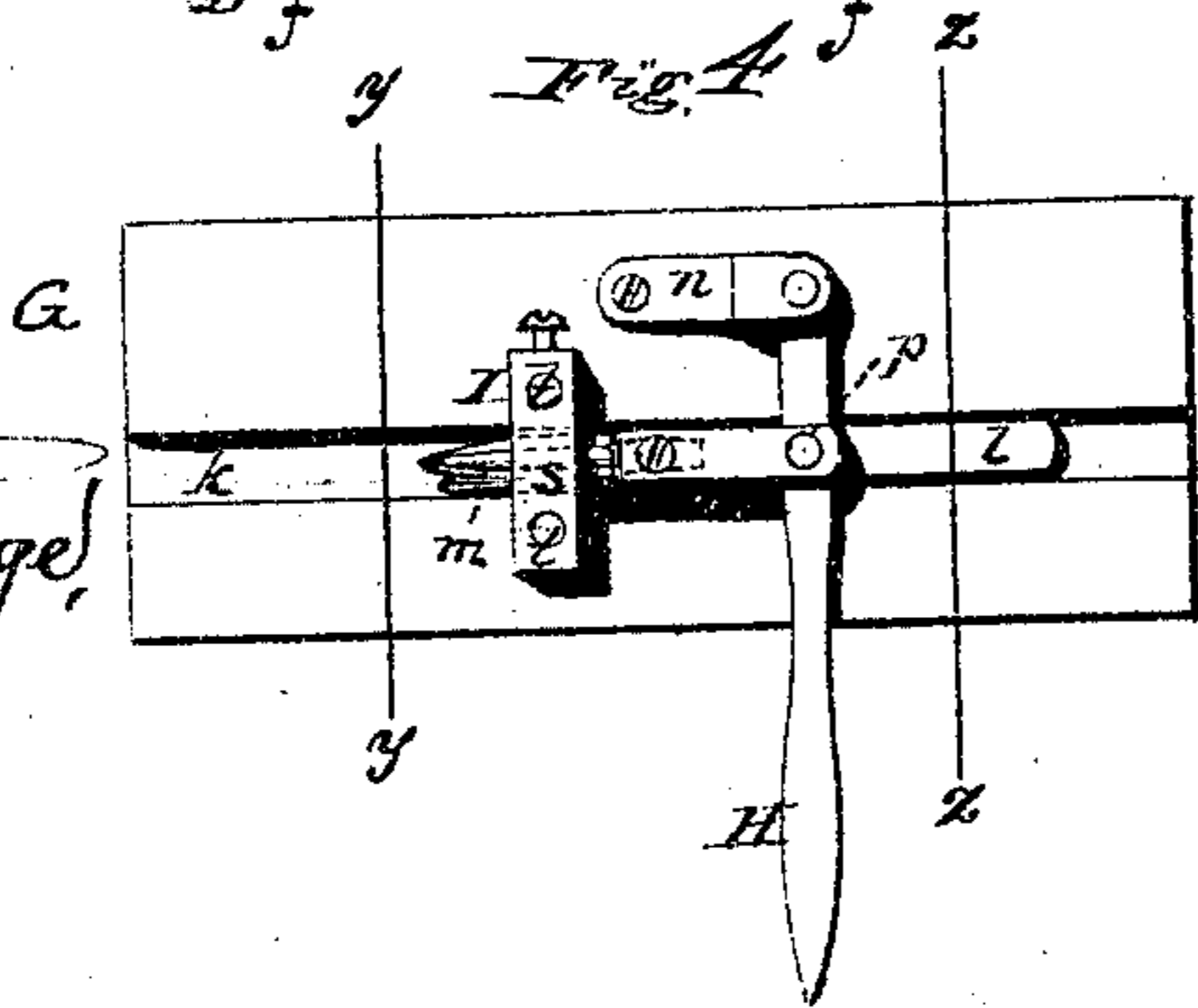


*Fig. 6.*



Witnesses.

*Harry King*  
*Phil. S. Dodge*



Inventor.

*Geo. S. Knapp*  
*by*  
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# UNITED STATES PATENT OFFICE.

GEORGE S. KNAPP, OF WINONA, MINNESOTA.

## IMPROVEMENT IN MACHINES FOR JOINING TUBULAR LIGHTNING-RODS.

Specification forming part of Letters Patent No. 116,453, dated June 27, 1871.

*To all whom it may concern:*

Be it known that I, GEORGE S. KNAPP, of Winona, in the county of Winona and State of Minnesota, have invented certain Improvements in Devices for Joining Tubular Lightning-Rods, of which the following is a specification, reference being had to the accompanying drawing:

My invention relates to devices for use in joining sections of tubular lightning-rods; and it consists in one tool for opening or expanding the end of one section and another tool for compressing the end of the other section, so that one will enter the other, as hereinafter described.

Figure 1 is a face view of the compressing device, a portion of the front being broken away to show the interior. Fig. 2 is an inside-face view of the front plate of the same. Fig. 3 is a section of the compressor on the line *xx* of Fig. 1. Fig. 4 is a top-plan view of the expanding device, and Figs. 5 and 6 are cross-sections of the same on the line *zz* and *yy*, respectively.

In the drawing, A, Figs. 1, 2, and 3, represent the body of the compressing device, consisting of two upright parallel plates, *a* and *b*, having a circular boss or hub, B, secured between them. Through the front plate *a* and the center of hub B a star-shaped opening, *c*, is made to receive the end of the lightning-rod; and a pin, *d*, to fit within the end of the rod, is secured to the back plate *b*, so as to extend forward through the center of opening *c*, this pin being of less diameter than the hollow center of the lightning-rod. A number of radial slots, *e*, is formed in the hub B and front plate *a*, from the central opening outward, and in each of these slots a sliding jaw or plate, C, is mounted, as shown in Figs. 1 and 3. Around the hub B is placed a ring, D, provided with a hand-lever, E, as shown. The inside of this ring next to the hub is formed with eccentric or inclined faces, *f*, equal in number to the jaws C, and so arranged that the outer end of each jaw bears against one of the inclines, as shown in Figs. 1 and 3. On the side of ring D, along the edge of each incline *f*, is formed a flange, *g*, and on the outer end of each jaw is formed a lug, *h*, which engages over the adjoining flange, as shown. When the various parts are thus arranged, if the ring D be turned toward the right by depressing the hand-lever E, the inclines *f* will force all the jaws inward toward the center. When the le-

ver is raised so as to turn the ring toward the left the flanges *g* draw the jaws outward. Thus it will be seen that, by raising or lowering the lever, the jaws may all be moved toward or from the center simultaneously. When it is desired to compress or reduce the end of a rod, the end is slipped on the pin *d* within the opening *c*. The hand-lever is then pressed down so as to force the jaws inward against the rod and compress its end down around the pin *d*. The lever is then raised and the rod withdrawn. The expanding device is shown in Figs. 4, 5, and 6; and it consists of a clamp for holding the end of the rod and of a conical expanding-plug forced by a hand-lever into the same. G represents a suitable bed-plate, provided with a groove, *k*, to receive a sliding bar, *l*, which has secured to one end a conical plug, *m*. To the bed-plate G is pivoted a link, *n*, and to the free end of this link is pivoted one end of a hand-lever, H, which is also connected by a pivot, *p*, to the sliding bar *l* before mentioned, so that, by vibrating the hand-lever, the bar may be moved to and fro in the slot or groove *k*. To the bed-plate, across the groove *k* and in front of the conical plug *m*, is attached a clamp, I, made in two parts, the lower part or half *r* being rigid, while the upper half *s* is connected thereto by two vertical sliding stems or rods, *t*, which pass down through, as shown in Fig. 6, so that the part *r* may be raised up or drawn down by means of said stems. In operating the apparatus the bar *l* is moved back from the clamp, the lightning-rod inserted through and so as to project beyond the clamp, and held by forcing the upper half *r* down thereon, and then the hand-lever moved so as to force the tapered plug *m* into the end of the rod, and thereby expand the same. The bar *l* is then moved back to withdraw the plug, the clamp opened, and the rod withdrawn. The stems *t* may be operated in any suitable manner, as, for instance, by a hand or foot-lever.

When it is desired to join two sections of rod the end of one is reduced or tapered down by the compressing device and the end of the other enlarged by the expanding device, and then one is slipped within the other and the two soldered or otherwise fastened together. The two sections are thus joined securely together so that they cannot become loose, and so as to present a very neat appearance. The two parts being thus lapped

at the joint, and strongly soldered, there is no break in the continuity of the rod, it being as perfect a conductor of electricity at the joint as elsewhere.

The devices described are cheap, simple, and durable, and by their use the rods may be joined with ease and rapidity.

Having described my invention, what I claim is—

1. The combination of the sliding jaws C, ra-

dially arranged, with the cams *g*, operated by the lever E for compressing the end of the lightning-rod, as described.

2. In combination with the clamping-jaws I and *r*, the sliding conical plug *m*, arranged to operate substantially as described, for opening the ends of tubular rods, as set forth.

Witnesses:

GEO. S. KNAPP.

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W. ROUNSEVILLE.