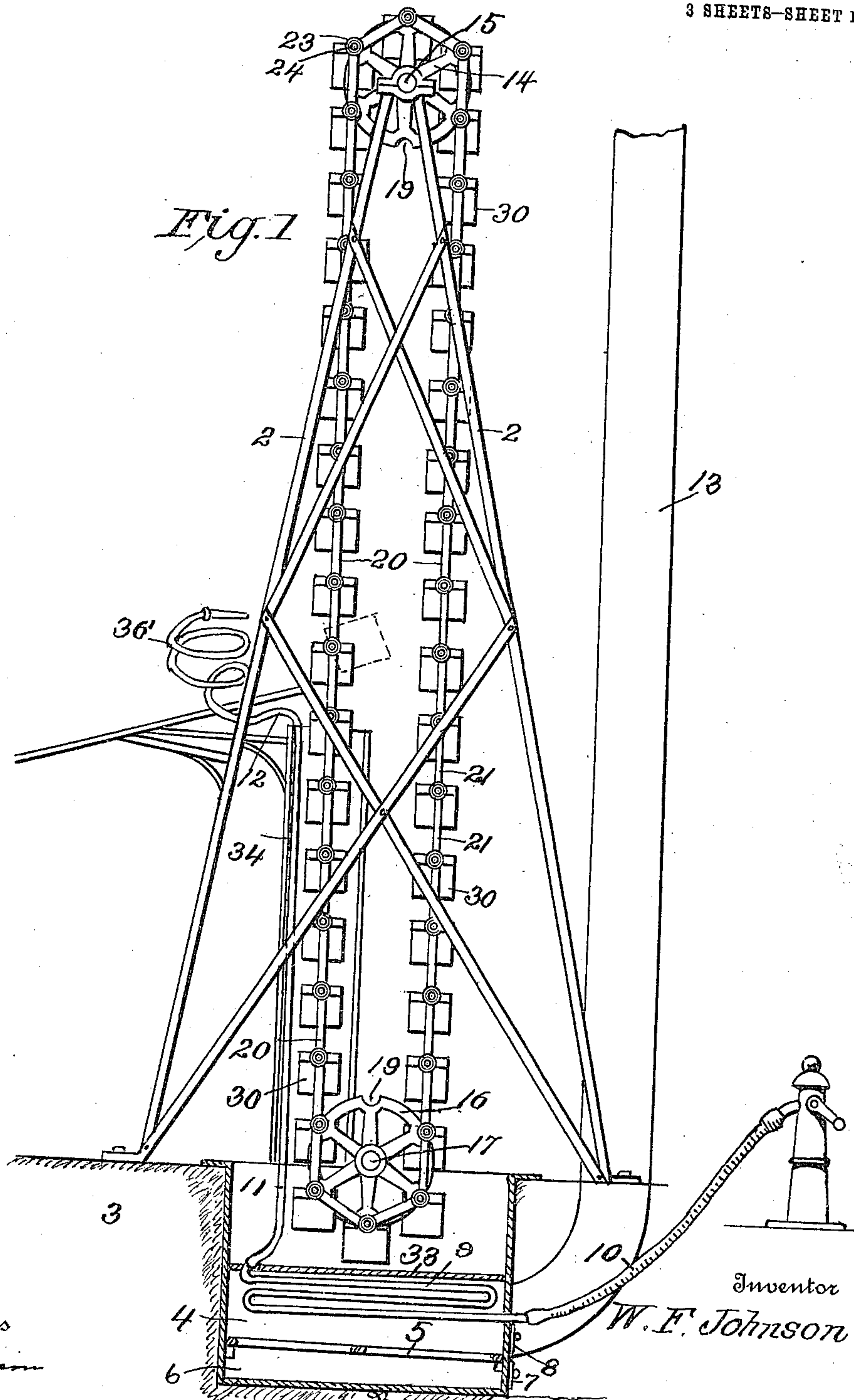


985,601.

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ICE FORMING APPARATUS.
APPLICATION FILED MAR. 19, 1910.

Patented Feb. 28, 1911.

3 SHEETS—SHEET 1.



Witnesses
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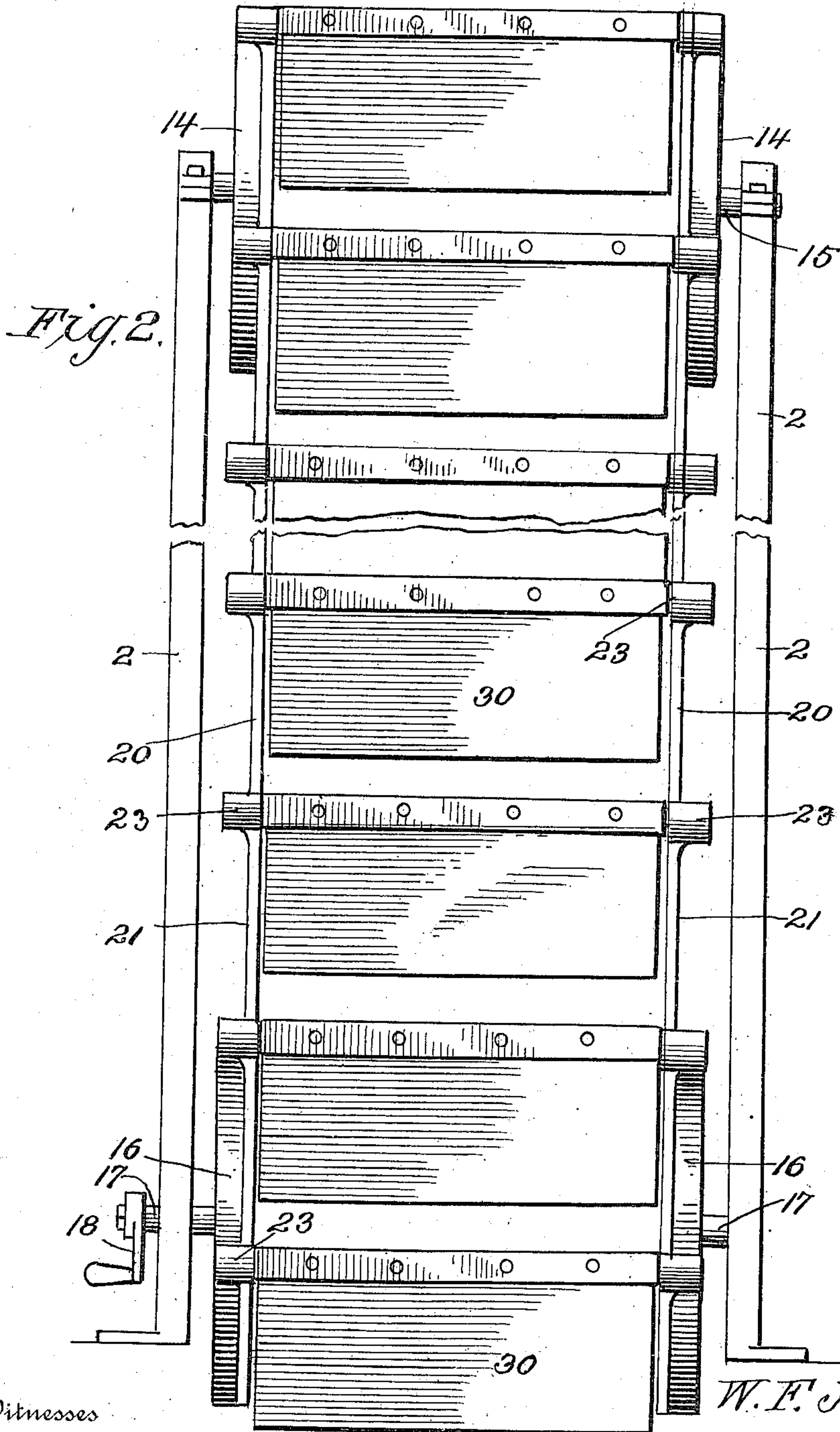
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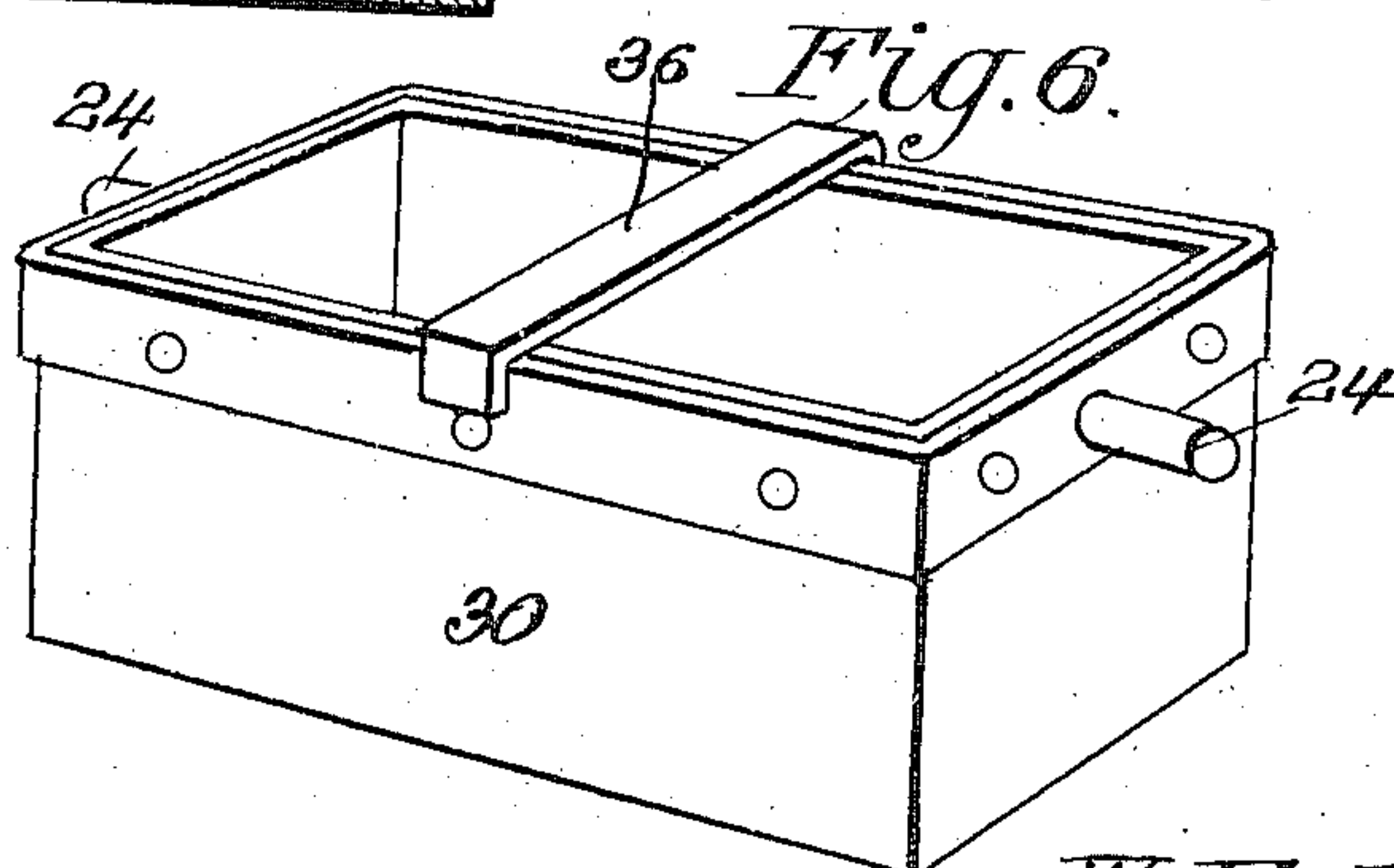
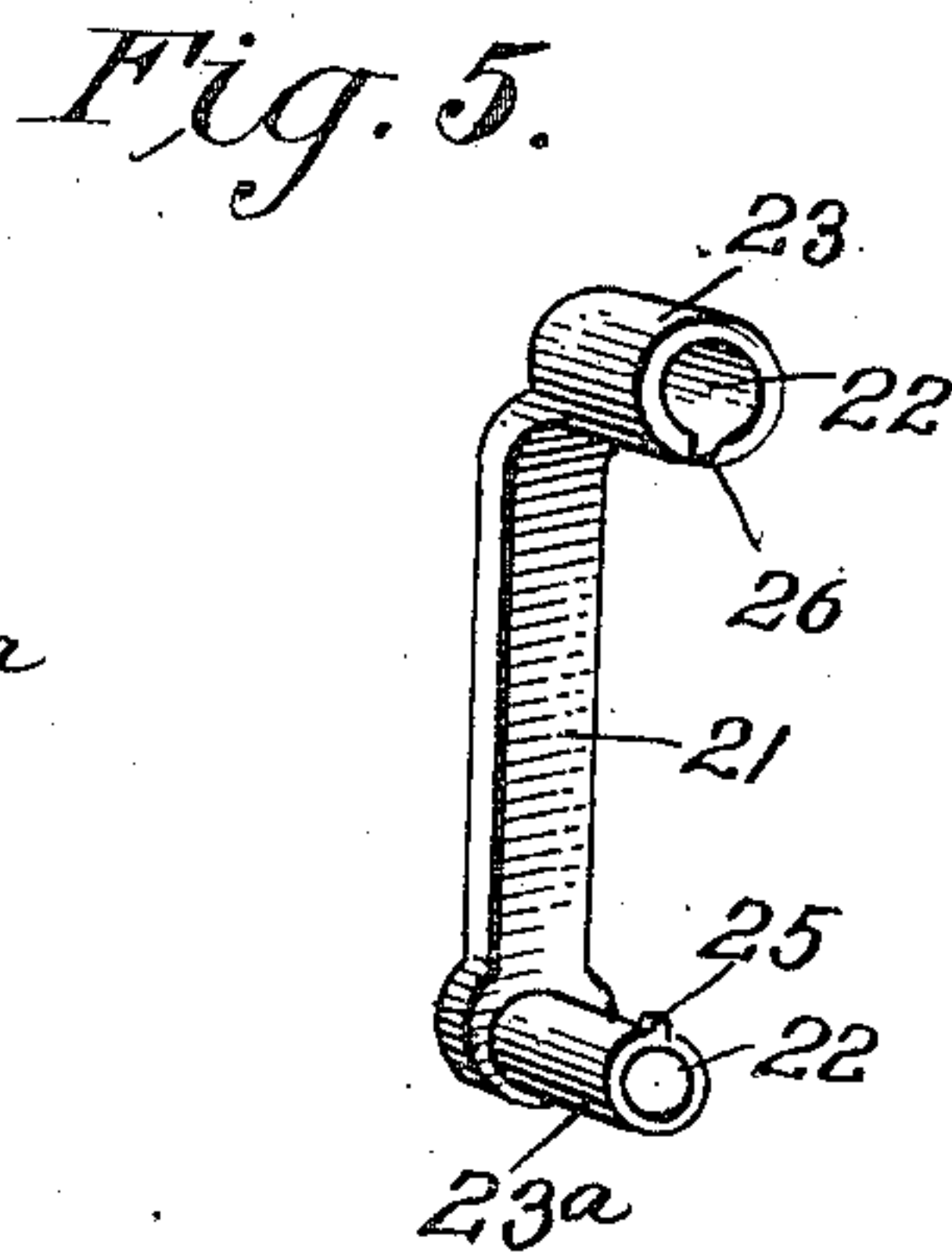
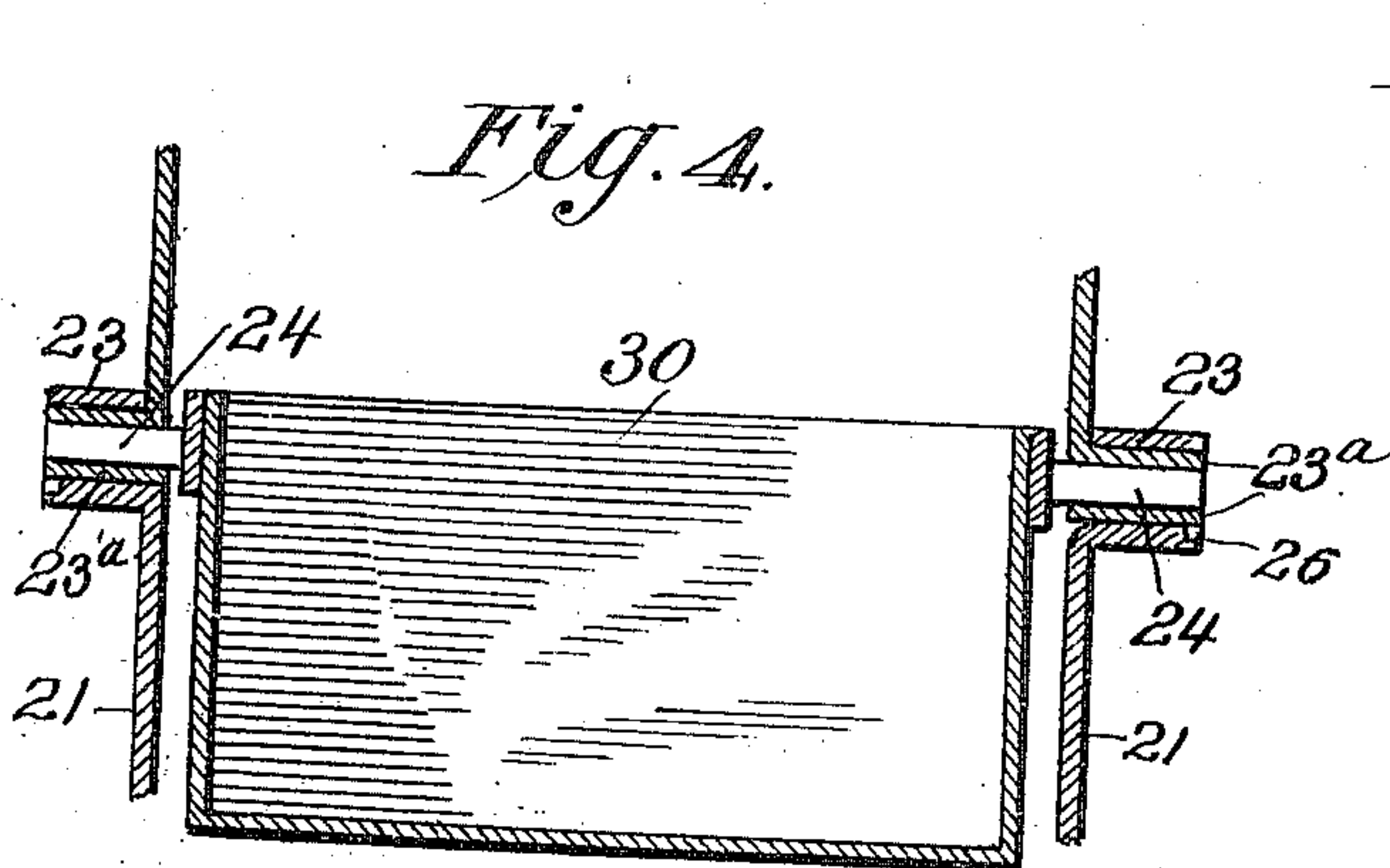
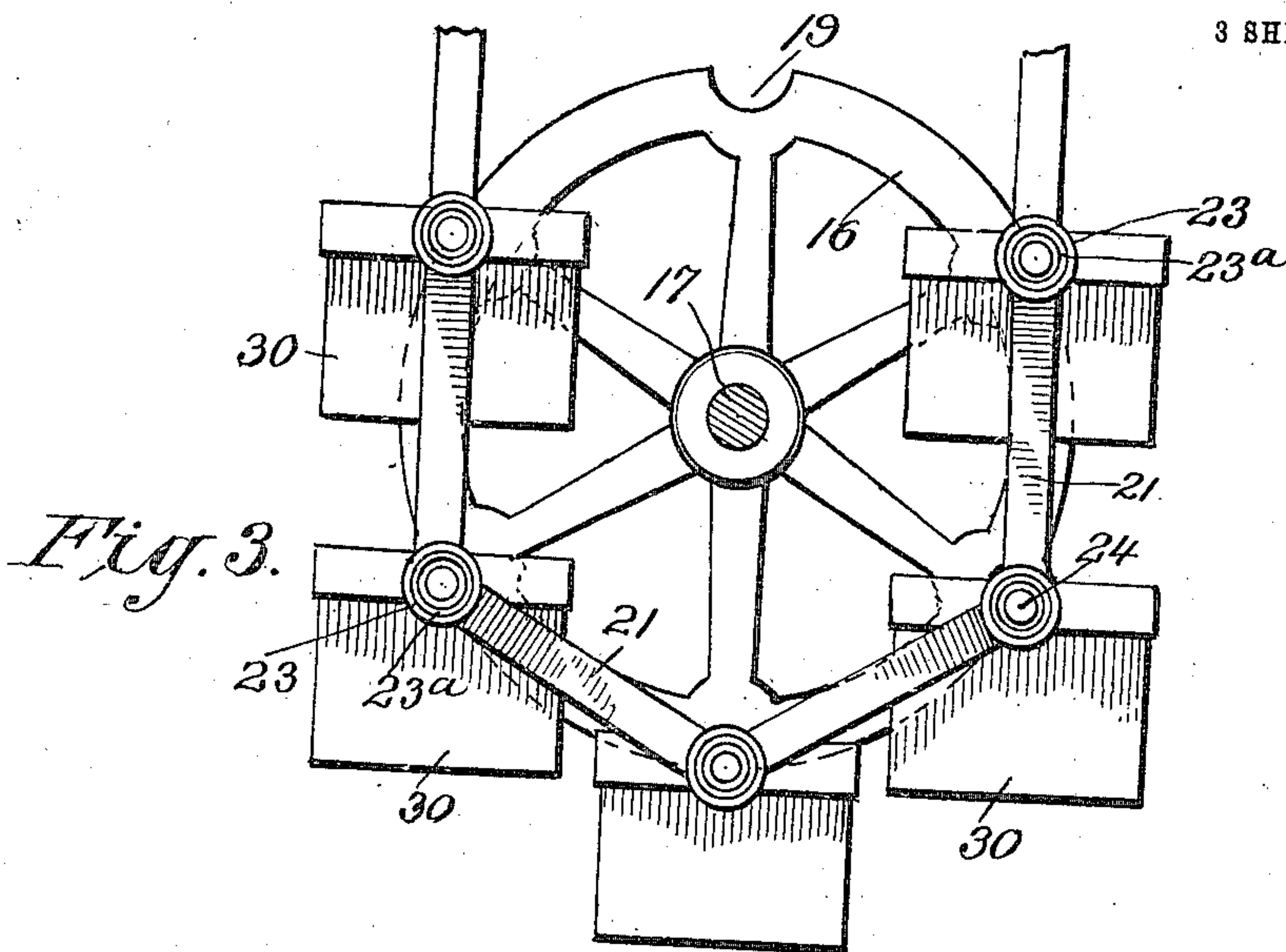
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

WILLIAM F. JOHNSON, OF BASIN, WYOMING.

ICE-FORMING APPARATUS.

985,601.

Specification of Letters Patent. Patented Feb. 28, 1911.

Application filed March 19, 1910. Serial No. 550,467.

To all whom it may concern:

Be it known that I, WILLIAM F. JOHNSON, a citizen of the United States, residing at Basin, in the county of Bighorn and State of Wyoming, have invented certain new and useful Improvements in Ice-Forming Apparatuses, of which the following is a specification.

My invention relates to apparatus for forming ice, and the object of the invention is to provide an apparatus of a very simple and effective construction, easily operated at a reasonable cost, which will permit water to be frozen by natural means, but without any chance of contamination, and which will also provide for a sufficient heating of the water prior to its formation into ice to rid the water of any germs that may be present therein.

A further object of the invention is to provide a construction wherein water may be heated, then elevated in ice molds, frozen in this elevated position, then lowered to a proper delivery point, detached from the mold, and the mold tipped so as to discharge the ice upon a chute leading to an ice house or other storage place.

A further object is to provide a construction upon which a series of molds may be carried for freezing water into the form of blocks, this construction being of such character as to take up very little space, require very little attention, and which will support the molds in such position that they will be most effectively acted upon by natural cold.

For a full understanding of the invention and the merits thereof, and to acquire a knowledge of the details of construction, reference is to be had to the following description and accompanying drawings, in which:

Figure 1 is an elevation of my improved apparatus, the furnace thereof being shown in section; Fig. 2 is an enlarged front elevation of the mold-supporting chains; Fig. 3 is a side elevation of the lower sprocket wheel, the lower portion of the chain engaging therewith, and the molds; Fig. 4 is a longitudinal section of one of the molds and links connected therewith; Fig. 5 is a perspective view of one of the links forming the sprocket chain; and, Fig. 6 is a perspective view of one of the molds.

Corresponding and like parts are referred to in the following description and indi-

cated in all the views of the drawings by the same reference characters.

Referring to these drawings which show what I believe to be the best form of my invention, 2 designates a tower, preferably of skeleton formation, and which is mounted upon a base 3 of concrete or like solid construction. Preferably mounted within a chamber in the base 3 is the furnace 4 which is of any suitable construction and is provided with the grate bars or grates 5. The furnace is also formed with the ash pit 6 and an ash door 7. The fire box has the door 8. Mounted in the upper portion of the furnace so as to be affected by the heat therefrom are the heating coils 9. An inlet pipe 10 connects with these coils and leads from a suitable source of water supply, such as a hydrant. An outlet pipe 11 leads from these coils and extends upward along the tower, as will be later described, the upward extension of this pipe being designated 12. A chimney or stack 13 carries off the products of combustion from the furnace, this stack being preferably higher than the tower 2. Mounted upon the upper end of the tower are the oppositely disposed sprocket wheels 14, mounted upon a shaft 15 which is rotatable in bearings in the upper end of the tower. Mounted in the base of the tower above the coil 9 are the oppositely disposed sprocket wheels 16 of exactly the same form as the sprocket wheels 14. These are mounted upon a shaft which may be connected to any suitable motor or to a crank 18. The sprocket wheels are formed with recesses 19 in their circumference for the accommodation of the projecting sockets on the sprocket chain.

Passing over the sprocket wheels 14 and 16 are the double sprocket chains 20, each composed of links 21 formed with eyes 22 at their opposite ends and with inwardly projecting sockets or sleeves 23—23^a. The sleeve 23^a is smaller than the sleeve 23 so as to fit inside of the same as shown in Fig. 4, and the trunnion 24 of the mold fits in the interior of the sleeve or socket 23^a. The sockets 23^a are each provided with a projecting lug or key 25 which when the sockets are inserted in each other, pass through grooves in the inside face of the sockets and thus hold the links together. I do not wish to be limited to this construction, as any other means of linking the separate members of the sprocket chains to each other

may be used. It is sufficient if two oppositely disposed sprocket chains are provided, connected by any transversely extending member.

5 Pivotally mounted between the sprocket chains are the molds 30. These molds are oblong in shape and rectangular in cross section and are pivotally supported upon the sprocket chains. Preferably, each of the
10 molds is provided at a point above its middle with the outwardly projecting trunnions 24 which engage in the eyes 22 and are rotatably supported therein, these trunnions being provided with keys which engage the
15 grooves formed in said eyes. Inasmuch as each mold box is pivotally swung at a point above the middle thereof, it is obvious that they will always maintain a vertical position when passing up over the sprocket wheels 14
20 and passing beneath the sprocket wheels 16.

It will be plain from the construction above described that the molds may be successively filled with water, the sprocket wheels rotated so as to lift the molds on one
25 side and lower the molds on the opposite side, and if the molds are kept in their elevated position when filled with water, the water in the molds will be frozen into solid blocks in a relatively short time, depending
30 upon the coldness of the weather. After the water is frozen in the molds, they may be moved by continuing the rotation of the sprocket wheels and tipping the molds as they arrive at a transfer point. The molds
35 may be again filled with water and the process continued.

While, as stated above, any means might be used whereby the opposite sprocket chains may be connected with each other and the
40 molds pivotally supported thereon, I prefer the construction illustrated in the drawing. As seen in Figs. 4 and 5, each link 21 has the sockets 23—23^a, the socket 23 being formed with a groove 26 extending entirely
45 through it. The lug 25 on the socket 23^a is placed oppositely relative to the groove 26 so that in order to engage or disengage the links it is necessary to turn the links at right angles to each other. When the links
50 are straight, however, it will be obvious that they will be held together. The links may be variously engaged or disengaged from each other and thus it is possible to increase or decrease the number of molds, as circum-
55 stances may demand.

In order to prevent the molds from being deformed by the weight or pressure of the ice, I prefer to use a removable brace 36
60 having downwardly bent ends which engage over the sides of the mold and which being easily removed will permit the easy removal of the cake of ice from the mold after it is formed.

It is necessary to provide means for de-
65 taching a frozen block of ice from the in-

terior of the mold, and for that reason I permit each mold carrying its block of ice to pass over the furnace, being protected therefrom, however, by a sheet iron cover or a plate of protecting material 33, and then
70 carry the mold into a chamber through which it eventually emerges with the block of ice detached from the inclosing casing so that when the mold is tilted, the block of ice will easily slide out. This heating cham-
75 ber is designated 34 and extends from the furnace casing upward so as to close the lower portion of one stretch of the sprocket chains. At the upper end of the heating tube I may provide a chute 35 which ex-
80 tends to an ice house or any storage point. There is also preferably provided at this point a platform upon which an operator may stand. The outlet tube 11 extends up through this heating chamber 34, as at 12, 85
and at its upper end is connected to a hose 36' whereby the molds, after they have been tipped to remove the block of ice therein, may be refilled with water, this water hav-
90 ing been previously heated in the coils thereof to kill the germs therein and to remove all danger of disease therefrom.

While I have shown the chute 35 as being located at the upper end of the heating tube 30, I do not wish to be limited to this loca-
95 tion, as it is obvious that these chutes might be provided at different levels to take the ice from the molds. It will be seen that the molds are freely suspended in the open air at a height above the ground; are entirely
100 surrounded by air, and therefore are in the best position for being quickly and solidly frozen, and particularly without any chance of contamination such as occurs where ice is formed on ponds or rivers. At the same
105 time, no expense is incurred in the freezing of the ice, it being only necessary to maintain a fire in the furnace to thoroughly boil the water prior to placing it within the molds, and to provide sufficient heat to de-
110 tach the blocks of ice from the molds. The elevator may be operated once or twice a day, or as quickly as the ice freezes around the outside of the mold. The construction may be made of various capacities and sizes,
115 to suit varying circumstances, and is particularly convenient in country places distant from ice manufactories and which are ordinarily dependent upon ice taken from ponds and rivers.
120

Having thus described the invention, what I claim is:—

1. An apparatus of the character described, including a tower, an elevator supported on the tower, a plurality of freezing
125 molds carried by said elevator, and a heating chamber inclosing one portion of the path of the elevator.

2. An apparatus of the character described, comprising a supporting structure, 130

a conveyer mounted thereon, a plurality of molds carried upon said conveyer, a heating chamber through which said conveyer passes at one point in its travel, and means for filling the molds after they have been carried through the heating chamber.

3. An apparatus of the character described, comprising a supporting structure, a furnace disposed below a supporting structure, a conveyer mounted upon the supporting structure, a plurality of molds upon the conveyer, means for manually operating said conveyer, a shield interposed between the furnace and the conveyer, water heating means located in the furnace, and means for conducting the heated water into a position where the molds may be filled.

4. An apparatus of the character described, comprising a supporting tower, an endless conveyer mounted on said tower, a furnace at the base of the tower, a series of molds mounted upon said endless conveyer, water-heating means in said furnace having an outlet pipe leading to a point where said molds may be filled, and a heating chamber connected to the furnace, through which the molds pass prior to being filled with water.

5. An apparatus of the character described, comprising a tower, parallel sprocket wheels at the upper end of the tower, parallel sprocket wheels at the lower end of the tower, parallel sprocket chains passing over said sprocket wheels, a series of freezing molds pivotally supported at their upper ends on said chains and disposed between the same so as to have a free swinging movement, means for releasing the ice on said molds and means for filling the molds with water after the cakes of ice formed therein have been withdrawn therefrom.

6. An apparatus of the character described, comprising a tower, a heater located at the base of the tower, double sprocket wheels mounted at the top and bottom of the tower respectively, sprocket chains passing over the double sprocket wheels, a plurality

of freezing molds pivotally supported between the sprocket chains, a heating chamber extending from said heater, into which said conveyer and molds pass through one portion of the travel of the conveyer, a discharge chute supported above the heating chamber, water-heating devices arranged within the heater, and an outlet pipe leading from said water-heating devices to a point above the heating chamber and provided with means whereby the molds may be successively filled.

7. An apparatus for freezing water including a tower having upper and lower sprocket wheels, an exposed endless conveyer passing over said sprocket wheels, a series of freezing molds carried upon said endless conveyer, a furnace located below the tower, a shield interposed between said furnace and the lower stretch of the conveyer, and a hot air flue leading from the furnace through which flue the endless conveyer passes.

8. An apparatus of the character described, comprising a tower, sprocket wheels carried upon the upper end of the tower and base thereof, oppositely disposed sprocket chains passing over said sprocket wheels, each of said chains composed of links, each link formed at one end with an inwardly extending tubular sleeve, the inner face of the sleeve being grooved, means for operating said sprocket wheels, and a plurality of freezing molds carried upon said sprocket chains, said freezing molds being each provided with oppositely disposed trunnions adapted to extend through the sleeves of adjacent links, said trunnions being each provided with a lug projecting radially outward therefrom and adapted to pass through the groove in the inner face of the sleeve.

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

WILLIAM F. JOHNSON. [L. s.]

Witnesses:

GRACE F. ALEXANDER,
JOHN P. ARNOTT.