

No. 717,172.

Patented Dec. 30, 1902.

J. W. CRUIKSHANK.  
LEER FOR ANNEALING PLATE GLASS.

(Application filed May 27, 1902.)

(No Model.)

2 Sheets—Sheet 1.

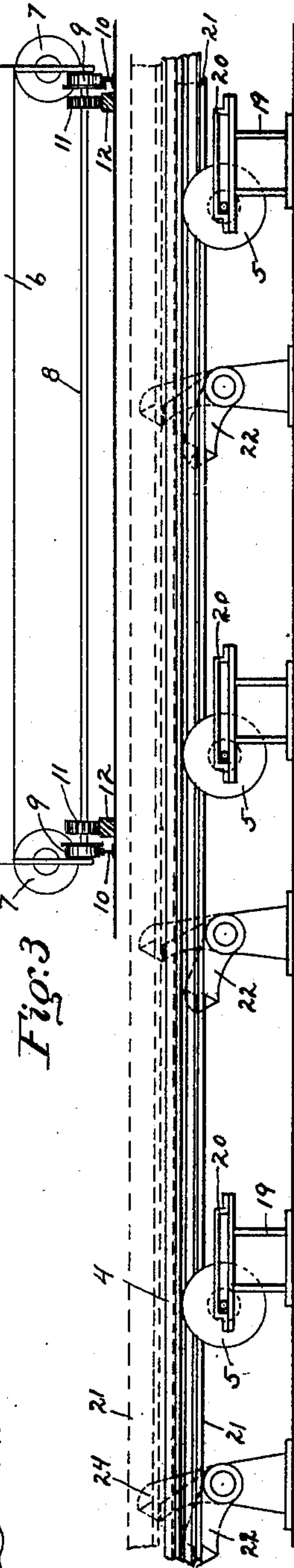
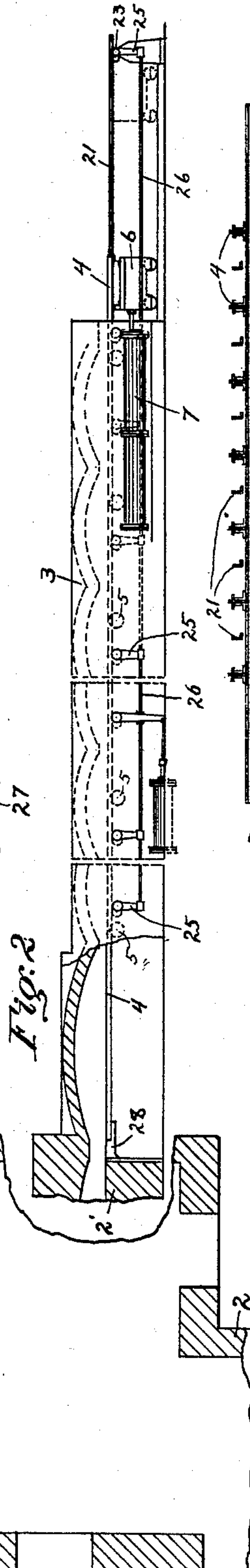
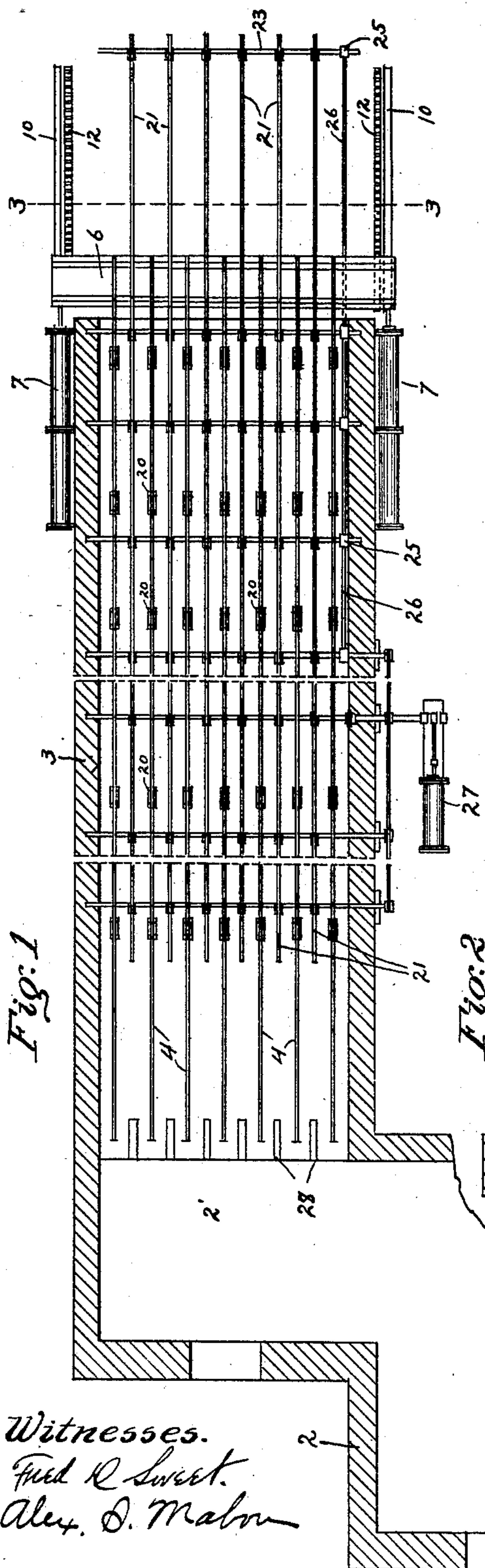


Fig. 4

Witnesses.  
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Fig. 5

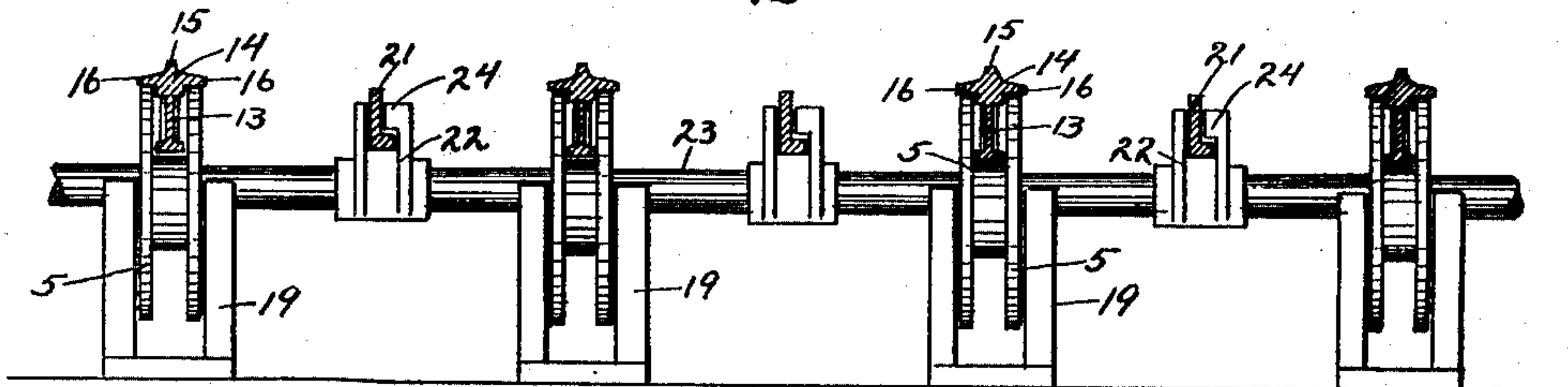


Fig. 6

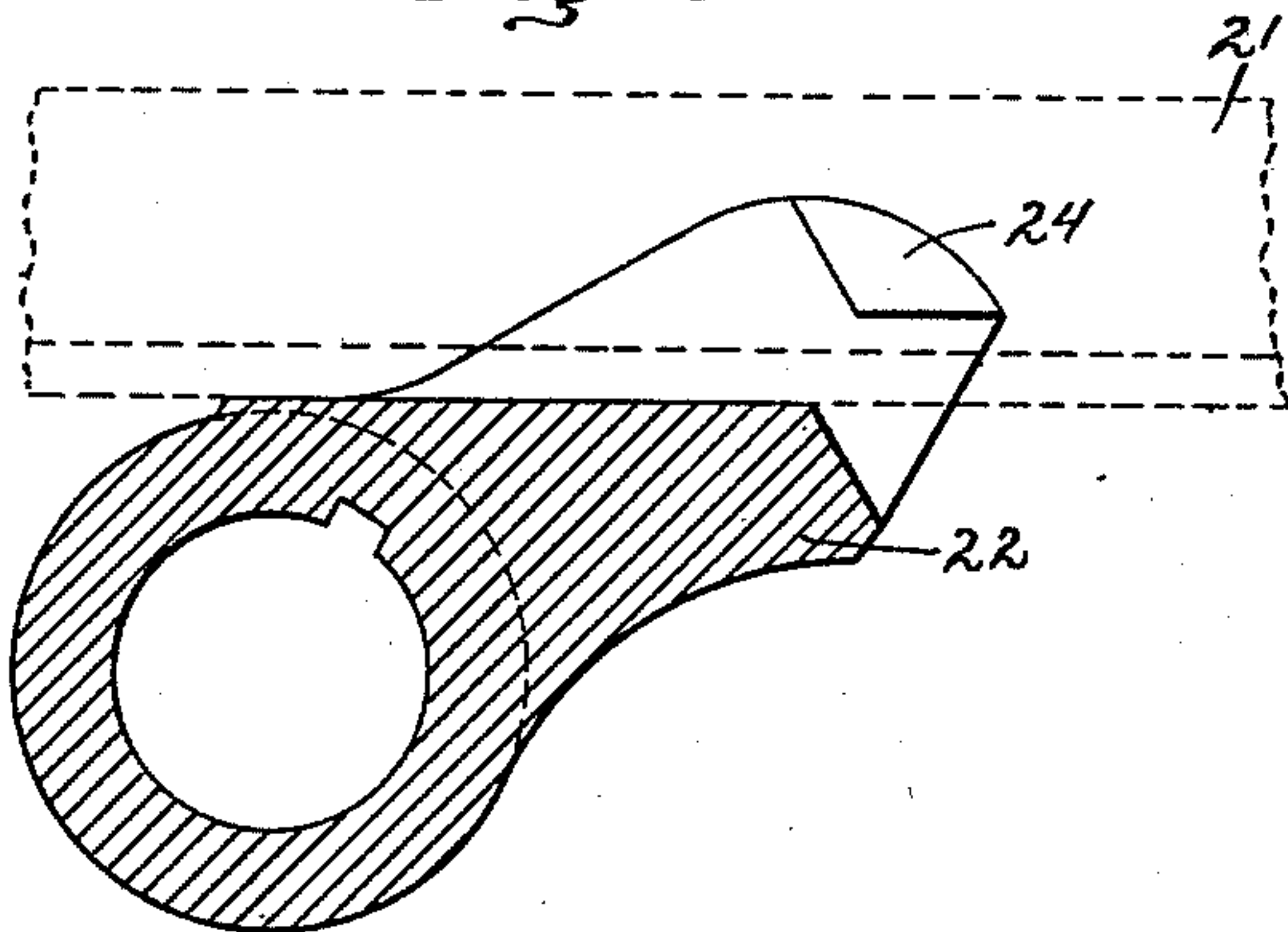


Fig. 7

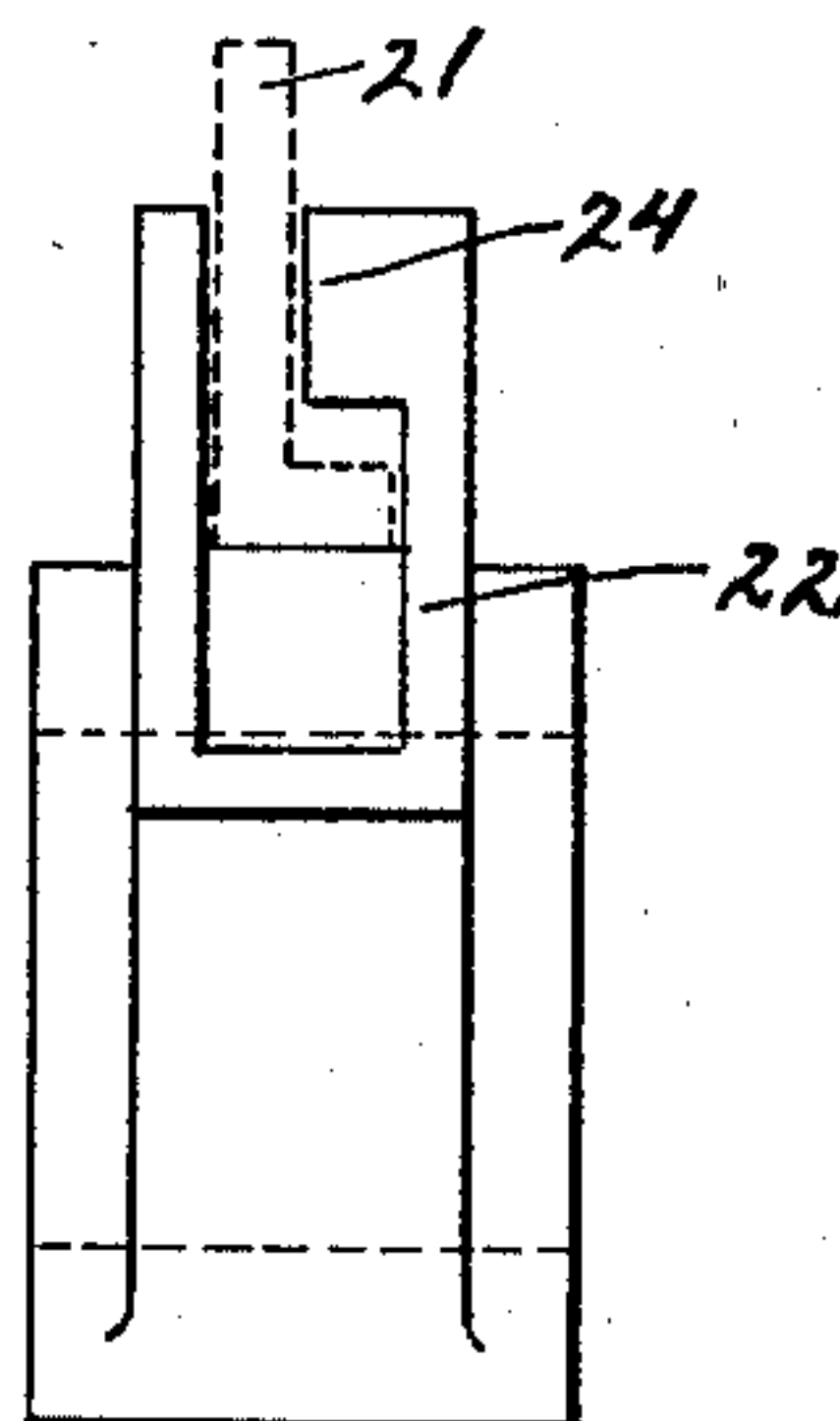


Fig. 8

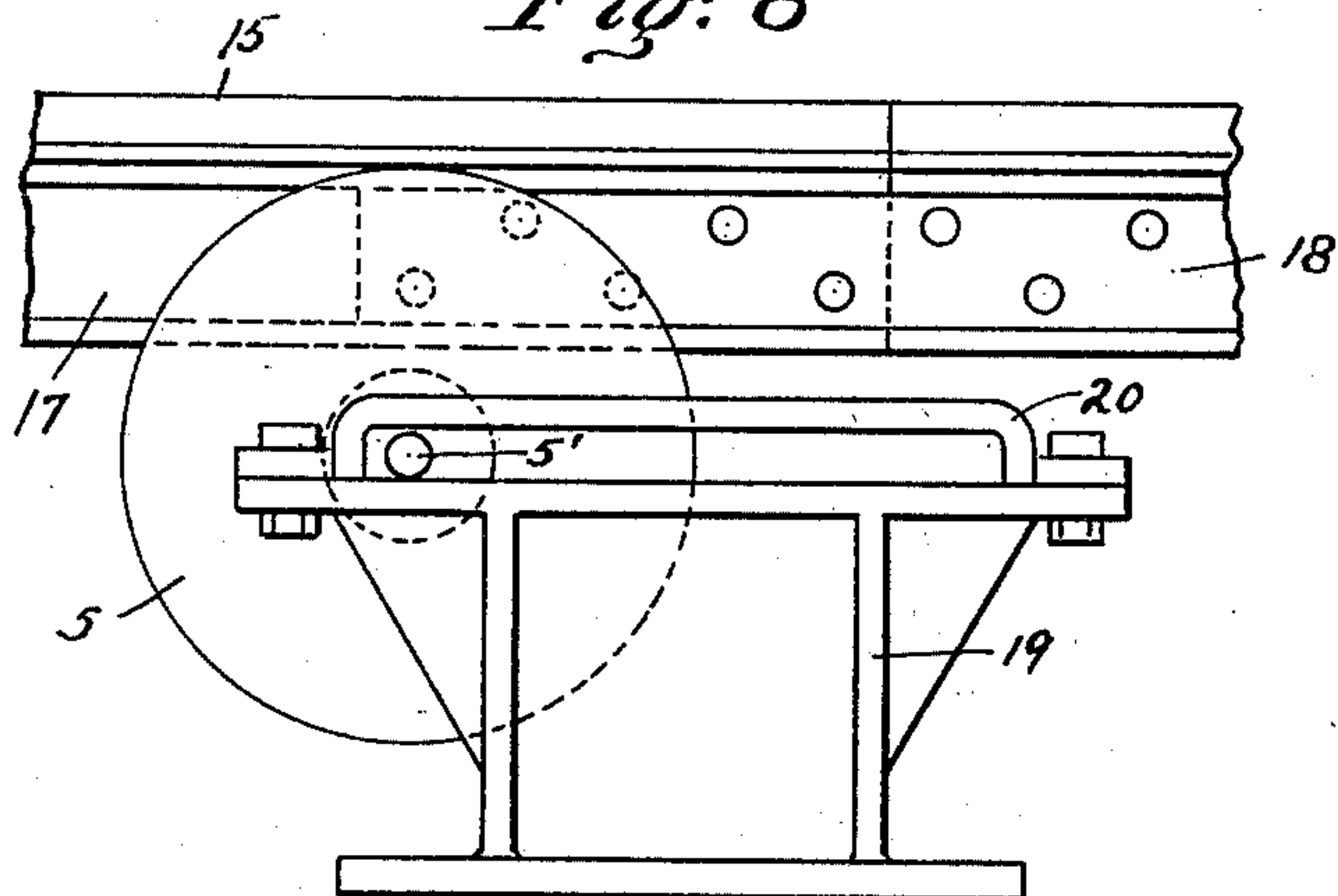
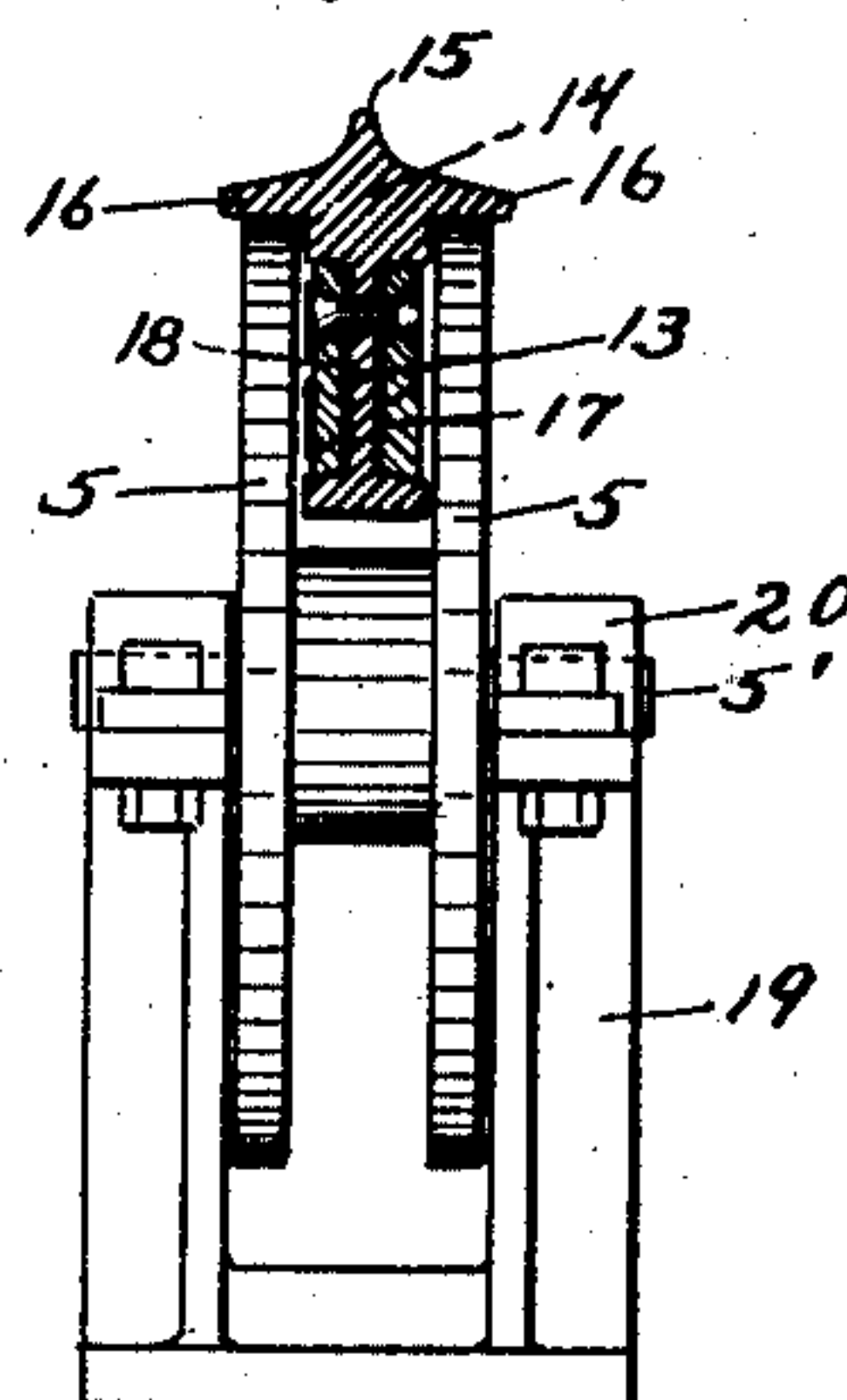


Fig. 9



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# UNITED STATES PATENT OFFICE.

JAMES W. CRUIKSHANK, OF PITTSBURG, PENNSYLVANIA.

## LEER FOR ANNEALING PLATE-GLASS.

SPECIFICATION forming part of Letters Patent No. 717,172, dated December 30, 1902.

Application filed May 27, 1902. Serial No. 109,129. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES W. CRUIKSHANK, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Leers for Annealing Plate-Glass, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention relates to that type of annealing apparatus wherein the plates or sheets of glass are carried progressively through the leer by longitudinally-reciprocating bars or rods which operate in conjunction with vertically-reciprocating bars or rods, the latter serving to sustain the glass clear of the carrying-bars during the backward reciprocations of the latter. The rods or bars are very long, and the traveling bars are actuated entirely from one end. It is necessary that these bars be quite strong to prevent buckling, yet of as light section as possible to economize material and to reduce weight.

25 One object of this invention is to provide a bar or rod of improved section possessing maximum strength or stiffness.

30 A further object is to so construct these bars in connection with the rollers upon which they travel that they are effectively held in proper position, also that the sections thereof may be coupled together without the coupling members interfering with the rollers.

35 A further object is to provide improved mechanism for reciprocating the traveling bars.

Still a further object of the invention is to improve the glass-lifting mechanism.

40 In the accompanying drawings, Figure 1 is a sectional plan view of portions of a leer constructed in accordance with my improvements, parts of the annealing-ovens being shown in connection therewith. Fig. 2 is a side elevation, partly in section, of the portions of the leer shown in Fig. 1. Fig. 3 is a cross-sectional view on line 3-3 of Fig. 1. Fig. 45 4 is a side elevation of portions of the rods or bars and their supporting and elevating mechanism. Fig. 5 is a cross-sectional view of a portion of the leer, showing the rods and their supporting mechanism in position. Figs. 6 and 7 are views in detail of the mechanism for raising and lowering the lifting-bars. Figs.

8 and 9 are similar views of one of the traveling bars, together with its supporting-rollers.

Referring to the drawings, 2 represents annealing-ovens, and 3 the leer or tunnel. Within the leer and in the plane of oven-floor 2' are the carrying-bars 4, resting on rollers 5 and connected at their outer ends to cross-head 6, actuated by power-cylinders 7 on opposite sides of the leer, whereby the rods are reciprocated longitudinally. The cross-head is mounted on axles 8 and wheels 9, the latter running on tracks 10. Secured to one of the axles are gear-wheels 11, which mesh with racks 12, paralleling tracks 10, whereby the cross-head is maintained at right angles to its line of travel regardless of slight variations in the operations of the power-cylinders. Bars or rods 4 are very long, extending from end to end of the leer, and being operated entirely from one end they are liable to twist or buckle unless sufficiently strong to withstand this tendency. One of the primary objects of this invention is to provide bars of minimum weight having sufficient strength or lateral stiffness as to resist buckling. My preferred rod is of general T form in cross-section, having a deep body portion or web 13 and head 14, the latter terminating in the central glass-supporting edge 15 and beneath the latter extended laterally and forming the relatively wide flanges 16, which support the bar on the parallel rollers 5, with the I-section body or web 13 suspended between and guided by the latter. To lighten the bars without detracting from their strength and to provide space for the coupling-plates 18 within the vertical lines of the bars, the body or web 13 is channeled on opposite sides at 17, making said body portion of substantially I-section. Thus the bar-sections are united without the coupling members interfering in any manner with the movement of the bars between the supporting-rollers. The lateral expanse of bar-head, including flanges 16, and the deep but relatively narrow body or web 13 of I-section afford the requisite lateral rigidity, and this, together with the lateral bracing effected by the rollers, practically eliminates all danger of buckling. The rollers 5 are arranged at suitable intervals on stands 19, provided with runways 20 for roller-spindles 5', thereby avoiding friction.



Alternating with traveling rods 4 are lifting-bars 21, preferably of L-section, which are supported in the bifurcated arms or cams 22, secured to shafts 23, suitably journaled transverse the leer and at such elevation as to normally sustain the upper edges of the bars slightly below the plane of supporting edges 15 of bars 4. Overhanging the lower angles of bars 21 are projections 24 on the inner faces of the arm or cam bifurcations, whereby, saving slight play, the bars are confined within the arms and caused to rise and lower positively therewith. At the same time the bars are unconfined longitudinally, and hence free to expand and contract without interference. Shafts 23 project at one end through the leer and carry crank-arms 25, which are connected together by rod 26, the latter being operatively connected to power-cylinder 27, positioned midway the ends of the leer, whereby the shafts are oscillated for raising and lowering the lifting-bars. At the discharge end of the leer crank-arms 25 and connecting-rod 26 may be placed inside the leer to avoid power-cylinder 7, as shown in Figs. 1 and 2.

In operation, with the traveling rods 4 in inward position, as in Figs. 1 and 2, a plate or sheet of glass is moved onto the ends thereof from the oven 2, bridge-fingers 28, overlapping the rod ends, facilitating this operation. Rods 4 are then moved outward the full length of their stroke, which positions the plate above the inner ends of lifting-rods 21. Then with bars 4 at rest shafts 23 are oscillated in the manner above described, causing arms 23 to raise bars 21, which lift and support the glass clear of bars 4, when the latter are free for the backward reciprocation to receive a fresh plate. Bars 21 are then positively lowered, repositioning the glass in advanced position on bars 4, and the latter are again given a forward reciprocation, the operation continuing as long as desired, so that when the leer is full each reciprocation of the bars presents an annealed plate at the discharge end of the leer for removal to the cutting-table or other place.

Reverting to bar 4, I believe myself to be the first to design a bar of the section shown which combines lightness and lateral rigidity for long lengths and provides for compact couplings. While this bar is designed with especial reference to leer use, I do not restrict myself thereto.

I claim—

1. A glass-carrying bar of improved section consisting of a body portion of I-section, and a head wider than the body and projecting laterally beyond the opposite side faces of the latter, said head terminating in a glass-supporting edge, substantially as described.

2. A glass-carrying bar consisting of a body portion of I-section, and a head wider than the body and projecting laterally beyond the opposite side faces of the latter, in combination with supports upon which the head rests and between which the body portion depends, substantially as described.

3. A glass-carrying bar consisting of a body portion of I-section, and a head wider than the body and projecting laterally beyond the side faces of the latter, and coupling-plates entirely within the side channels of the bar-body, in combination with parallel supports separated to admit the bar-body and upon which the laterally-projecting head portions rest, substantially as described.

4. In glass-annealing leers, a glass-carrying bar consisting of a body portion having longitudinally-channeled vertical faces, said body portion having a head projecting laterally from opposite sides thereof, coupling-plates for the bars entirely within the channels thereof, and supports between which the bar-body depends and against which the side faces thereof are adapted to bear, the laterally-projecting bar-head resting on said supports, substantially as described.

5. A glass-lifting bar for leers having a base-flange, and a bar-lifting device bifurcated to embrace the bar, one arm of the bifurcation having an inwardly-extending projection overhanging the bar-flange, substantially as described.

6. A glass-lifting bar L-shaped in cross-section, and a vertically-moving lifting device bifurcated to embrace the bar, the inner face of one arm of the bifurcation being flat complementary with the flat or unflanged face of the bar, and the other arm provided on its inner face with a projection overhanging the side flange or projection of the L-shaped bar, substantially as described.

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

JAMES W. CRUIKSHANK.

Witnesses:

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ALEX. S. MABON.