

No. 774,810.

PATENTED NOV. 15, 1904.

G. M. WILLIS.  
RAIL BOND COMPRESSOR.  
APPLICATION FILED MAR. 31, 1902.

NO MODEL.

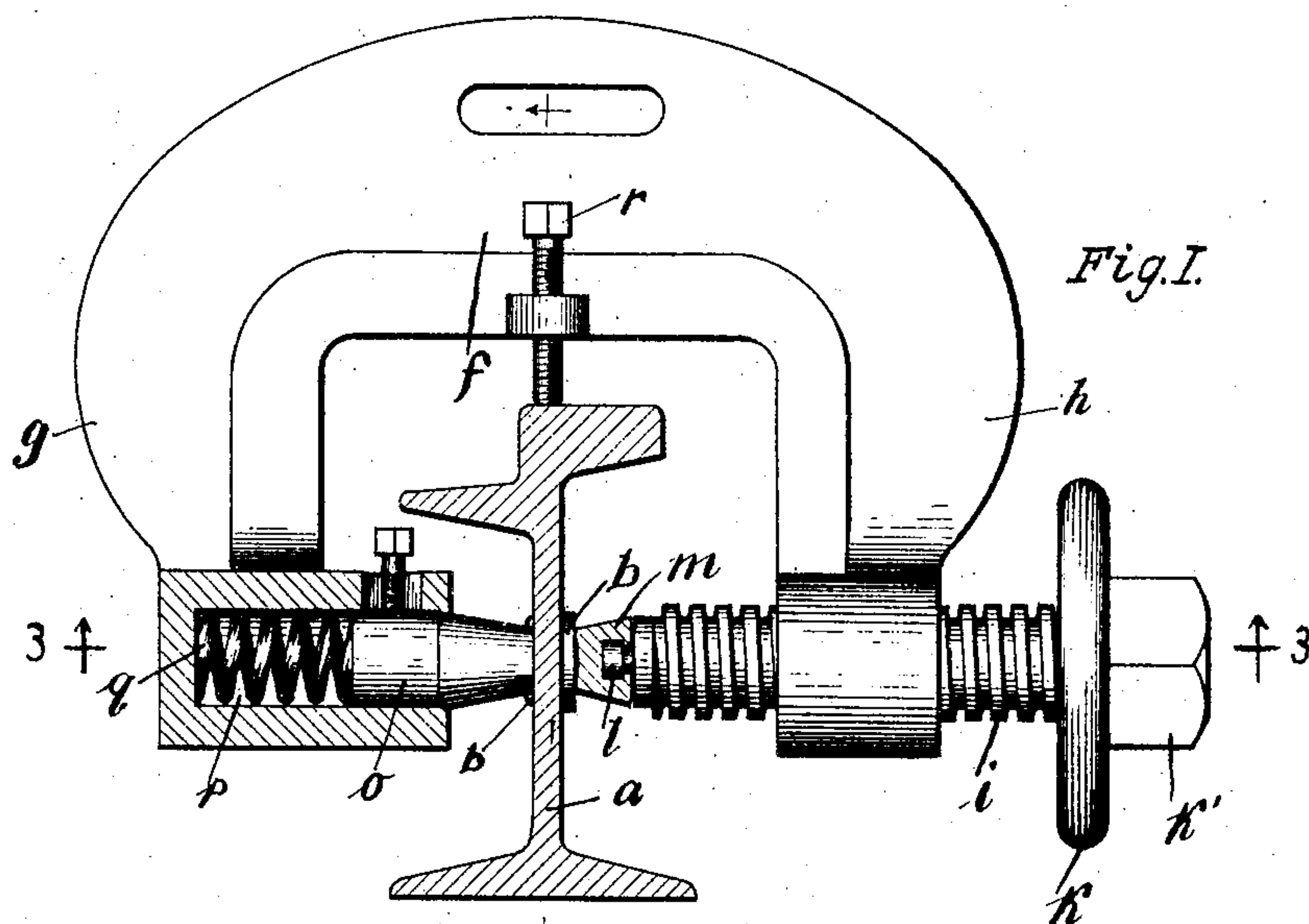


Fig. 1.

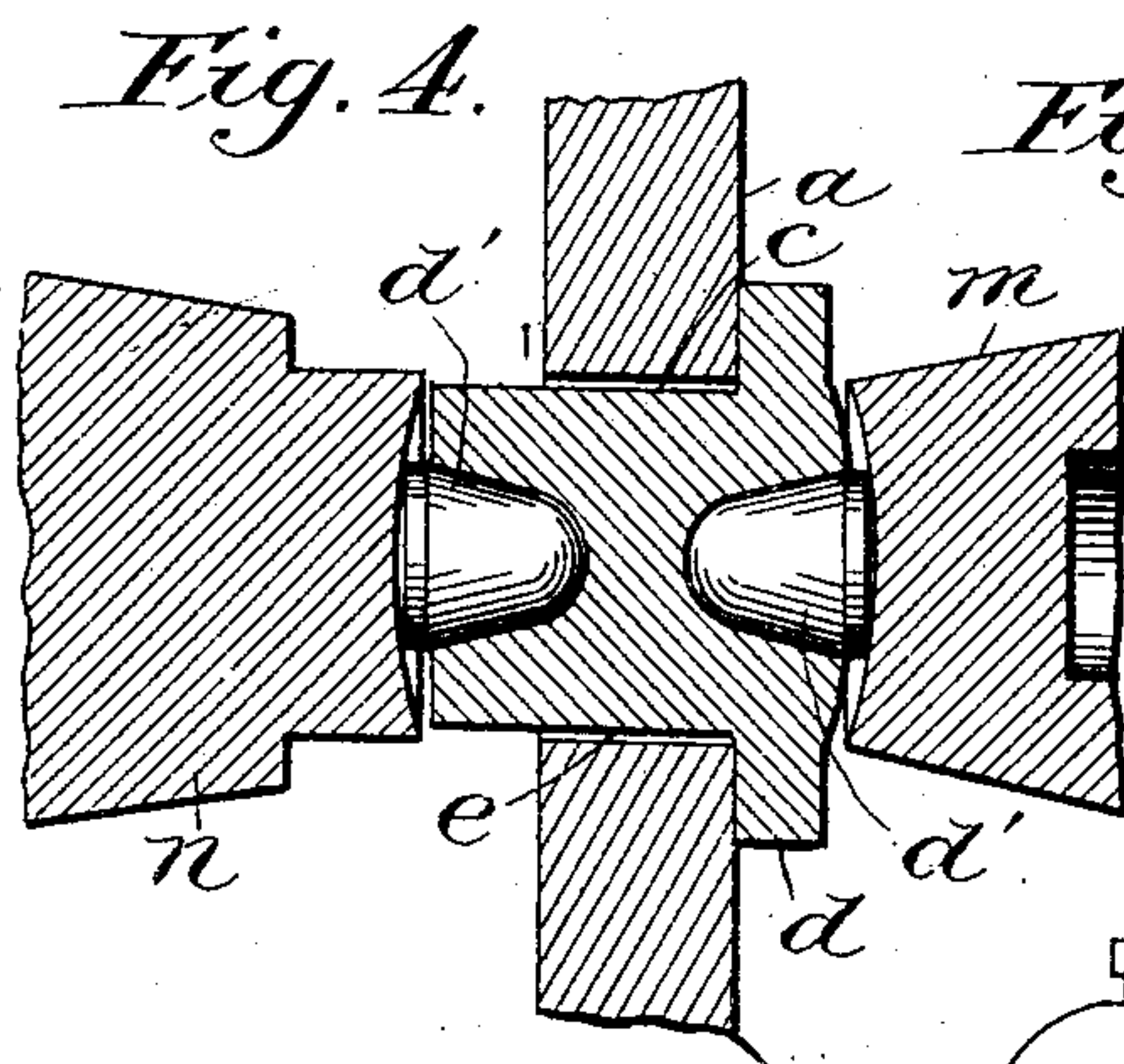


Fig. 4.

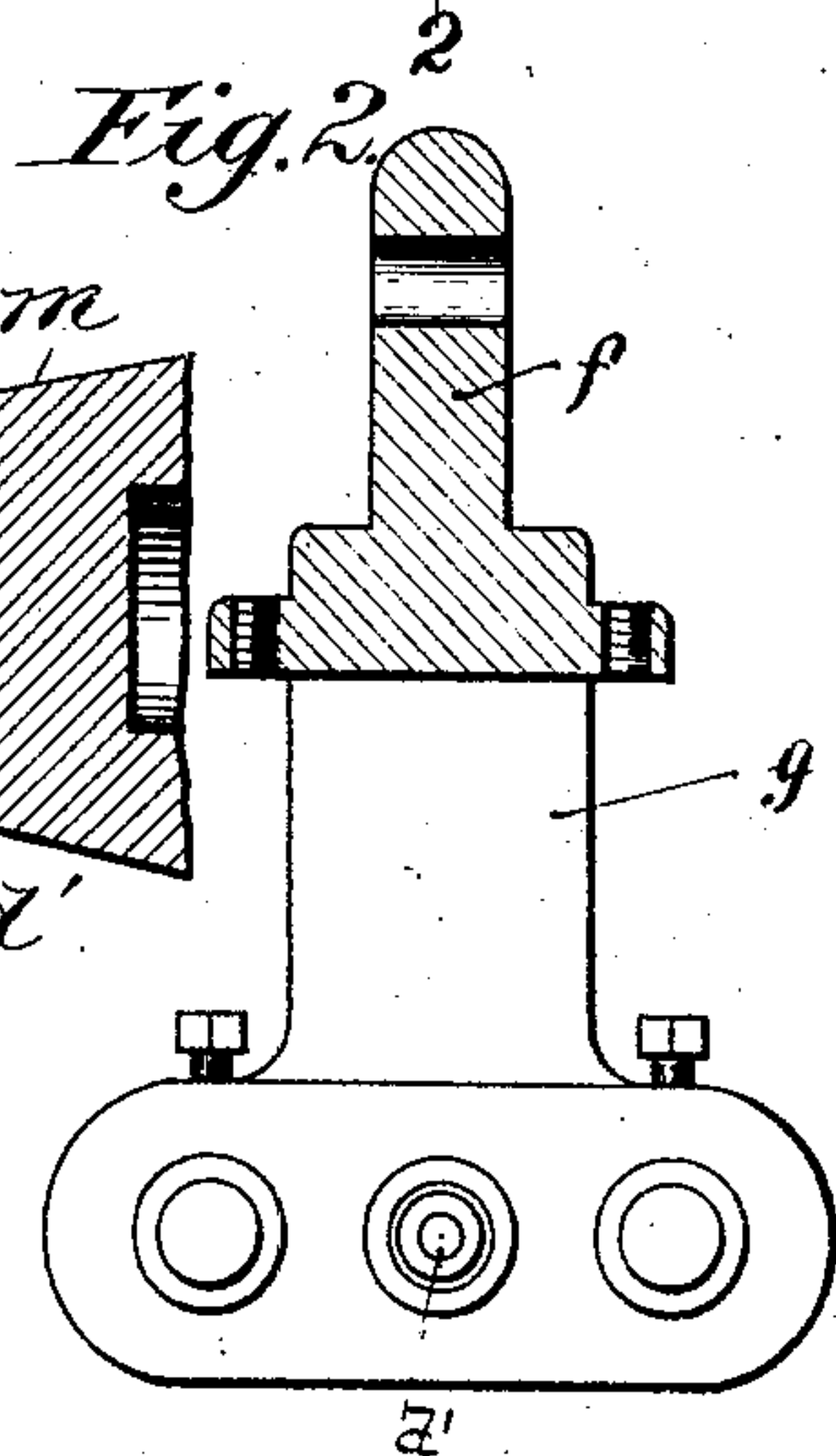


Fig. 2.

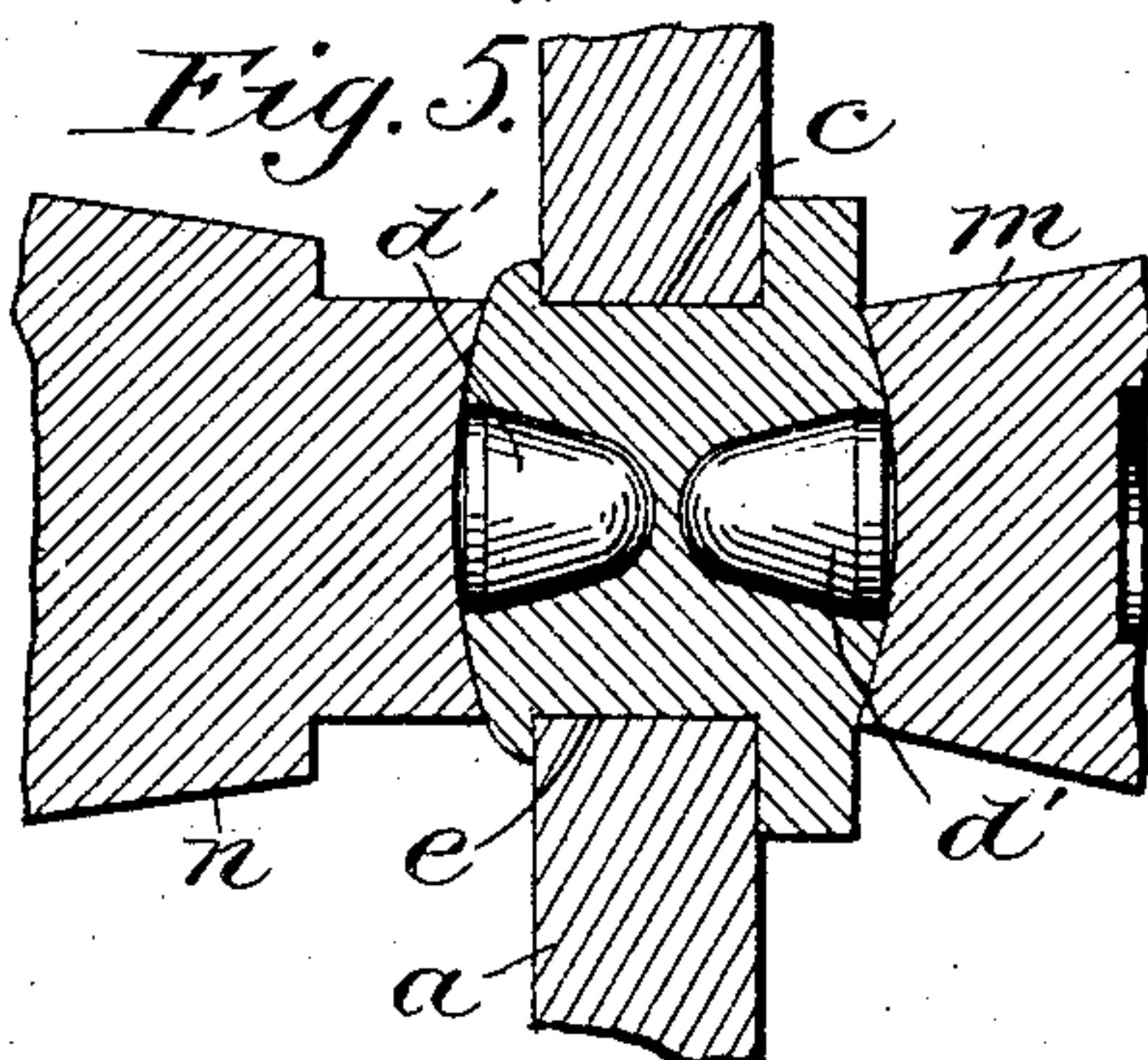


Fig. 5.

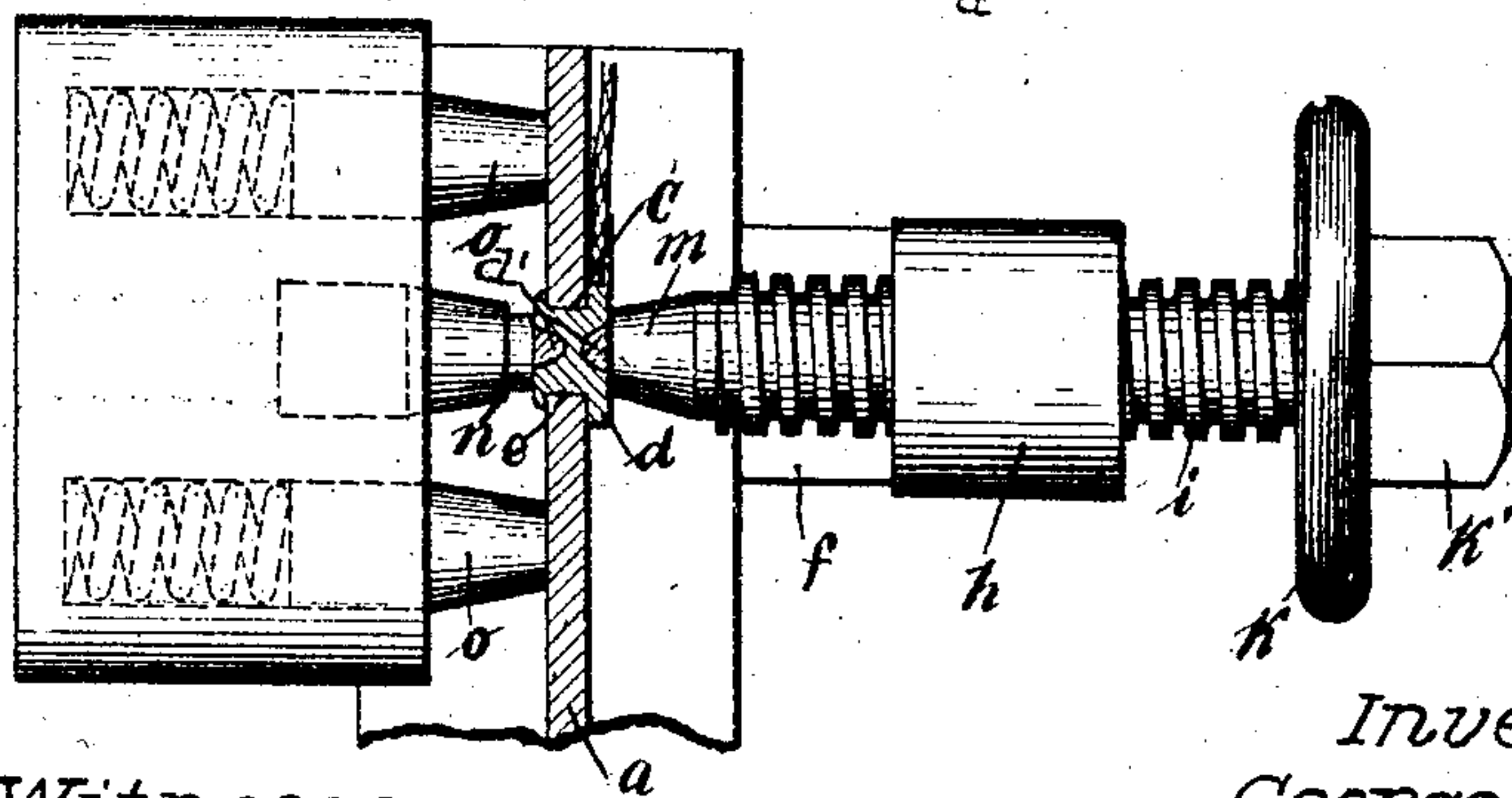


Fig. 3.

Witnesses  
L. W. Novander.  
John Stahr

Inventor  
George M. Willis.  
By Charles A. Brown & Cragg  
Attorneys.



## UNITED STATES PATENT OFFICE.

GEORGE M. WILLIS, OF CHICAGO, ILLINOIS.

## RAIL-BOND COMPRESSOR.

SPECIFICATION forming part of Letters Patent No. 774,810, dated November 15, 1904.

Application filed March 31, 1902. Serial No. 100,841. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE M. WILLIS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Rail-Bond Compressors, (Case No. 2,) of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to rail-bond compressors, and has for its object, first, the provision of an improved form of rail-bond compressor, whereby the compressing-head will not turn the head of the bond as it compresses the same; second, the provision of improved means whereby the moving head of the bond-compressor may initially be maintained in engagement with the head of the rail-bond to maintain the rail-bond in proper engagement with the rail.

Heretofore no means were provided in combination with the bond-compressor for maintaining the rail-bond in proper engagement with the rail before the application of that degree of pressure necessary to upset the bond to unite it with the rail. By means of the device of my invention no great degree of skill or care is required to adjust the bond-compressor before the application of the upsetting pressure.

While the device of my invention is particularly adaptable for use in bonding rails, I do not wish, however, to be limited to this particular use thereof.

The compressor of my invention is peculiarly and particularly adapted for use in conjunction with bond terminals, such as described in a copending application, Serial No. 97,499, filed March 10, 1902, in which Francis B. Badt is a joint applicant with myself, and in United States Letters Patent No. 699,060, issued April 29, 1902, to Francis B. Badt and George M. Willis.

Generally speaking, the first feature of my invention is preferably embodied in a structure having a threaded shaft which is movable, preferably by lever mechanism, and a head mounted upon the end of the shaft that is to be placed contiguous to the rail, which

head is rotatable with relation to the threaded shaft, so that the friction of the compressor-head against the bond and the friction of the bond against the rail will be greater than the friction of the compressor-head against the threaded shaft, whereby the compressor-head is forced to remain stationary as the threaded shaft is rotated, thereby accomplishing a very desirable result, inasmuch as with bond-compressors that have been actually used the heads of the bonds have been rotated to such an extent while they were being upset as to entangle, disconnect, and render imperfect the link uniting the heads of the bond.

The second feature of my invention is preferably embodied in a structure having spring mechanism whereby the compressor-head of the bond-compressor is maintained in engagement with the bond-terminal to force the bond-terminal into proper relation with the rail before the application of that degree of pressure necessary to upset the bond into firm engagement with the rail. To this end I prefer to equip the bond-compressor with a stationary jaw (the head upon the threaded shaft of the bond-compressor comprising the other jaw) and provide spring mechanism upon the same side of the bond-compressor with the stationary jaw, which causes a bodily movement of the bond-compressor to effect the initial engagement of the moving compressor-head mounted upon the threaded shaft with the bond. This spring mechanism is preferably in the form of two spring-actuated pistons, between which the fixed jaw of the compressor is disposed, the axes of these pistons being preferably disposed in the same horizontal plane. By this construction the spring mechanism, which is disposed upon one side of the rail, exerts a force in a direction opposite to the direction of thrust of the compressor-head when the compressor-head is moved to upset the terminal head, so that the engagement of the bond-compressor, which is initially preferably only sufficient to maintain the proper engagement of the bond with the rail, is ultimately replaced by that degree of pressure necessary to upset the terminal head.

I will explain my invention more fully by



reference to the accompanying drawings, in which---

Figure 1 is an elevation, partially in vertical section, of the improved device of my invention.  
 5 Fig. 2 is a sectional view on line 2 2 of Fig. 1.  
 Fig. 3 is a bottom view on line 3 3 of Fig. 1.  
 Fig. 4 is a central longitudinal cross-sectional view showing the bond-terminal and the jaws before compression. Fig. 5 is a  
 10 similar view after the terminal has been compressed, and thereby fastened within the web of the rail.

Like parts are indicated by similar characters of reference throughout the different figures.

In Figs. 1 and 3 I have illustrated a body, as a rail *a*, to which the bond *b* is to be secured to form more effective electrical union between the rail-section *a* or other portion  
 20 and a contiguous rail or companion metallic portion. I have illustrated but one rail-section; but it is to be understood that the bond *b* is to effect electrical union between this rail-section and another. In the rail-section illustrated there is shown an aperture *c* through  
 25 the web of the rail, through which aperture the head *d* of the bond-terminal is passed. This head *d* is provided with oppositely-disposed aligned recesses, within which are contained plugs *d'* *d'* and between which intervenes  
 30 a web *e*, which is designed to be compressed to effect a distention of the bond-terminal to fill the aperture in the rail. The compressing-machine is preferably provided with a yoke  
 35 *f*, to which are secured the legs *g* *h*. The leg *h* is provided with a threaded aperture disposed in a horizontal plane, through which is passed the threaded stem *i*, that may be  
 40 actuated by a wheel *k* or other suitable form of lever to effect initial adjustment of the screw, whereafter that degree of pressure necessary to upset the bond-terminal head  
 45 may be secured by means of a wrench applied to the end *l* of the threaded shaft, this end being preferably polygonal in contour. The  
 50 inner end of the threaded shaft or stem *i* is provided with a reduced end *z*, which constitutes one member of a swivel-joint, the companion member of the swivel-joint comprising the moving compressor-head *m*. The  
 55 compressor-head of the compressing device is preferably associated with a companion compressor-head *n*, that is preferably stationary, being mounted upon the leg *g*.

As best illustrated in Figs. 4 and 5, the two  
 60 compressor-heads *m* and *n* are desirably made with their compressing-faces slightly concave, the faces preferably taking the form of parts of the surface of a sphere. As best  
 65 shown in Figs. 4 and 5, the bond-terminal is provided with hardened plugs *d'* *d'*, adapted to be forced into the softer material of the terminal proper to cause its enlargement to fill the opening in the web of the rail. Before the bond has been fastened to the rail

these plugs project a slight distance from the terminal. The provision of the spherically-concave faces of the compressor-jaws causes the compressor to center itself with respect to the axis of the bond-terminal as the jaws  
 70 are brought together. In the use of such bond-terminals as I have herein described I have found it quite important that the compressor be almost perfectly centered with respect to the axis of the bond-terminal, and  
 75 the provision of the concave faces of the compressor-jaws causes the compressor to automatically center itself without particular attention from the operator. Furthermore, it  
 80 will be seen that the provision of the concavity in the compressor head or jaw *m* insures a large diameter of the area of contact between the jaw and the terminal plug engaged thereby. It will be noted in this connection  
 85 that the reduced end *z*, which transmits the pressure of the screw to the head, is of comparatively small diameter. These provisions serve the additional purpose of causing the  
 90 relative turning between the screw and the bond-terminal to take place entirely within the swivel rather than relatively between the compressor-head and the bond-terminal.

Heretofore the engagement of the moving compressor-head with the bond-terminal depended upon the proximity of the movable  
 95 and stationary compressor-heads. I am enabled to secure an engagement of the movable compressor-head with the bond-terminal irrespective of that degree of proximity between  
 100 the compressor-heads that was hitherto necessary to insure the proper location of the bond with respect to the rail.

To secure a suitable adjustment of the compressor about the rail, the spring mechanism for holding the moving compressor-head  
 105 against the rail-bond is duplicated, each spring mechanism preferably comprising a plunger *o* within a spring-barrel *p*, the plungers projecting beyond the spring-barrels and engaging the web of the rail upon each side of the  
 110 fixed compressor-jaw. The springs that are preferably used for effecting a movement of the plungers or pistons toward the rail are coiled springs *q*. It is obvious that a variety  
 115 of spring mechanisms might be employed for effecting engagement of the moving compressor-head against the bond-terminal, and I do not, therefore, wish to be limited to the precise form of spring mechanism illustrated.

I have found that there is a marked cooperation between the concavity in the compressor-jaw and the particular embodiment of  
 120 spring mechanism which I have shown herein. The jaw *m* being in engagement with a plug *d'* of the bond-terminal is advanced by turning the screw *i*. This advancement of  
 125 the jaw *m* is resisted by the increased compression of the springs *q*, as the compression of the springs increases with the continued turning of the screw *i*. The plungers used  
 130



slide and adjust themselves with respect to the web of the rail until the jaw *n* is brought into center with respect to the bond-terminal. The jaw *n* therefore comes into engagement with the plug of the terminal perfectly centered with respect thereto.

Other features of the compressing device illustrated need not be particularly set forth, as they are understood by those skilled in the art. For example, the function of the set-screw *r* in securing the proper vertical adjustment of the compressing device is well understood.

It is obvious that other means may be employed for preventing the moving compressor-head from rotating materially as the bond-terminal head is being compressed.

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

1. In a bond-compressor, the combination with a C-shaped frame, of a movable compressor-head having a concave face carried by said frame, a fixed compressor-head carried by the other limb of the frame, and spring-

actuated plungers carried by one limb of the frame at either side of the fixed compressor-head, said plungers acting oppositely to the closure of the compressor-heads.

2. In a bond-compressor, the combination with a C-shaped frame, of a movable compressor-head having a concave face carried by said frame, a fixed compressor-head having a concave face carried by the other limb of the frame, and spring-actuated plungers carried by one limb of the frame and symmetrically placed with reference to the fixed head, the faces of said plungers normally extending beyond the face of the fixed compressor-head, said plungers serving to oppose the closure of the compressor-heads, substantially as described.

In witness whereof I hereunto subscribe my name this 27th day of March, A. D. 1902.

GEORGE M. WILLIS.

Witnesses:

GEORGE L. CRAGG,  
HARVEY L. HANSON.