

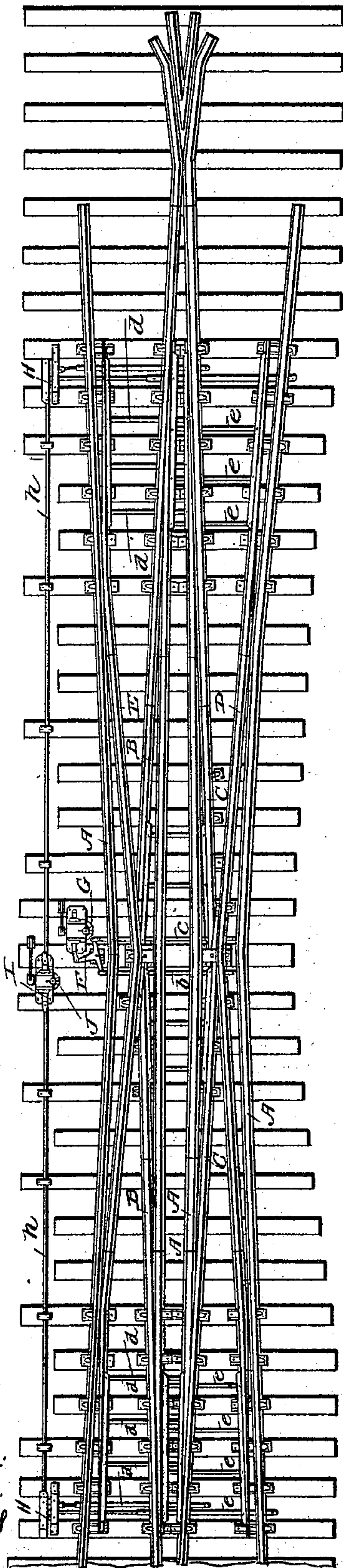
(No Model.)

2 Sheets—Sheet 1.

N. W. BOYD.  
ADJUSTABLE DOUBLE BELL CRANK.

No. 516,361.

Patented Mar. 13, 1894.



Witnesses:  
 Wm. A. B. B. B.  
 W. B. B. B.

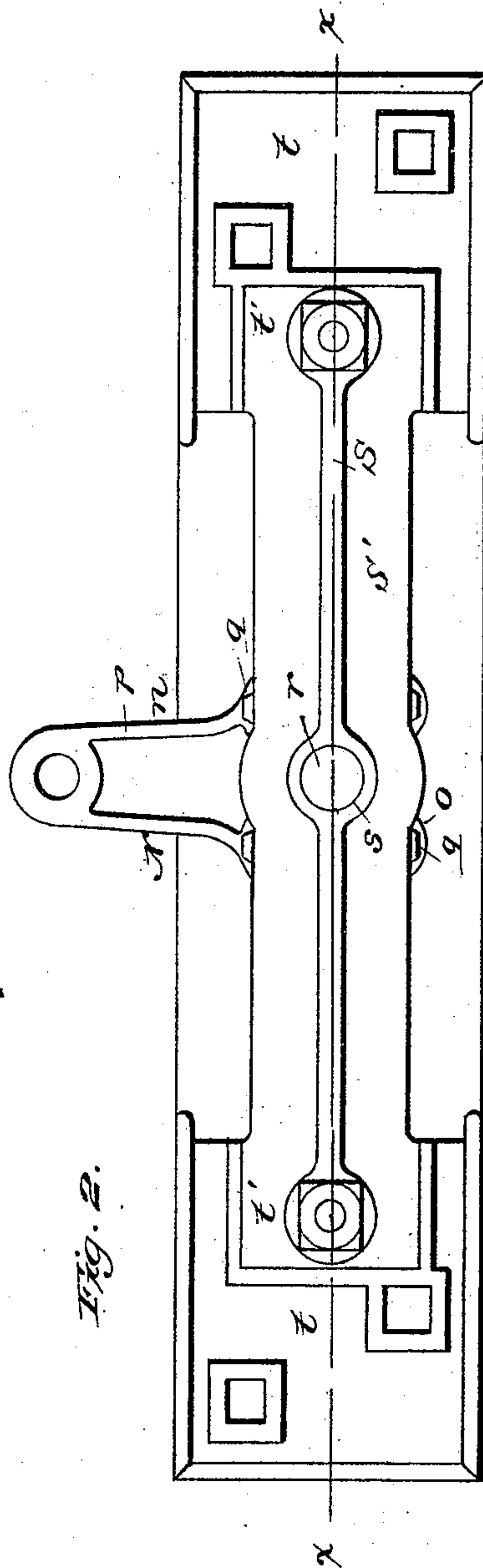


Fig. 2.

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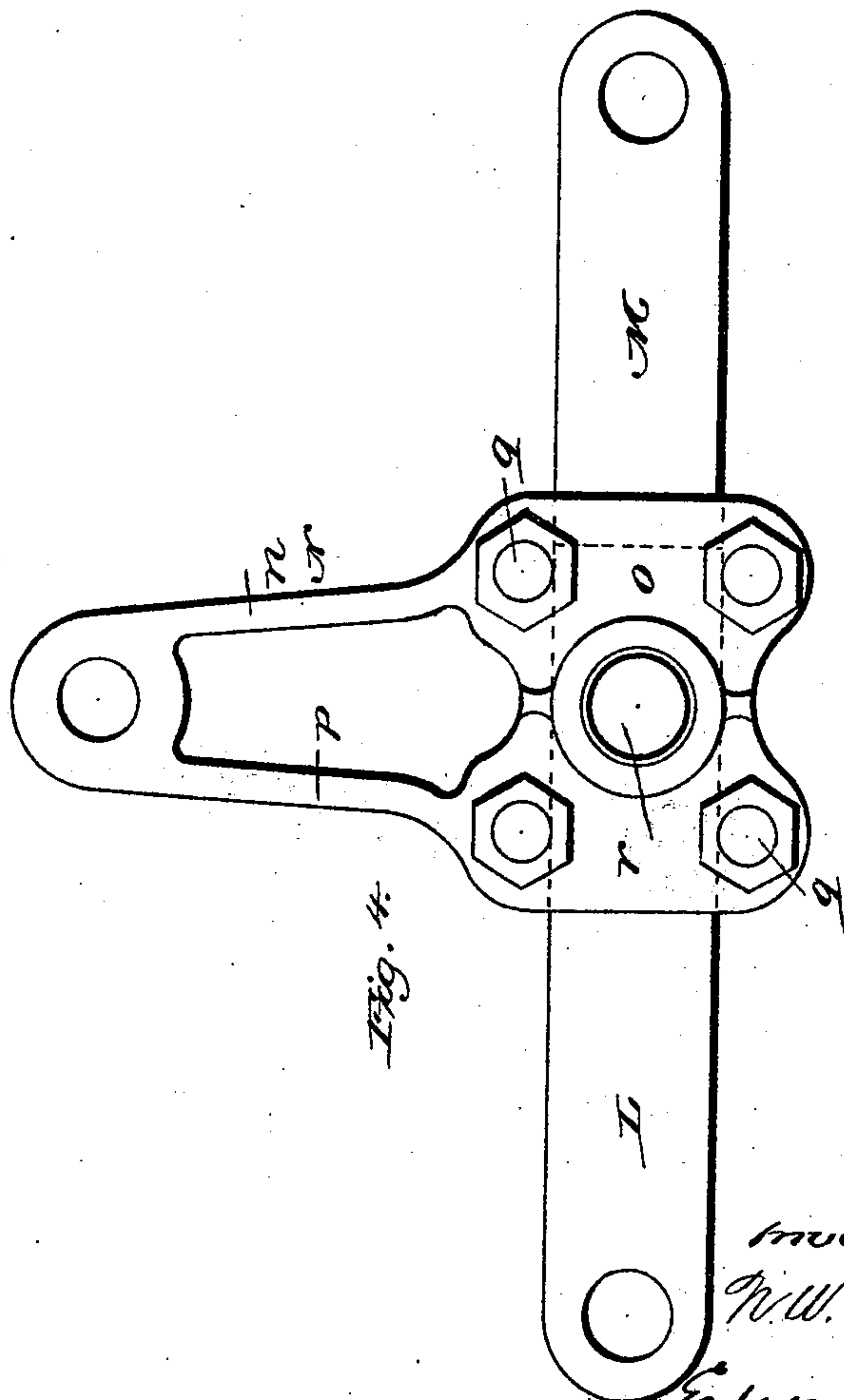
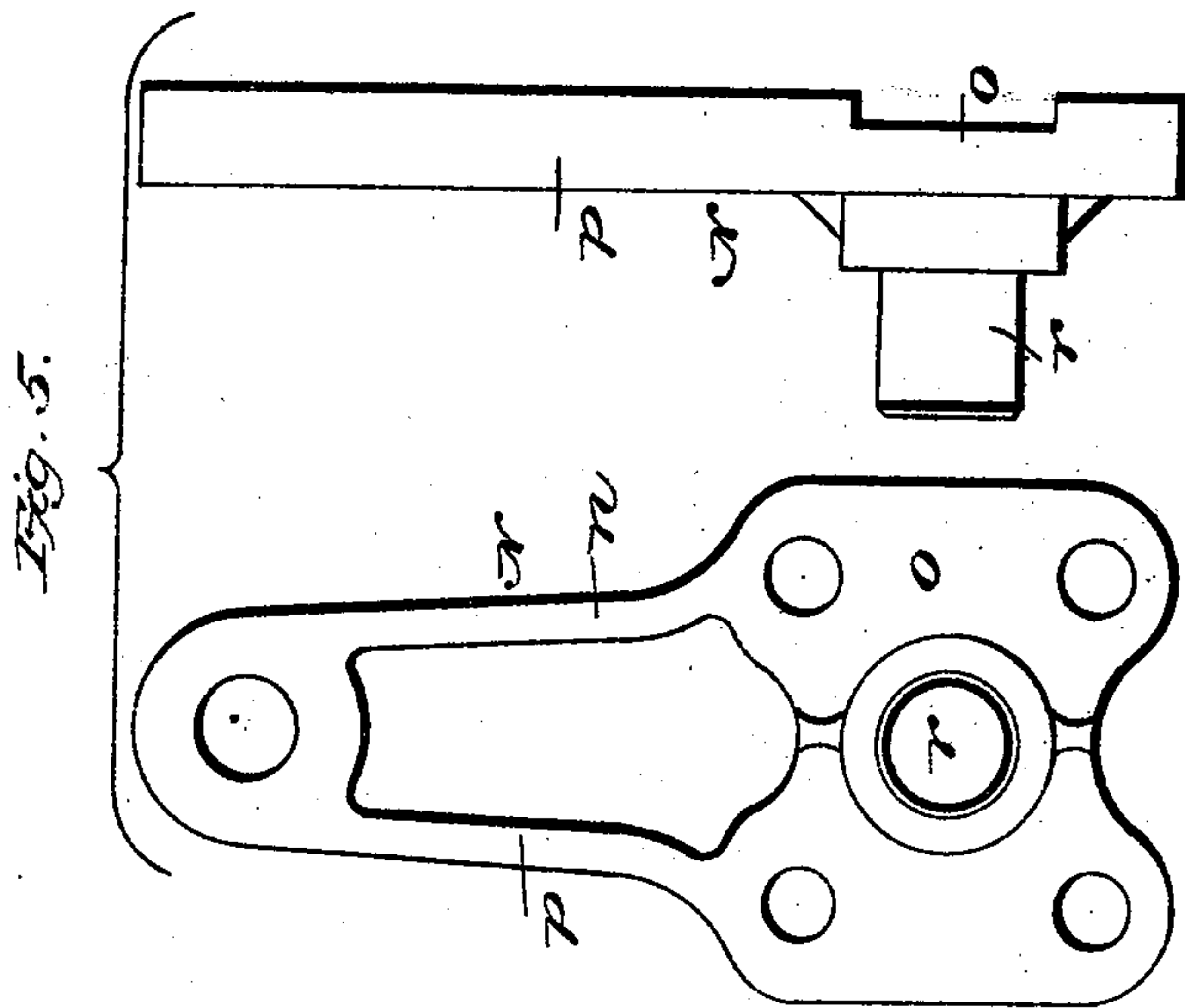
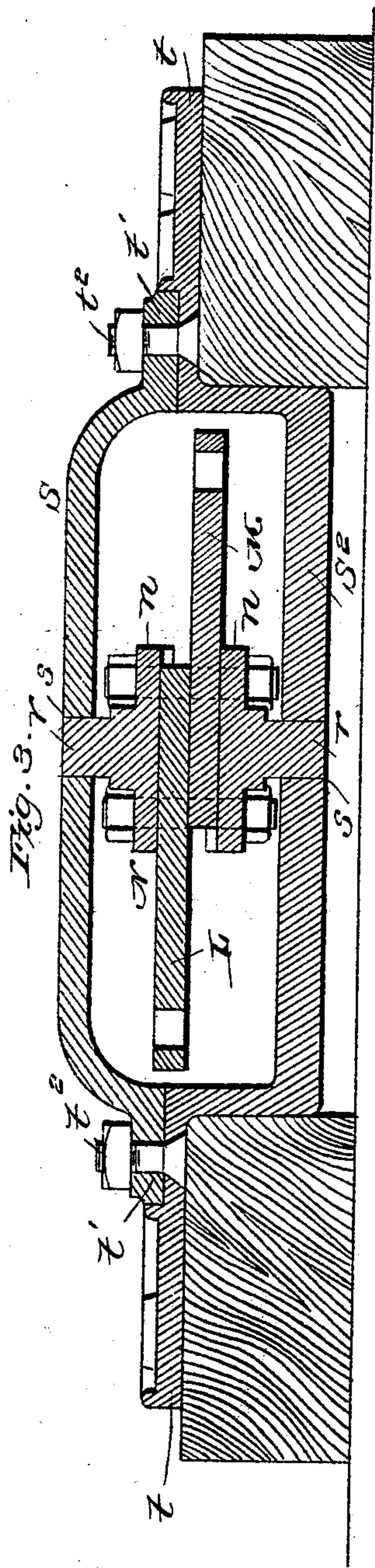
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Witnesses:

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# UNITED STATES PATENT OFFICE.

NATHANIEL W. BOYD, OF CARLISLE, PENNSYLVANIA.

## ADJUSTABLE DOUBLE BELL-CRANK.

SPECIFICATION forming part of Letters Patent No. 516,361, dated March 13, 1894.

Application filed September 16, 1892. Renewed September 7, 1893. Serial No. 485,023. (No model.)

*To all whom it may concern:*

Be it known that I, NATHANIEL W. BOYD, a citizen of the United States, residing at Carlisle, in the county of Cumberland and State of Pennsylvania, have invented certain new and useful Improvements in Adjustable Double Bell-Cranks; 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.

My present invention relates to an adjustable double bell-crank lever more particularly designed for use in "slip switches and cross-overs" of railway tracks, although such bell-crank lever is capable of advantageous use in any art or relation where it is desired to have the parts adjustably connected together by a bell crank.

In a slip switch and cross-over for railway tracks it is usual to employ a double bell-crank lever having an arm connected to the signal staff and its other two arms connected to the throw-rods of two sets of switch-rails to effect their simultaneous movement in opposite directions. The bell-crank which forms the subject of this application is made so its arms, to which are connected the switch-rods, are adjustable longitudinally with respect to each other and diametrically opposite in line with the fulcrum of said bell-crank, whereby the "throw" or extent of movement of the switch rails and rods can be adjusted to bring the points of the switch rails in proper position relative to the fixed rails of the switch and cross-over.

My improved adjustable bell-crank is composed or "built up" of sections which are rigidly clamped together in a manner which enables the switchman to readily adjust the arms of said bell-crank, the whole device being composed of few parts of simple construction.

The invention further consists of the novel combination and construction of parts which will be hereinafter more fully described and claimed.

To enable others to understand my invention, I have illustrated its application to a railway slip switch and cross over in the ac-

companying drawings, forming a part of this specification, and in which—

Figure 1 is a plan view of said switch and cross over with my improved bell-crank connected to the signal and movable rails. Fig. 2 is an enlarged plan view of the supporting yoke and bell-crank. Fig. 3 is a longitudinal sectional view on the line  $x-x$  of Fig. 2. Fig. 4 is a detail view of the bell-crank detached from its supporting yoke, and Fig. 5 is a detail view, in plan and elevation, of one of the plates forming the arm to which the signal staff is to be connected.

Like letters of reference denote corresponding parts in all the figures of the drawings.

Referring more particularly to Fig. 1 of the drawings, A, A, designate the fixed rails of a railway switch technically known as a "slip switch and cross over," B, B, C, C, are the movable middle-rails, and D, D, E, E, are two sets of movable rails arranged at opposite ends of the switch, on opposite sides of the movable middle rails B, B, C, C. The movable rails B, B, C, C, have switch rods  $b, c$ , respectively connected to the same, and these rods are pivoted to oppositely extending arms of a double bell-crank F in a manner to simultaneously effect opposite movement of said rails as the bell crank is turned on its fulcrum, the third arm of said double bell-crank being linked to a switch-stand G. The two sets of rails D, D, and E, E, on opposite sides of the middle rails B, B, C, C, (or at each end of the switch and cross over) are likewise provided with switch-rods  $d, e$ , which are adapted to move the rails D, D, and E, E, in opposite directions simultaneously; and said switch rods  $d, e$ , are pivoted to the diametric arms of a bell-crank H. Two of these bell-cranks H are provided, one at each end of the switch; and to the third arm of each bell-crank H is pivoted a connecting rod  $h$ , the rods  $h, h$ , being in turn pivoted to the opposite arms of a central bell crank I having the switch stand J connected to its remaining arm.

Having now explained the general nature of the switch to which my improvement is especially (although not exclusively) adapted, I will now proceed to a detailed descrip-



tion of the bell-crank itself, reference being had more particularly to Figs. 2 to 5 inclusive, of the drawings.

The bell-crank (either F, H or I of Fig. 1) is built up or composed of sections, namely, the two oppositely-extending arms L, M, and the third arm N at right angles to the oppositely-extending arms L, M. One of the arms or sections of the bell-crank is formed so as to clamp the other arms or sections together, but I do not desire to strictly confine myself to this specific construction, as it is evident that a separate clamp may be used to hold the meeting ends of the three arms together forming the bell-crank.

In the embodiment of my invention shown in the accompanying drawings, I prefer to make the arm N of two plates  $n, n$ , which are duplicates of each other, the body  $o$  of the plates being made broad and wide to form bearing surfaces for the inner ends of the oppositely extending arms L, M, while the shanks  $p, p$ , of said plates are arranged one above the other in substantially vertical alignment. The two plates  $n, n$ , are placed paralld with each other, a sufficient distance apart to adapt them to receive the inner ends of the other arms L, M, and through the broad bodies of the plates are passed the clamping bolts  $q$  (preferably four in number, one at each corner) which serve to draw the plates tightly and thereby hold the arms L, M, between the members of the arm N by frictional contact. Such construction provides a substantial rigid and simple connection between the three arms of the double-bell-crank; and it is evident that the bolts can be loosened to permit the arms L, M, to be moved longitudinally, either inward toward or outward from the center or fulcrum of the bell-crank, whereby the arms L, M, can be changed to vary or regulate the "throw" or extent of movement of the switch rods and movable switch rails. I have also devised novel means for supporting and pivoting the bell-crank. The sections or plates  $n, n$ , of the arm N are each provided with an integral stud or pivot  $r$ , which are in the same vertical line, the one extending upwardly and the other downwardly from said arm N; and these studs or pivots are fitted in vertical sockets or openings  $s, s$ , provided on the inner opposing faces of the supporting yoke S.

For the convenient and easy adjustment of the bell-crank between the yoke, and its ready application to the ties of the railway track, I make this yoke S in two parts or sections, a lower part  $S'$  and an upper part  $S^2$  which are detachably, but securely, fastened together. The lower member  $S'$  of the yoke is shaped and proportioned to fit between the ties and has horizontal arms  $t$  which are adapted to be securely fastened to the ties by bolts or equivalent means; and the upper member  $S^2$  of said yoke has feet  $t'$  which are

fitted in sockets in the upper faces of said arms  $t$ , said feet  $t'$  being fastened securely to the arms  $t$  by bolts  $t^2$  or in any equivalent or suitable way.

A yoke constructed as herein described provides a substantial support for the bell-crank which is free to turn in the yoke, and as the sides of the yoke are open and its upper member is removably fastened in place, ready access can be had to the bell crank for the purpose of adjusting its oppositely extending arms L, M, to adjust the same and the throw of the switch rails.

The yoke and bell crank can be easily applied to the ties of a track, and the parts are simple in construction and effective and reliable in operation.

The operation and advantages of my invention will be readily understood and appreciated by those skilled in the art to which it appertains from the foregoing description taken in connection with the drawings.

Although I have herein shown and described my improved adjustable double-bell-crank as adapted for a slip switch and cross over, yet I would have it understood that I do not confine myself to this specific application of the double bell crank, as it is evident that the same can be used in other arts or relations where it is desirable to adjustably connect parts together. Nor do I limit myself to the details of construction and form and proportion of parts herein shown and described as an embodiment of my invention as the same can be modified and changed by a skilled mechanic without departing from the spirit or sacrificing the advantages of my invention.

What I claim as new, and desire to secure by Letters Patent, is—

1. A double bell-crank lever, consisting of three arms which extend radially from the fulcrum and having their inner ends adjustably confined or held together at said fulcrum of the lever, as and for the purpose described.

2. A double bell-crank lever, comprising three radial arms, one of which is provided with the fulcrum studs, and the other arms adjustably clamped to the arm having said studs, as and for the purpose described.

3. An adjustable double bell-crank comprising a sectional clamp arm, and the arms adjustably fitted between and confined by said sectional arm, substantially as and for the purpose described.

4. An adjustable double bell-crank, comprising a clamp-arm which forms the fulcrum of said crank, and the separate arms adjustably confined or held by said clamp-arm, as and for the purpose described.

5. An adjustable double-bell-crank, comprising a sectional arm, the oppositely extending arms fitted between said sectional arm, and transverse fastening means for hold-



ing said members or parts rigidly and adjustably together, as and for the purpose described.

5 6. An adjustable double bell-crank comprising a sectional arm having the rigid pivot-studs adapted to fit in suitable bearings or sockets, the oppositely extending arms which overlap each other between the sections of said arms, and means for clamp-

ing the sectional arm rigidly and adjustably to the overlapping arms, as and for the purpose described. 10

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

NATHANIEL W. BOYD.

Witnesses:

JOHN R. MILLER,  
W. H. MCCREA.