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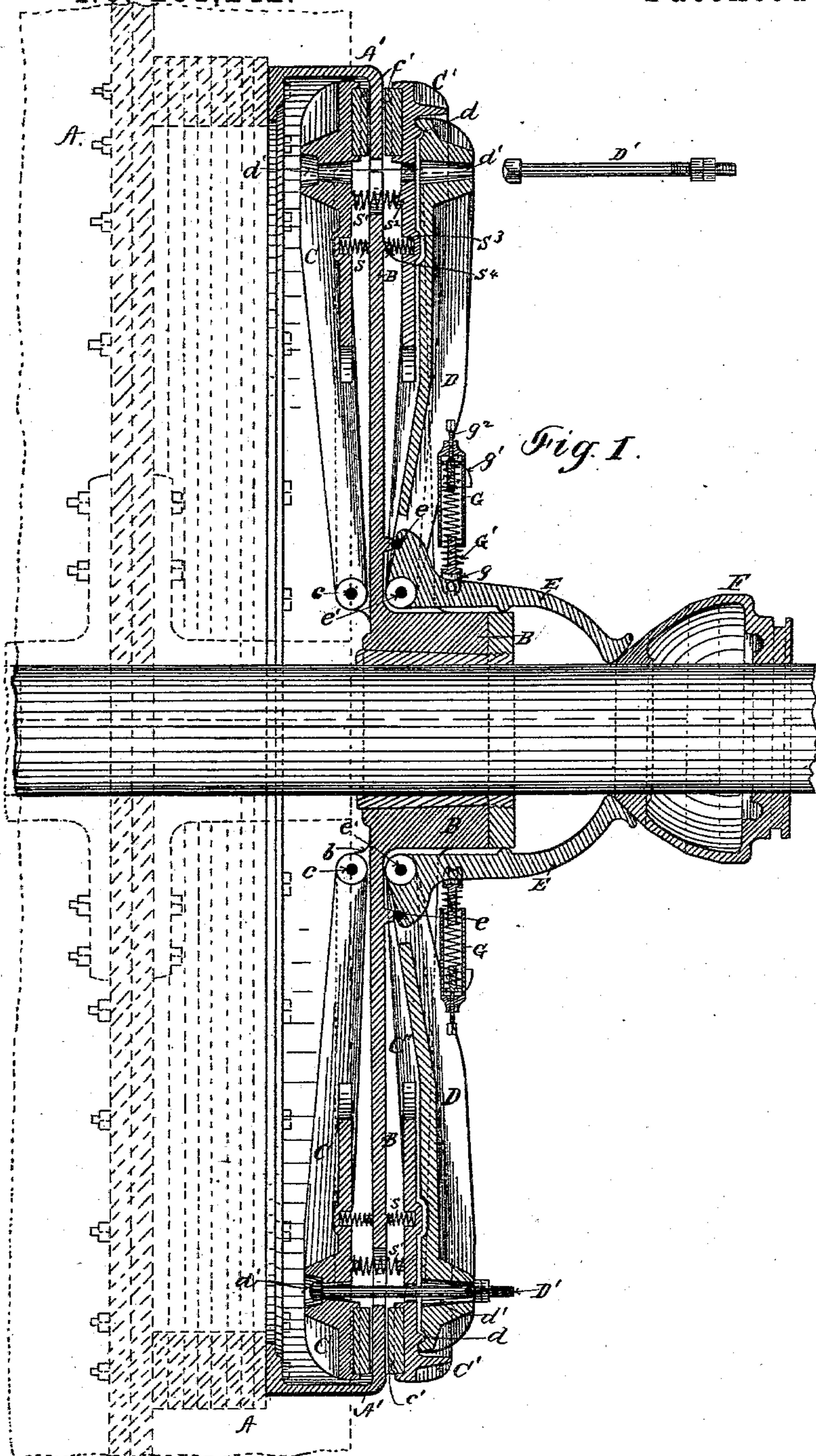
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H. C. CROWELL.

FRICTION CLUTCH.

No. 281,242.

Patented July 17, 1883.



Witnesses

W. R. Edelen.

M. A. Edelen.

Inventor

Helen C. Crowell

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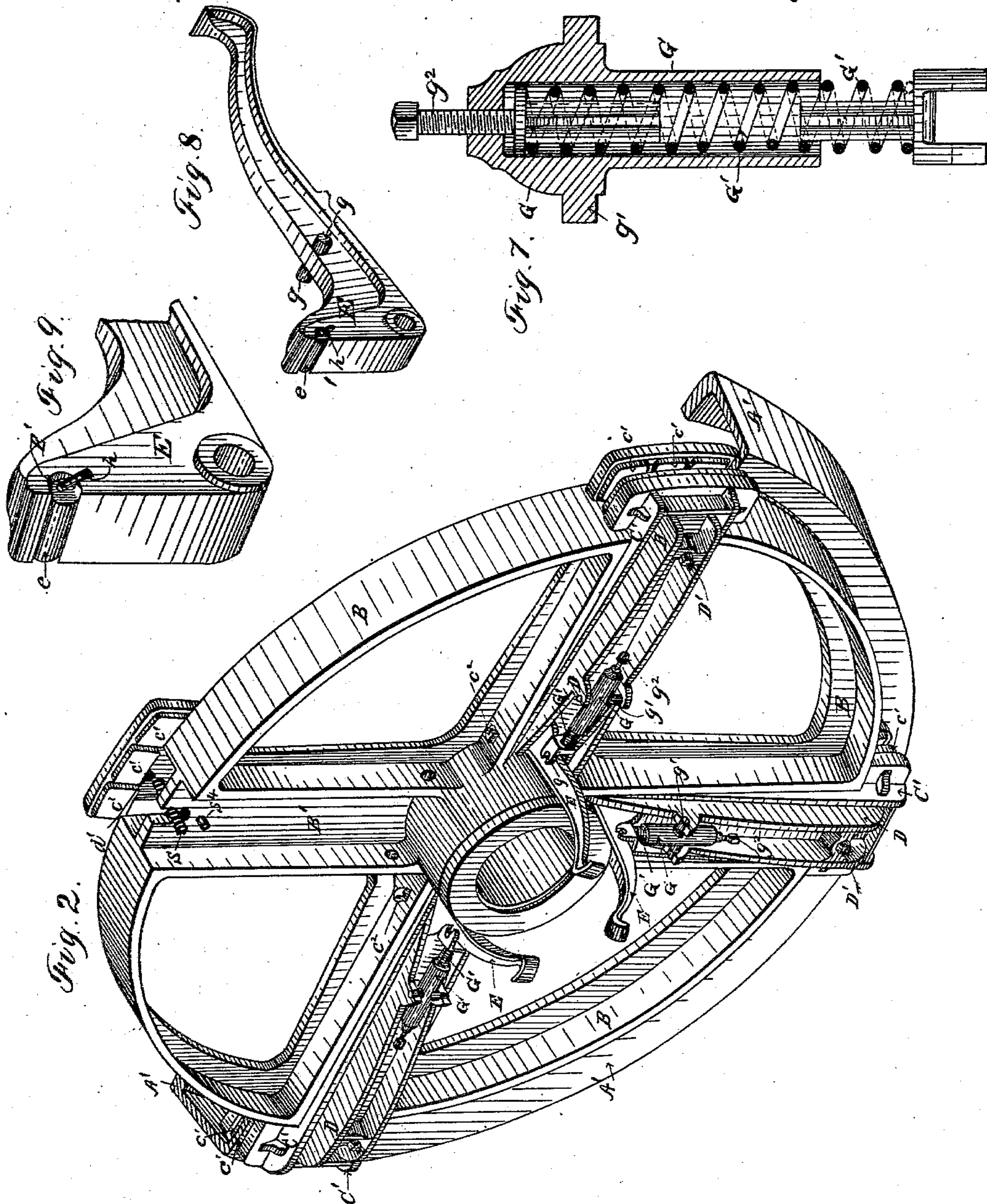
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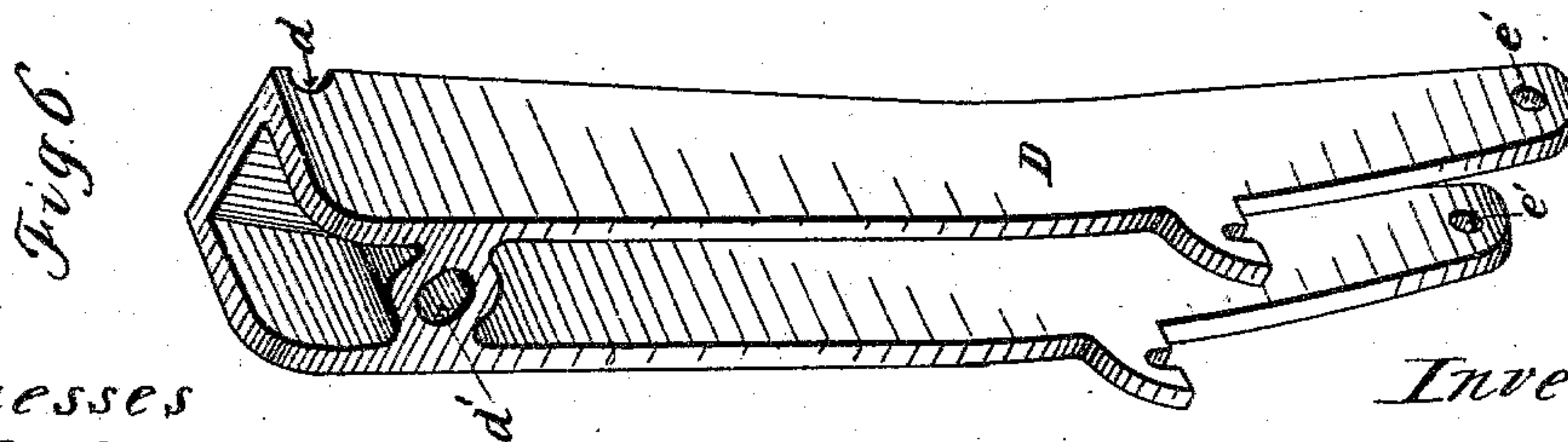
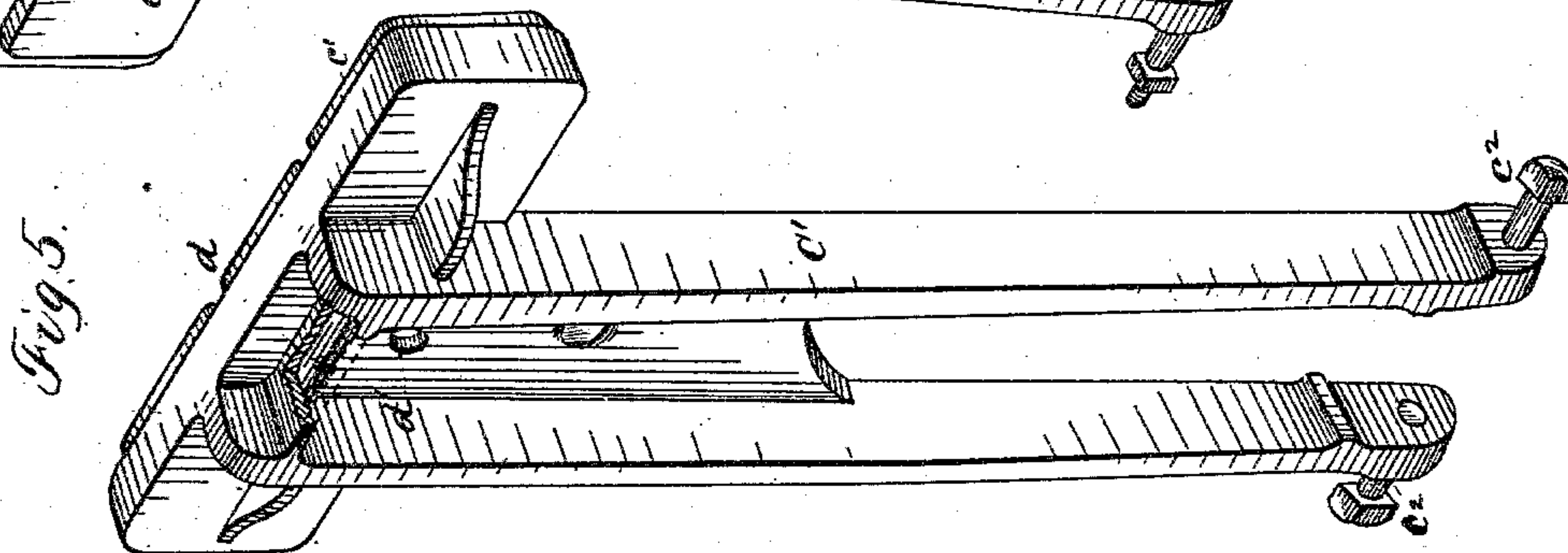
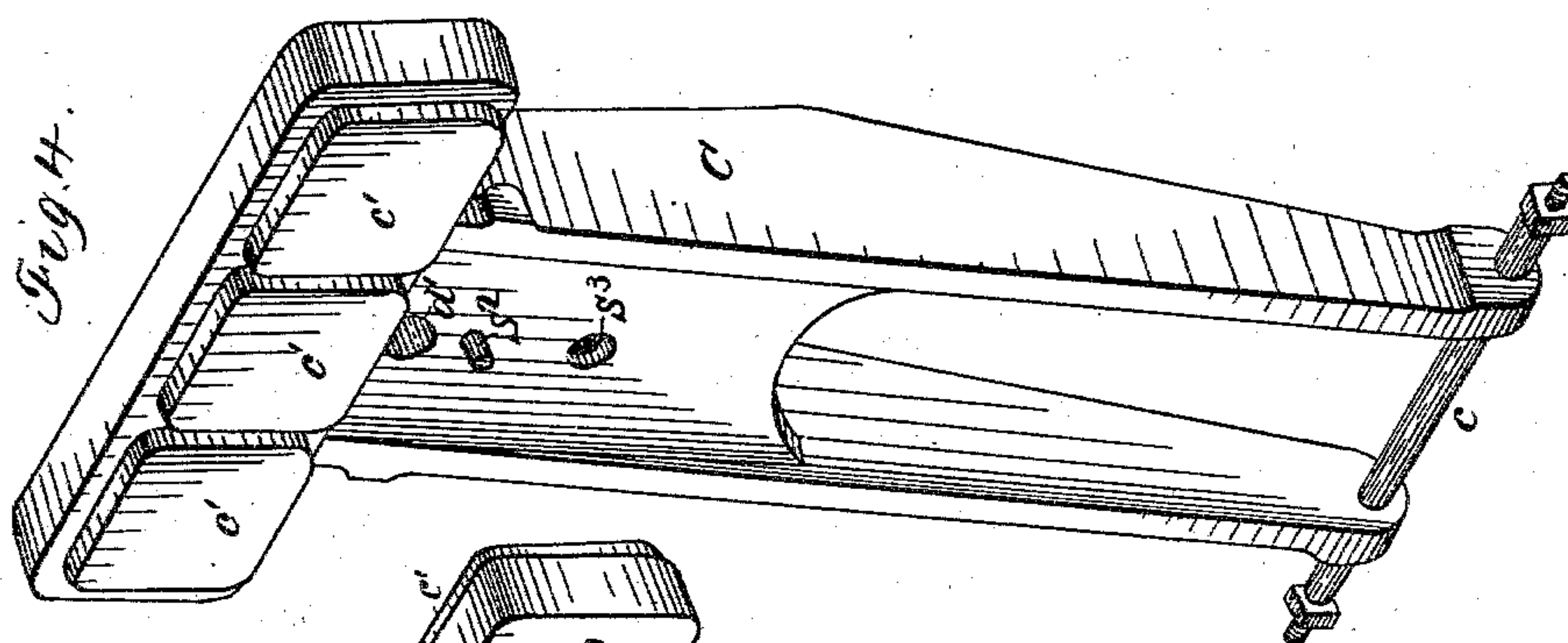
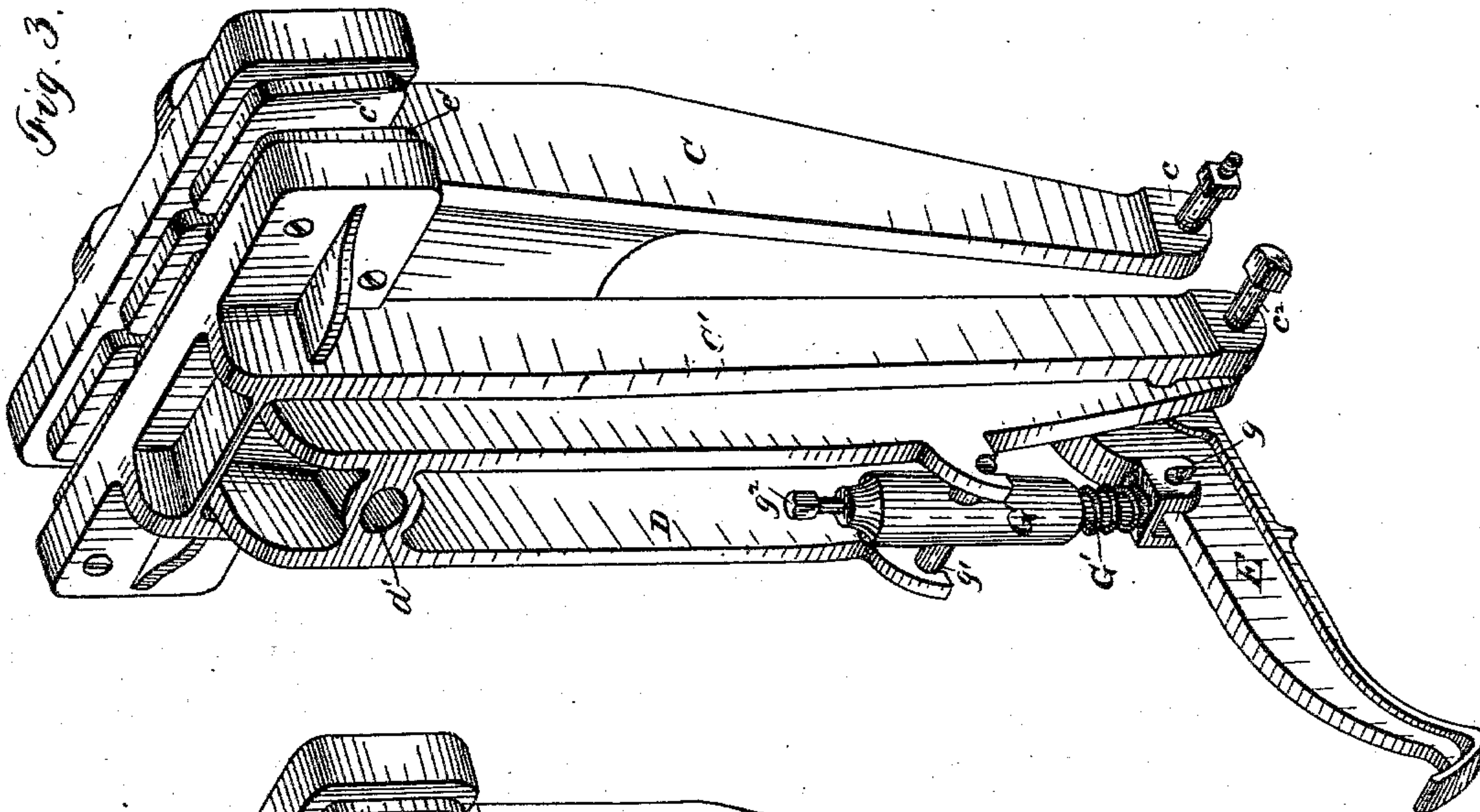
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FRICITION CLUTCH.

No. 281,242.

Patented July 17, 1883.



Witnesses

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UNITED STATES PATENT OFFICE.

HILEN C. CROWELL, OF ERIE, PENNSYLVANIA.

FRICITION-CLUTCH.

SPECIFICATION forming part of Letters Patent No. 281,242, dated July 17, 1883.

Application filed November 22, 1882. (No model.)

To all whom it may concern:

Be it known that I, HILEN CANFIELD CROWELL, a citizen of the United States, residing at Erie, in the county of Erie and State of Pennsylvania, have invented certain new and useful Improvements in Friction-Clutches; and I do hereby 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 appertains, to make and use the same.

This invention relates to that class of friction-clutches in which the clutching is effected by clamping the opposite sides of a clutch-flange which is attached to the web of the pulley or other object upon which the clutch is to operate, which class of clutches is exemplified in the United States Patents to Lull, May 31, 1870; Bean, January 16, 1877, and to myself November 11, 1879.

The primary object of this invention is to so construct the clamping apparatus as to have both of its jaws movable—that is to say, so that the clamping jaws or surfaces which grip each side of the clutch ring or flange will each be movable. In all the clutches of this class with which I am acquainted only one of the jaws or clamping-surfaces is movable, the other being fixed on a frame, or cross-head, or disk or like device which is keyed to the shaft, and the result is that in case the apparatus is at all large, as is generally the case, the shaft is more or less sagged by its weight, and the cross-head or frame and the pulley are thrown out of their proper parallel relation to each other to such an extent that there is not sufficient movement in the movable jaw to clear the pulley, or clutch-ring on the pulley, or else the stationary jaw by the said deflection is kept in contact with the clutch-ring, one or the other, according to the construction of the clutch. The result of the above is to entirely defeat the purpose of the clutch, and when the deflection is increased by the amount of power being transmitted by the pulley and belt, as is generally the case, very serious results often occur. By my construction—that is, by making both jaws movable, or, rather, by giving to each jaw a positive movement—I entirely overcome the above difficulties. As the various forms of clutches embraced in the class named differ from each other in the forms of the jaws and the arrangement and construc-

tion of the levers by which they are moved, each species of the class will require a different modification in its construction in order to apply my invention thereto, and it is impossible for me to here illustrate all these various modifications; however, in almost every instance such modification will readily suggest itself to a skilled mechanic after having becoming familiar with the construction I here show, which is founded upon the general construction shown in the patent to me above referred to.

The secondary features of this invention relate to minor details of construction by which the device is improved, as will be hereinafter fully described and claimed.

The accompanying drawings illustrate my invention, as follows:

Figure 1 is a vertical sectional view, the line of section being the shaft-line, and shows the clutch device in full lines and a fragment of a wooden pulley, A, in dotted lines. Fig. 2 is a perspective view showing a fragment of the clutch ring or flange A', the cross-head or frame B complete, and three of the gripping devices complete, the fourth being dissected to show the form of the cross-head or frame more perfectly. Fig. 3 is a perspective view of one of the gripping devices complete, being composed of the movable jaws C C' and the compound leverage D E. Figs. 4, 5, and 6 are perspective views of the said parts C, C', and D respectively. Figs. 8 and 9 are like views of the lever E. Fig. 7 is a detail of the trunnioned spring-socket G, (seen in place in the other figures.)

While the drawings show the clutch as having four gripping devices, it may be constructed with a less number; and while the clutch is shown as in connection with a loose pulley, such is not the limit of its use, for it is largely used as a shaft-coupling where it is desired to have one part of a line of shafting so it can be disconnected at any time.

In the drawings, the pulley A is loose upon the shaft, and has the clutch-ring A' fastened concentrically upon its web. The clutch-frame B is keyed or otherwise secured upon the shaft, and carries with it the gripping devices. It is placed, with relation to the clutch-ring A', so that its web is in the same vertical plane as the flange of the ring, and thus brings

one series of jaws on one side of the flange and the other upon the other, and by giving each jaw an independent movement the extent of the movement of each need be but slight in order to give a sure clearance when the jaws are open; and it will also be seen that in case the weight of the device and the pulley, or the strain of the load or exertion of the pulley were to sag or deflect the shaft, it would simply throw the rim of the flange out of the plane of the frame B toward one of the movable jaws, which would adjust itself to the change, and yet be able to move away from it when the jaws are thrown open. Now by observing the patent to Bean, No. 186,296, and the patent to myself, No. 221,396, to which I have above referred, we will, for example, see that the movable jaw is on the inside of the clutch-ring, while the fixed jaw is on the frame, which extends out past the clutch-ring for the purpose of affording a place for this fixed jaw. A slight lateral movement is provided for the pulley in order that it will not be in contact with the fixed jaw when the clamp is open; but it will be also seen that this lateral movement must necessarily be very slight, and also that a deflection of the shaft will throw the pulley over against the fixed jaw, and if this occurs the clutch cannot be wholly disengaged from the clutch-flange. From a long experience with this class of clutches I have found that such an impingement of the clutch-ring upon the fixed jaw is a very common occurrence, and causes great annoyance and often great damage. I have seen large and powerful clutches torn to pieces and wrecked by reason of the above condition of the parts. I have also found that by making both of the jaws movable I entirely overcome the above defect. When this is done, it is not necessary that there be any lateral movement of the pulley provided for, and this is of considerable, or, I might say, great advantage when the device is to be used in coupling line of shafting. The remedy having been found, its application to various forms of clutches is very simple, or may be so.

The essential parts of the construction are the two movable jaws, and a frame, disk, or head on the shaft whereon they may be secured and pivoted. For instance, take a clutch like the one shown in the Bean patent above referred to. By so modifying the construction that the arms of the frame on which the levers which move the movable jaw can also be pivoted the desired result would be attained; and in the patent to me above referred to, by jointing or pivoting the arms of the cross-head the two jaws would be movable, and would adjust themselves to the rim of the clutch-ring during any deflection of the shaft. This is what I have done, and illustrate in the drawings herewith, practically, although I have still left fixed arms on the head; but they do not reach to the flange of the clutch-ring, and only serve to steady and support the movable jaws, and would be de-

sirable in the modification for the purposes named of almost all styles of this class of clutches. I have also shown the arms of the cross-head B connected, so that it has the appearance of being a pulley or wheel. (See Fig. 2.) This is done for the purpose of adding strength to the device. Each arm is flanged, forming an inlet, B', into which the jaws are set and by which they are steadied. The jaw C is pivoted on the bolt *c*. The jaw C' is pivoted on the bolts *c*² *c*², which pass through the flanges on the arms and enter the sides of the jaw C', but do not pass clear across, thus leaving a space for the lever D to lie in, as seen clearly in Fig. 3. The lever D is also pronged, and receives the lever E between its prongs, to which said lever is pivoted by a bolt which passes through the holes *e*', which are so placed that the pintle of lever E will be concentric with the pintles of the jaw C' when the levers D and E are not in use—that is, when the jaws are open. The object of such an arrangement of the pintles named is to prevent the levers D and E from interfering with the pivotal movement of the jaw C' when the jaws are open. The lever D has its fulcrum on a rib, *d*, at the upper end of the jaw C'. The lever E has its fulcrum at the point *e* upon a rib on the arm of the cross-head. A bolt, D', within the opening *d'* through the jaws, the lever D, and the arm of the cross-head, connects the lever D with the jaw C. This bolt connects the lever D with its weight, which is the jaw C. As the jaw C' is pivoted and movable, its movement is effected by the fact that the lever D, in its action, pushes just as hard on its fulcrum *d* as it pulls on its weight, the bolt D', in fact, so far as the jaw C' is concerned. The fulcrum of the lever D is on the bolt D', and its weight is on the rib *d*, so that the lever D, in moving the jaw C', acts as a lever of the first order, and in moving jaw C it acts as a lever of the second order, and it does both these at once. The lever E operates in precisely the same manner as in the patent to me above referred to, and needs no further description, except to refer to an improvement in its construction, which consists in providing its bearing-point with a friction-roller, *e*, which sets in a socket, E', which is more than a half-circle in form, and thus prevents the roller from falling out, but still exposes it to receive the pressure of the lever's action. The roller is prevented from coming out endwise by a wire, *h*, which passes through the lever back of the roller-socket, and is bent up, as seen in Figs. 8 and 9. The sliding cone F raises the levers E, as in my former patent. To prevent the levers E from being lifted by the centrifugal force which acts upon them as the shaft revolves, I apply a spring, G', between them and a point on the lever D. This spring is housed in a socket, G, which has trunnions *g*', which set under lugs on the lever D; and it has a bearing-head which sets on lugs *g* on the lever E; and its tension can be regulated by a screw, *g*², which

works against a bearing-head on the spring within the socket G. This construction is clearly seen in Figs. 1 and 7. This spring G' also serves to give to the levers E a certain degree of resistance to the action of the cone F, which is desirable, as it prevents too sudden a movement of the parts at the inception of their action and before the jaws begin to pinch the flange of the ring A'. When the jaws are open they are kept from swaying on their pivots by springs S S on each side of the arms of the frame B. These springs act independently. Another spring, S', is used, which acts upon both jaws. The office of this spring is to insure the opening of the jaws when the cone F is thrown back; but this spring would not prevent the jaws swaying on their pivots. It would only make them sway together in unison. So it is that between the springs S and S' the jaws are kept open, and are kept from swinging while open, and thus coming in contact with the friction-ring when not wanted there.

I am aware that a loose pulley having a flange with two friction-faces, one of which is drawn against a disk fixed upon the shaft by a loose bar, which is drawn in contact with the opposite friction-face by means of a compound lever operated by a sleeve on the shaft, is old; but this device differs from mine in that it is necessary to move the pulley upon the shaft, whereas in mine both clutching-faces move toward the pulley-flange, thus obviating the necessity for lateral slipping of the belt upon the pulley.

What I claim as new is—

1. In a friction-clutch for the gearing of machinery, the combination, substantially as shown, of the following elements: a concentric clutch-flange upon one part of the machinery, which is provided with friction-surfaces on the inner and outer sides thereof, and a head or frame on the correlative part of said machinery, having adjusted upon it a gripping device with both its jaws made movable, and adapted, substantially as shown, to grip the said clutch-flange on its said friction-surfaces by a movement of both of said jaws.

2. In a friction-clutch for gearing for machinery, the combination, substantially as shown, of the following elements: a concentric clutch-ring upon one of the parts of the machinery, which is provided with a flange having friction-surfaces upon opposite sides thereof, a cross-head or frame upon the correlative part of said machinery, adjusted adjacent to said clutch-ring, a vise-like gripping apparatus having both its jaws made movable, one of which is within and the other without said clutch-ring, and, finally, a system of levers for operating said jaws, which are arranged on said cross-head or frame outside of said clutch-ring.

3. In a friction-clutch wherein the clutching is effected substantially as shown, the combination of the frame B with arms having recesses or inlets B', jaws C C', pivoted on each side of said arms and sitting within said recesses, and the levers D and E, and the bolt D' for operating said jaws, all substantially as and for the purposes set forth.

4. In a friction-clutch, substantially as shown, the combination of the frame B, jaws C C', bolt D', levers D and E, and the springs S S', substantially as shown.

5. In a friction-clutch, substantially as shown, the combination of the jaws C', bolt D', levers D and E, and an adjustable spring between said levers D and E, substantially as and for the purposes set forth.

6. In a friction-clutch, substantially as shown, the combination of lever D, having socket G, lever E, and an adjustable spring, G', attached to said socket and lever E, for the purpose set forth.

7. In a friction-clutch, substantially as shown, the combination, with the lever E, of a roller, e, adjusted within the socket E', and secured by the wire h, substantially as and for the purposes set forth.

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

H. C. CROWELL.

Witnesses:

JNO. K. HALLOCK,
W. S. BROWN.