

No. 780,804.

PATENTED JAN. 24, 1905.

E. W. MOIR.

GRAPPLING DEVICE FOR HANDLING STEEL SEGMENTS, BEAMS, &c.

APPLICATION FILED NOV. 16, 1904.

2 SHEETS—SHEET 1.

Fig. 2.

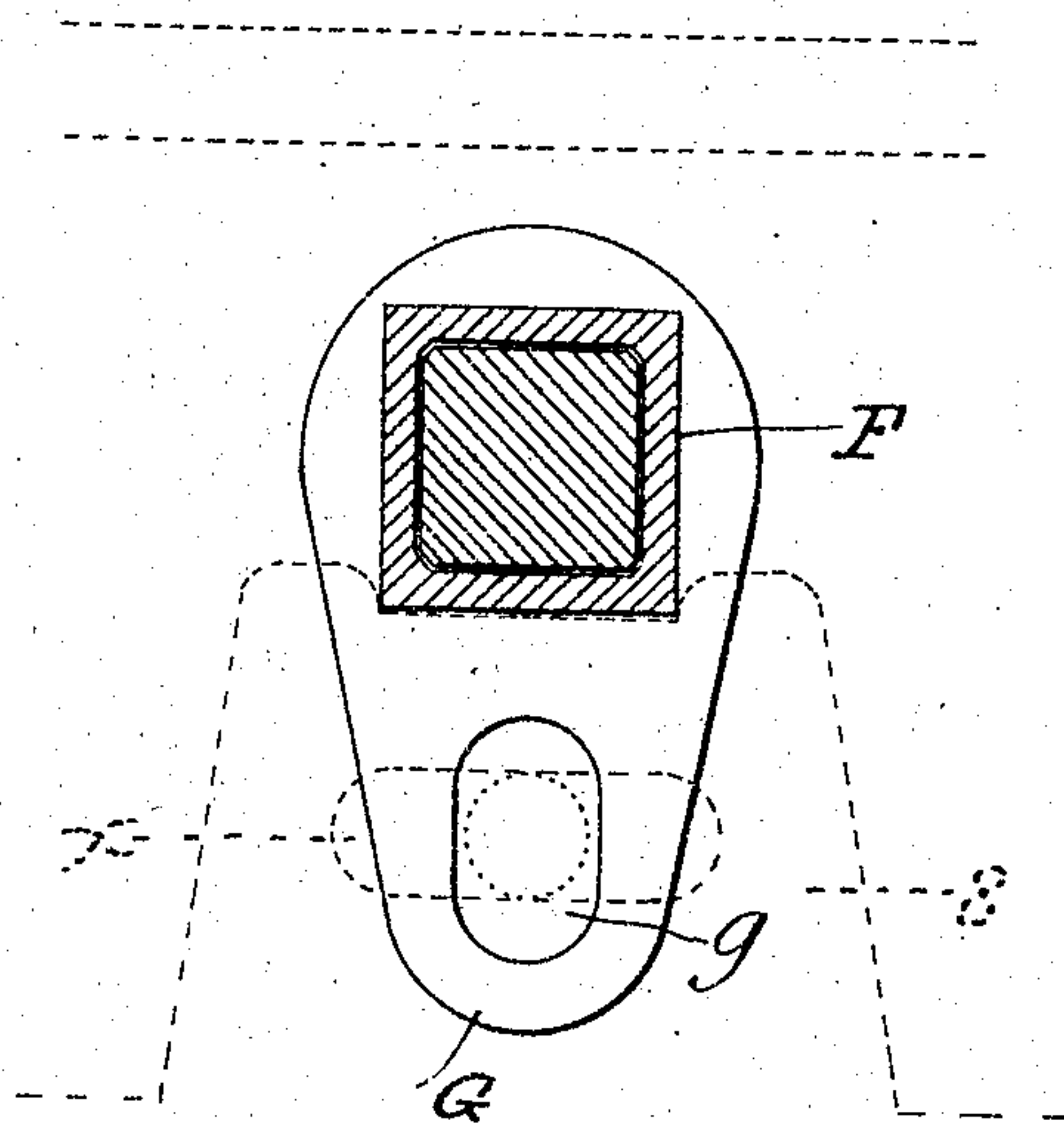
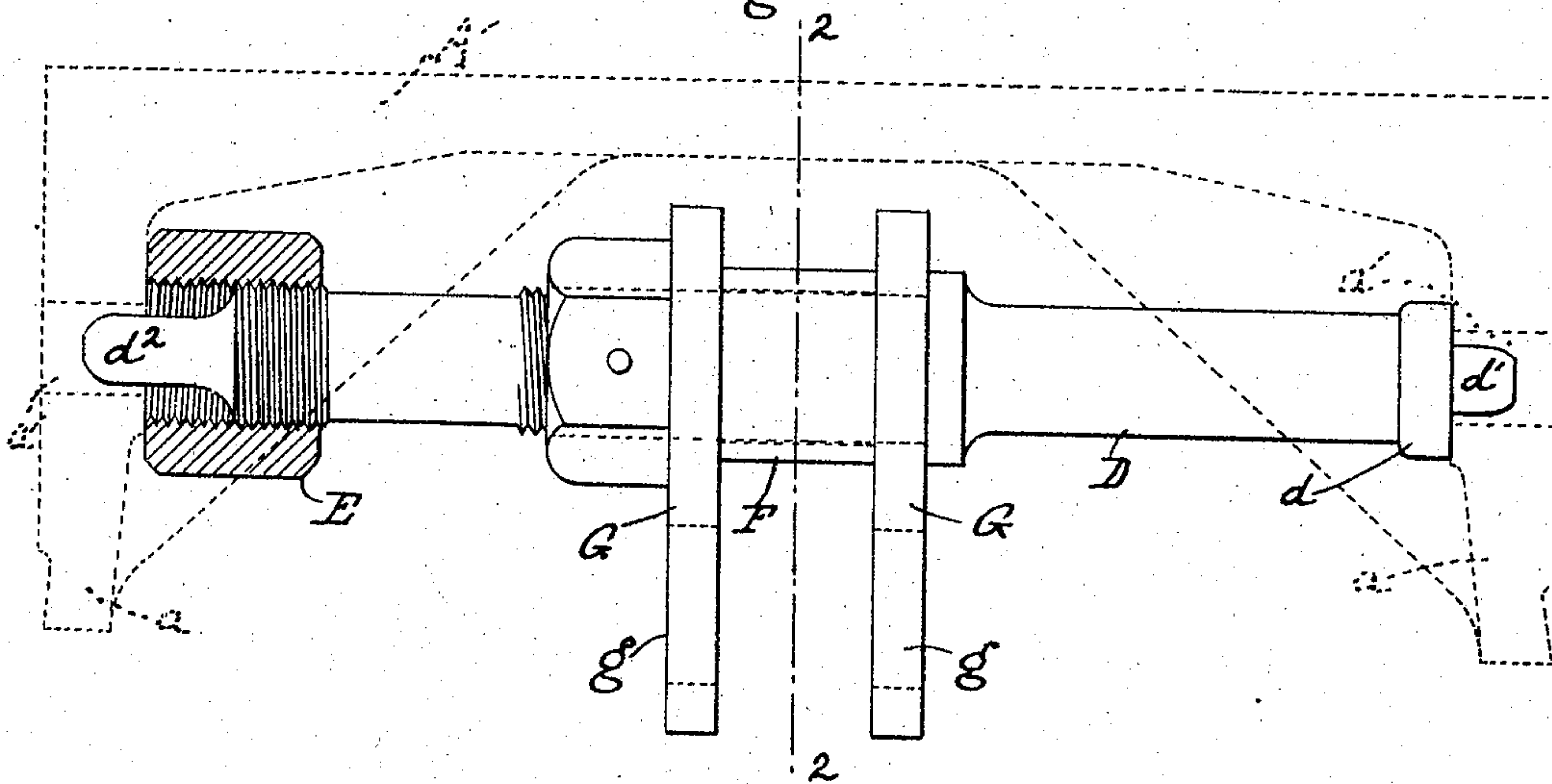


Fig. 1.



WITNESSES

E. W. Collins

Walter Abbe

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BY

Horizon and Horizon

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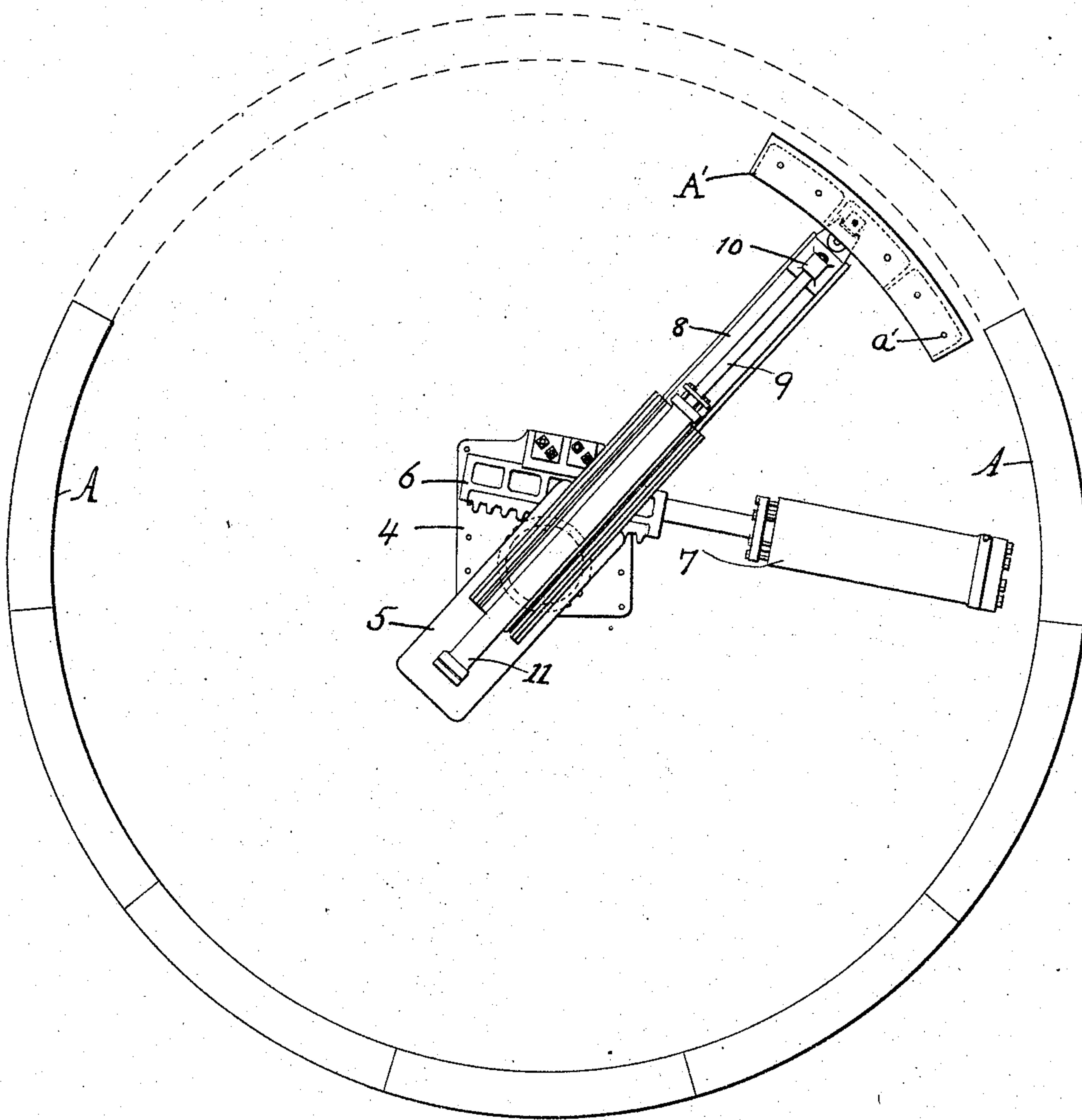
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2 SHEETS—SHEET 2.

*Fig. 3.*



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# UNITED STATES PATENT OFFICE.

ERNEST WILLIAM MOIR, OF LONDON, ENGLAND, ASSIGNOR TO S. PEARSON AND SON, INCORPORATED, OF LONG ISLAND CITY, NEW YORK, A CORPORATION OF NEW YORK.

## GRAPPLING DEVICE FOR HANDLING STEEL SEGMENTS, BEAMS, &c.

SPECIFICATION forming part of Letters Patent No. 780,804, dated January 24, 1905.

Application filed November 16, 1904. Serial No. 233,044.

*To all whom it may concern:*

Be it known that I, ERNEST WILLIAM MOIR, a subject of the King of Great Britain and Ireland, residing in London, England, have invented an Improved Gripping Device for Handling Steel Segments, Beams, &c., of which the following is a specification.

My invention consists of an improved gripping or clamping device for the lifting and handling of large steel or iron segments, beams, or the like and which is especially adapted for the handling of steel segments used in the erection of tunnel-tubes.

In the accompanying drawings, Figure 1 is a side view of my improved device with the cross-section of a flanged segmental tunnel-plate indicated by dotted lines. Fig. 2 is a cross-section on the line 2 2, Fig. 1; and Fig. 3 is a diagrammatic view illustrating the manner of using my device in the erection of a tunnel-tube built of segments.

For the more ready understanding of my invention, by way of example only, I have shown in Fig. 3 how my device may be employed in the handling and lifting of the curved flanged segments of steel of which the tube of a tunnel is composed. In this view, A A indicate a series of steel segments which have already been placed in position, while A' indicates another segment about being lifted into place by the hydraulic erector, which is mounted upon a suitable frame within the tunnel. This erector comprises a foundation-plate 4, on which is mounted a platform 5, adapted to be turned on a horizontal pivot by means of a pinion and a rack 6, operated by a hydraulic ram 7. On the rotary platform 5 there is mounted to slide in longitudinal guides a lifting arm or bar 8, operated by a piston-rod 9, secured to the arm 8 at 10 and working in a hydraulic cylinder 11. By this means the slide-bar 8, which is the lifting or erecting arm for the segments A A', can be turned around the horizontal pivot of the platform or, in other words, on the tunnel-axis, and also can be moved in and out radially, as has been customary in tunnel-work of this character.

My present invention has special reference

to a gripping or clamping device by which such an appliance as the erecting-arm 8 can securely take hold of such a piece of engineering metal work as the flanged segments A A'.

In Fig. 1 I have shown a cross-section of the segment A' by dotted lines, *a a* being the opposite side flanges of the segment, and *a' a'* the usual bolt-holes in such flanges. I provide a bar D of a total length a little greater than the space between the flanges *a a*. At the right-hand end of this bar is a reduced pin *d'* of less diameter than the bolt-hole *a'*, and adjacent to this end pin the bar is provided with an annular shoulder *d* of larger diameter than the bolt-hole. At the opposite end of bar D is a reduced pin *d''* to enter the bolt-hole *a'* in the corresponding flange of the segment, and this reduced pin *d''* is of such a length that it may be entered into the bolt-hole sufficiently far (at an angle in the first place) to permit the opposite end of the bar to be then swung in between the flanges of the segment until the reduced end *d'* is opposite its bolt-hole, whereupon the bar can be moved endwise (to the right in Fig. 1) to enter the pin *d'* within its bolt-hole with the shoulder *d* against the flange, as shown. On the bar D back of the reduced pin end *d''* is threaded a screw-nut E, which on the first introduction of the bar into the segment has been screwed back on the bar; but when the latter has been put into the described position on the segment A' the nut E is screwed outward on the bar until it finally binds like a shoulder against the inner face of the adjacent flange of the segment A', whereupon the bar D is found to be securely clamped to the segment. The center of this bar is provided with means whereby it may be secured to the forked end of the lifting or erecting arm 8. For this purpose the center of the bar is squared at F, as shown in Fig. 2, or made of other suitable polygonal shape, and on each side of this squared portion F, I provide lugs G G with radial slots *g*. The end of the lifting-arm 8, which is shown by dotted lines in Fig. 2, is provided with a forked outer end to fit over the squared portion F of the bar, and back of

the fork in the arm 8 is a transverse slot  $\alpha$ , Fig. 2, crossing the slots  $g$  in the lugs G, so that by driving a pin through the slots  $g$  and the hole in the bar 8 the whole may be secured  
5 together.

I claim as my invention—

1. The herein-described gripping device, comprising a bar having at one end a pin and shoulder and at the other end a pin and screw  
10 shoulder-nut, and having means by which the bar may be secured to a lifting-arm.

2. The herein-described gripping device,

comprising a bar having at its opposite ends means by which it may be clamped to a flanged segment and between the two, a polygonal por- 15  
tion and slotted ears by which it may be secured to a forked lifting-arm.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ERNEST WILLIAM MOIR.

Witnesses:

WILLIAM P. DEVINE,  
W. R. BIGNALL.