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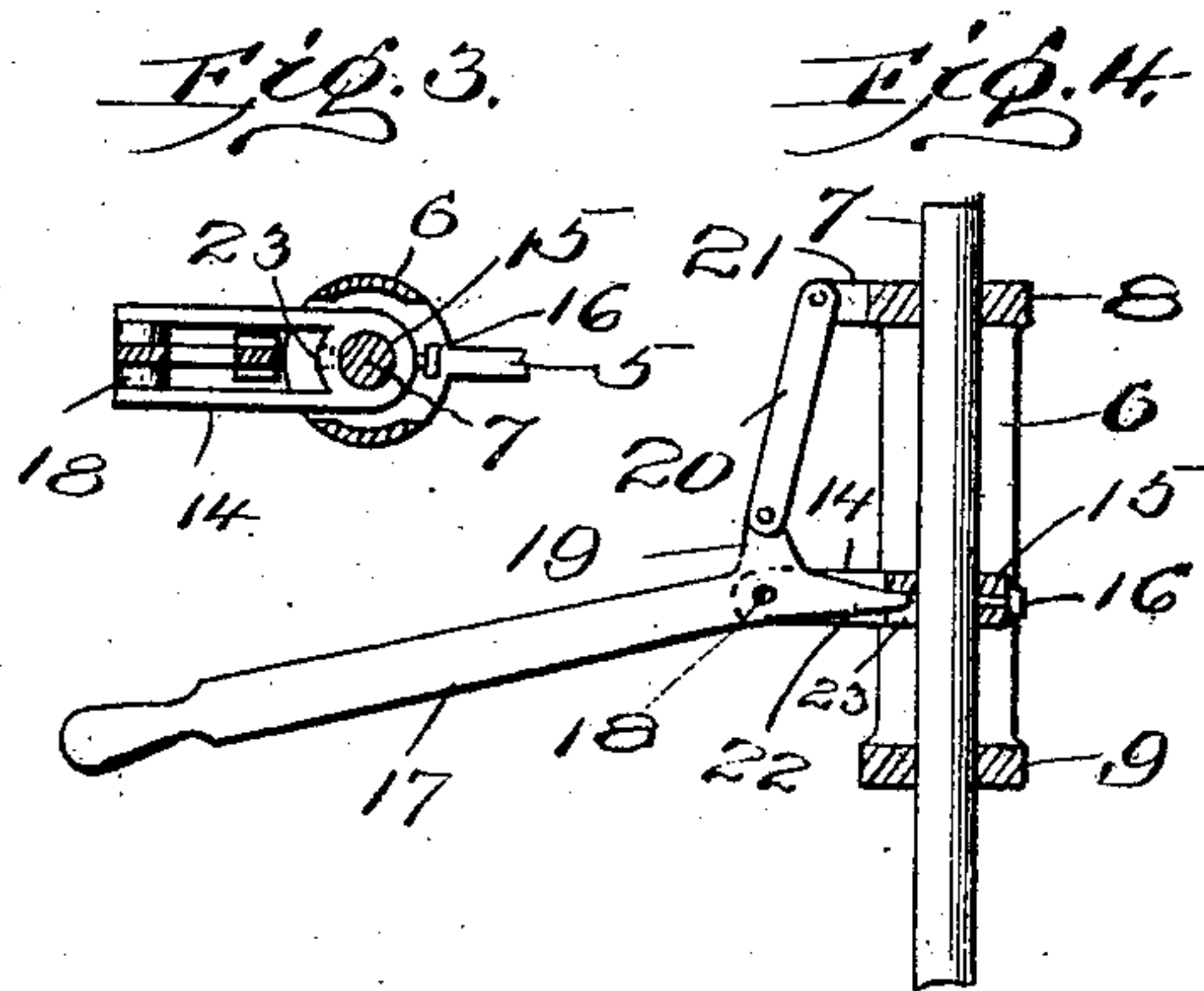
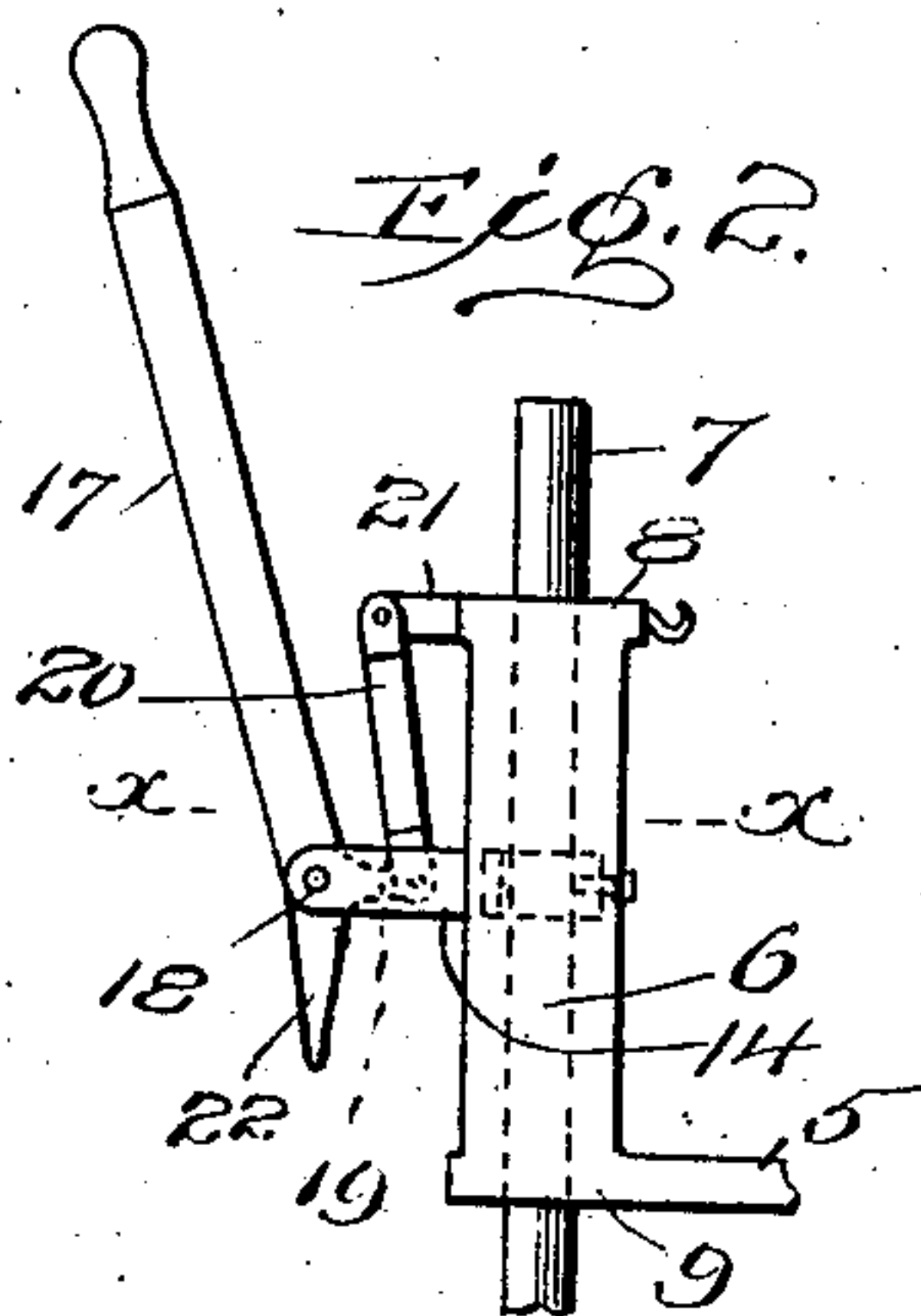
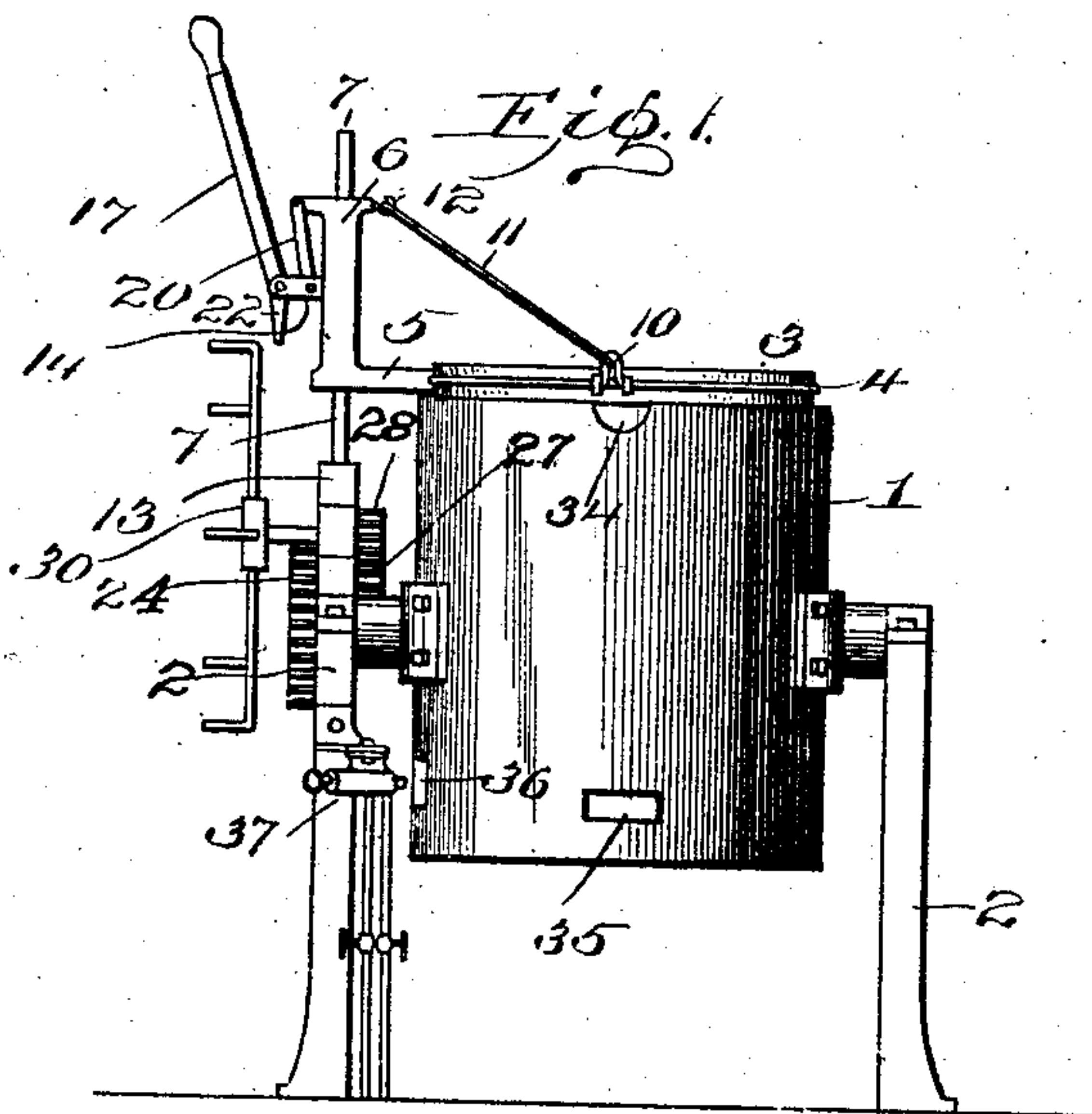
PATENTED FEB. 26, 1907.

D. R. STEELE.

FURNACE.

APPLICATION FILED OCT. 12, 1905.

2 SHEETS—SHEET 1.



Witnesses

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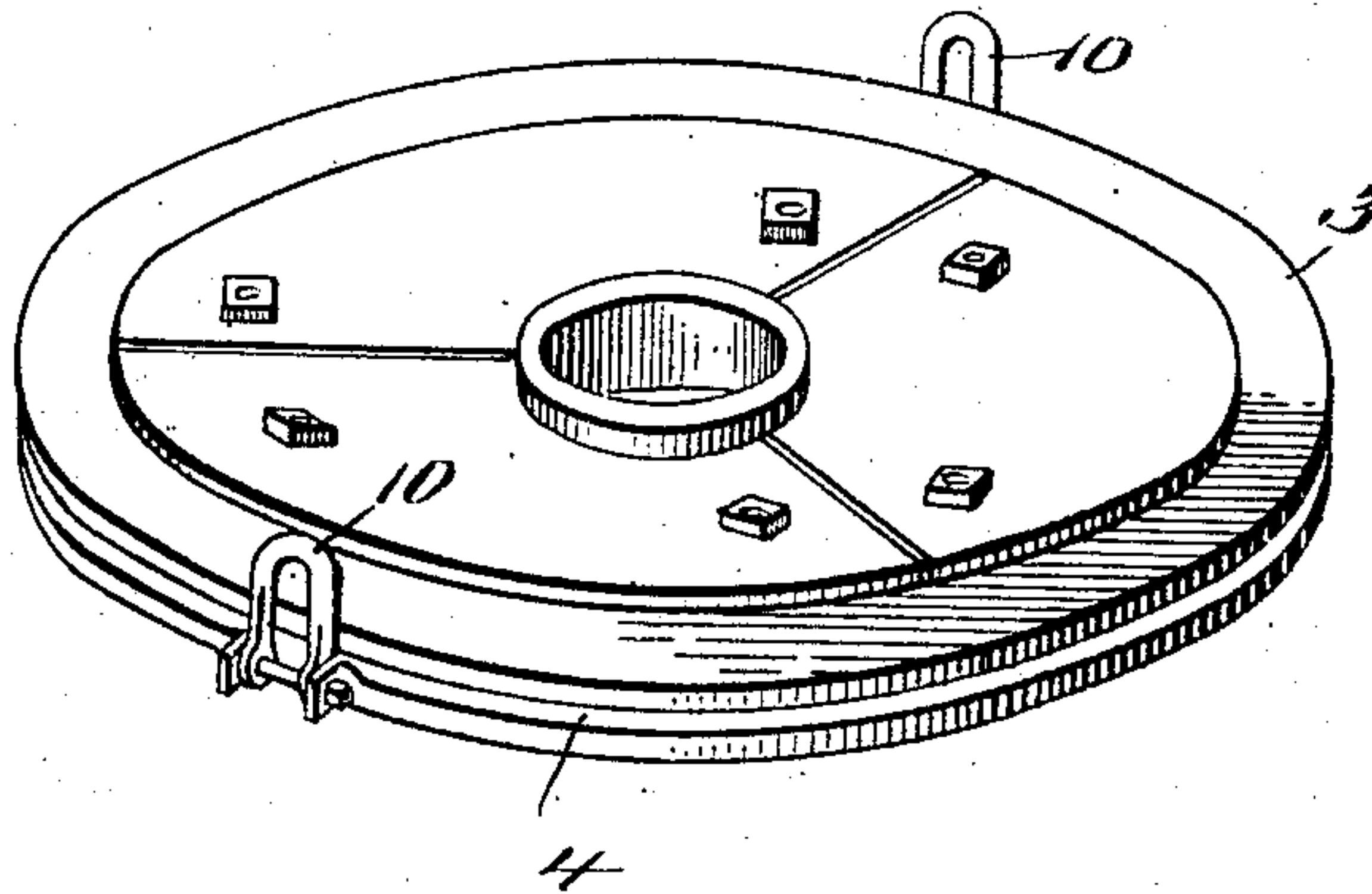
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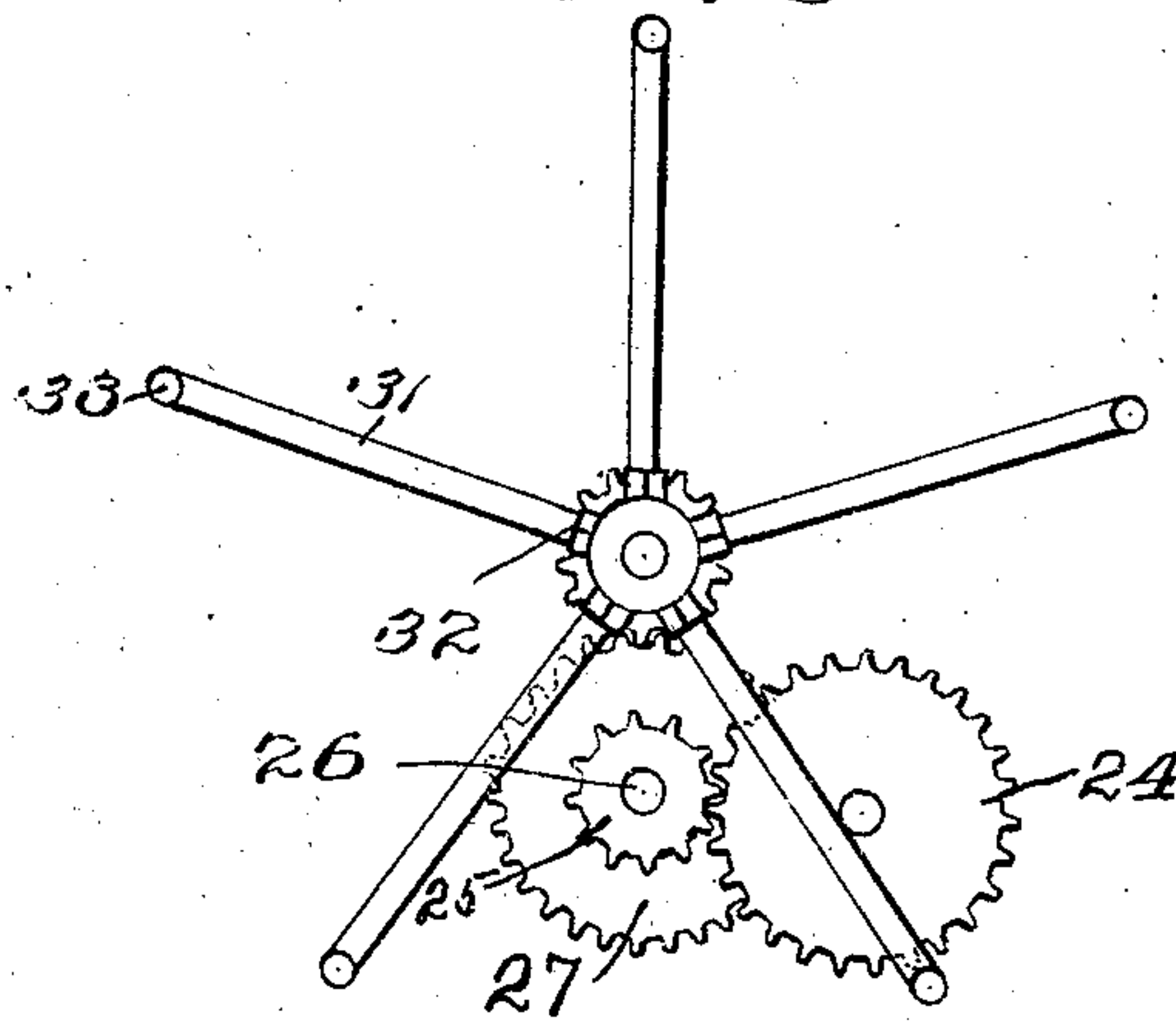
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2 SHEETS—SHEET 2.

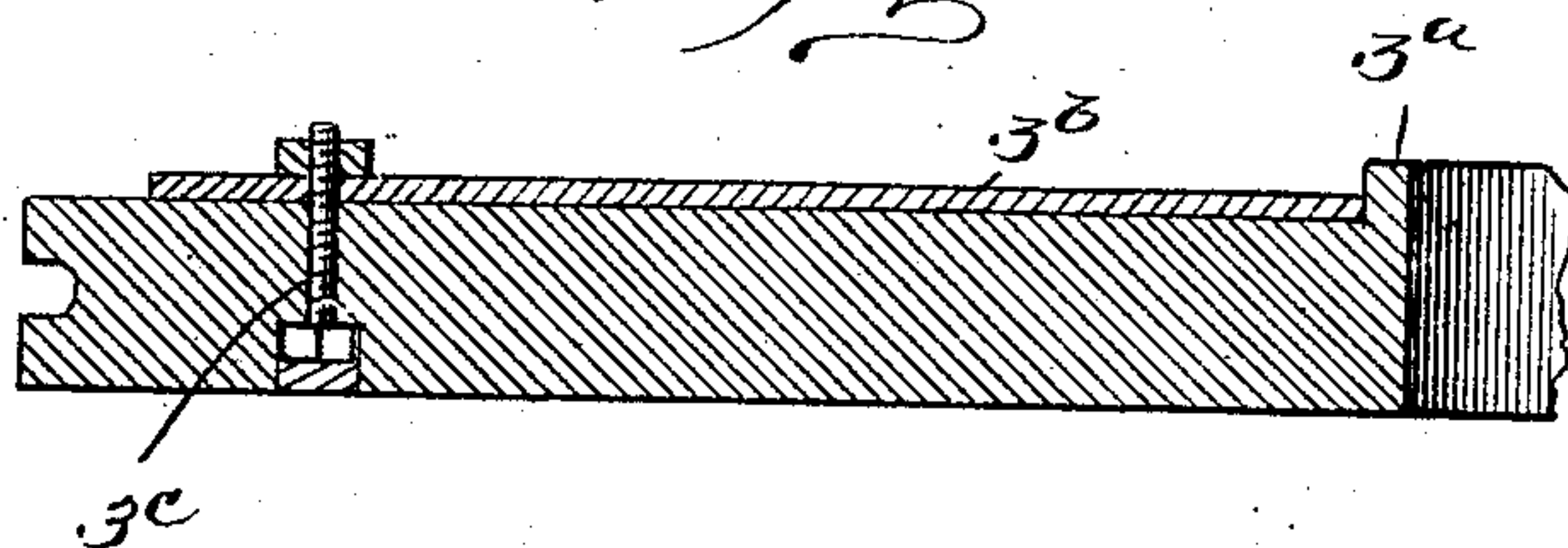
*Fig. 5.*



*Fig. 6.*



*Fig. 7.*



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# UNITED STATES PATENT OFFICE.

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TO HARRY D. HARVEY, OF BALTIMORE, MARYLAND.

## FURNACE.

No. 845,591.

Specification of Letters Patent.

Patented Feb. 26, 1907.

Application filed October 12, 1905. Serial No. 282,452.

*To all whom it may concern:*

Be it known that I, DAVID R. STEELE, a citizen of the United States, residing at Curtis Bay, in the county of Anne Arundel and State of Maryland, have invented certain new and useful Improvements in Furnaces; 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 improvements in furnace structures, and particularly to smelting-furnaces, which are adapted for melting or reducing ores and then pouring them in a molten condition.

It is the object of the invention, among other things, to provide a furnace with a fire-resisting top or cover which rests upon the furnace when it is in its vertical position, but may be lifted therefrom and moved to one side when the furnace is to be tipped.

It is the further object of the invention to so construct the top-lifting mechanism that it shall require only a minimum of strength to lift and operate the same.

With these and further objects in view the invention comprises certain novel constructions, combinations, and arrangements of parts, as will be hereinafter fully described and claimed.

In the accompanying drawings, Figure 1 is a side elevation of a smelting-furnace, the cover or top thereof being in position and provided with my improved lifting means. Fig. 2 is an enlarged view, in side elevation, of the lifting mechanism for the top or cover of the furnace. Fig. 3 is a horizontal sectional view taken upon the line X X of Fig. 2. Fig. 4 is a detail sectional view through the parts shown in Fig. 2 with the lever mechanism shown in elevation and the sleeve in its elevated position. Fig. 5 is an enlarged perspective view of the improved cover employed in connection with my furnace. Fig. 6 is a side elevation of the gearing used in controlling the movement of the furnace, the hand-wheel for operating the same being also shown. Fig. 7 is an enlarged detail sectional view through a portion of the top or cover, illustrating the central flanged portion and the means for strengthening the material of which it is composed.

In the accompanying drawing, 1 indicates

a furnace, which is generally pivotally mounted on suitable supports, as 2, the furnace being preferably of the open-top type adapted for the pouring of metals after they have been smelted within the furnace. It is necessary in carrying on some operations to close or partially close the top of the furnace in order to retain and properly apply the heat employed to the contents of the furnace. For this purpose a cover or top of material capable of withstanding a considerable degree of heat without melting or without detriment is employed and so mounted that it may be used without interfering with the tipping of the furnace. I preferably construct such a cover or top of fire-brick, as at 3, and secure the same for lifting purposes by means of a band or ring 4, which is drawn tightly around the periphery of said fire-brick, the said band usually fitting in an annular groove in the edge of the cover. The material forming the cover or top is provided with a central opening of small size, and an upwardly-projecting annular flange 3<sup>a</sup> is formed about said opening, as clearly shown in Figs. 5 and 7. Strengthening-plates 3<sup>b</sup>, preferably of a segmental form, are placed upon the upper surface of the brick cover, and securing-bolts 3<sup>c</sup> are passed through the material of the cover, their heads being embedded therein, as shown in Fig. 7, after which the heads are covered and protected by suitable fire-resisting clay or other material. Nuts applied to the upper ends of the bolts serve to draw the segmental plates 3<sup>b</sup> tightly in position upon the top of the cover. By this construction the fire-brick cover may be reinforced by metal plates, and the inner edges of said plates will be protected from the heat at the central opening by the flange 3<sup>a</sup>. The band, in addition to holding the fire-brick together, also affords means for lifting the same when the furnace is to be opened or tipped. The said band 4 engages an abutment or arm 5, which extends laterally from a movable sleeve 6. The said sleeve 6 is mounted upon a standard 7, which rises from the frame 2 of the furnace, and the sleeve movably engages said standard 7, preferably at its upper and lower ends, where suitable bearings 8 and 9 are provided for surrounding the said bar 7. The band 4 is also provided with removable loops or eyes



10, inserted between the outwardly-turned ends of the band-sections and held in place by bolts passed through said ends and said loops. The said loops 10 are connected by means of a bail 11 with a hook 12 or other detent projecting from the upper portion of the sleeve 6. In this manner the cover or top 3 is rigidly secured to the movable sleeve 6, and the said cover may be raised or lowered by raising or lowering the said sleeve.

The standard 7 is preferably made and so mounted upon the frame 2 that it may be turned in a bearing-socket, as indicated at 13, when it is desired to swing the cover to one side or the other. Rigidly secured to the said standard 7 is a bifurcated arm 14, having an eye or socket 15 formed in one end, which is capable of fitting upon the standard 7. The said bifurcated arm is set at a proper height for holding the cover in position on the furnace and is held in such position by means of a set-screw 16, so that said arm does not normally turn upon the standard ordinarily. Pivoted between the outer ends of the bifurcated arms is a cover elevating and turning lever 17, the said lever being pivoted at 18 in said arms. Projecting from one side of the lever 17 is an arm 19, which is pivotally connected by a link 20 with a projection or stud 21, extending laterally from the sleeve 6. The arm 19 forms, with the body portion of the lever 17, a bell-crank lever which is capable of elevating the sleeve 6 with a small outlay of power applied to the outer end of said lever. The arm 19 and the link 20 form a toggle connection between the parts, and when the lever 17 is pulled downwardly the said toggle is straightened, so that the sleeve 6 is positively held in its highest position and will remain thus elevated until the lever 17 is elevated again.

In order to increase the leverage of the lever 17 upon the standard and the sleeve mechanism for turning the cover or top to one side the inner end of the lever 17 is extended beyond the pivot-point 18, so as to form a point or projection 22. When the lever is turned downwardly, the end of the point 22 will enter and engage a groove or notch 23, formed in the periphery of the socket 15 at the inner end of the bifurcated arm 14.

In the operation of the device the cover may be lifted from its closed position, as shown in Fig. 1, by grasping the end of the lever 17 and pulling it downwardly to an approximately horizontal position. This will straighten the toggle connection formed by the arm 19 and the link 20, forcing the sleeve 6 upwardly, and thus lifting the cover well out of engagement with and above the upper edge of the furnace 1. The depressing of the lever 17 also places the point 22 in the groove or notch 23, and a firm purchase is thus obtained for the lever, which may then

be pushed to one side or the other for swinging or turning the cover further from the furnace. Because of the straightened condition of the toggle connection the parts will be positively supported in their lifted position upon the standard 7. Of course the standard turns in its socket 13 when the cover is thus turned to one side. Since the cover can be moved entirely out of the way of the furnace 1, the said furnace may be readily tipped upon its supports for pouring molten metal or emptying the contents thereof. When the furnace has been supplied with materials to be melted, the lever 17 is again grasped and the cover-supporting mechanism swung so as to bring the said cover from the top of the furnace again. By then lifting the lever 17 the cover can be deposited upon the top of the furnace.

It will be observed that the upward movement of the lever 17 is limited by the projection or lug 21, and if it should be desirable to hold the cover when in its lowered position a slight distance above the upper edge of the furnace it would only be necessary to loosen the set-screw 16 and raise the arm 14 the necessary distance and reclamp it in position.

When the contents of the furnace have been subjected to heat a sufficient length of time and it is desired to pour the contents into a mold or other receptacle, the cover 3 is elevated by pulling upon the lever 17 and is then turned to one side, after which the furnace is tipped by means of the hand-wheel and the gearing until the material is run into a dipper for pouring.

The furnace is capable of being held by the gearing with a minimum of exertion in any of its adjusted positions, and, as above stated, the cover also requires an exceedingly small expenditure of force or strength to accomplish its lifting and turning to one side.

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

1. A furnace mechanism, comprising a tipping furnace, a cover therefor formed of fire-resisting material having a central opening, reinforced plates applied to the surface of said cover, a protecting-flange around said opening and extending above the edge of the plates and means for lifting the cover when the furnace is to be tilted.

2. A furnace mechanism, comprising a tilting furnace, a removable cover therefor comprising a disk of fire-resisting material, reinforcing metal plates secured on one side of said disk, lifting and gripping bands surrounding the periphery thereof, having band-sections with their ends turned outwardly to form eyes, securing-bolts for drawing the band-sections together, loops threaded upon said bolts, a lifting-bail engaging said loops and means for supporting said bail for holding the cover in proper position.



3. A furnace-covering mechanism, comprising a standard pivotally mounted in a bearing or socket, a sleeve slidably mounted thereon, an arm rigidly secured to the standard, a bell-crank lever pivoted to said arm, a projection positioned on said lever for engaging said arm when the said sleeve is in its elevated position, a link engaging the bell-crank with the sleeve, and means for securing a cover to said sleeve.

4. A furnace-covering mechanism, comprising a vertical revoluble standard, an elongated sleeve loosely mounted thereon and having bearings at its upper and lower ends, and arm rigidly connected with the standard and projecting outwardly through the open side of the sleeve, a bell-crank lever mounted in said arm, a link connecting the same with the sleeve, a projection on said bell-crank lever, a stop on said arm for retaining said bell-crank lever in a position for holding the sleeve positively in an elevated position and a cover connected with said sleeve so as to be lifted thereby.

5. A furnace-cover mechanism, comprising a cover proper, a sleeve for holding the same having an abutment projection at its lower end and resting against the periphery of the cover but not secured thereto, a band gripping the periphery of the cover and having eyes formed in the ends thereof, links connecting the eyes with the sleeve, a hook projecting from the sleeve and supporting said

links and a lever mechanism for lifting the sleeve and turning it.

6. A furnace-covering mechanism, comprising a cover, a standard, a sleeve carried by the same, a bifurcated arm mounted adjacent to the sleeve with a groove or notch formed therein, a lever pivoted to said arm and having a projection adapted to engage the groove or notch and means connecting the lever with the sleeve for lifting the same, the lever when in its lowered position so engaging the notch or groove as to be capable of firmly turning the standard and the parts mounted thereon.

7. A furnace-covering mechanism, comprising a revoluble standard, a bifurcated arm mounted thereon and capable of adjustment to different heights upon said standard, standard-gripping means carried by said arm, a lever pivoted between the outer bifurcated ends of the arm and having a turning projection formed upon its inner end, a notch or groove formed in the standard-engaging portion of the arm, a link connecting the lever with a cover-supporting means, comprising a sleeve movably mounted on the standard, and means for connecting the cover therewith.

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

DAVID R. STEELE.

Witnesses:

JOHN W. TODD,  
JOS. C. READ.