No. 641,446. Patented Jan. 16, 1900.

E. N. FRIEDMANN.

AGITATOR FOR REFRIGERATING AND ICE MANUFACTURE.

(Application filed Apr. 22, 1899.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1,

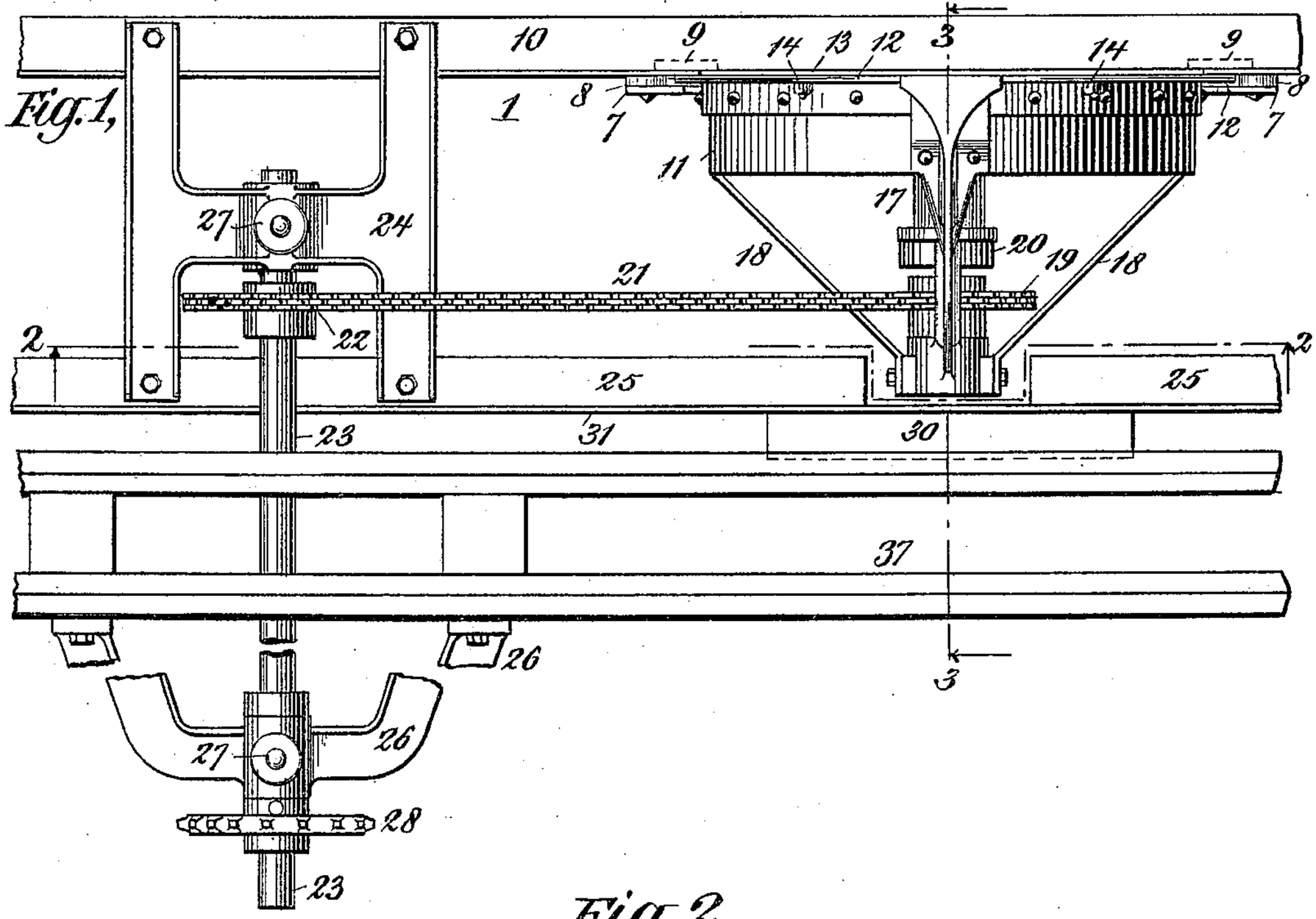

Fig. 2,

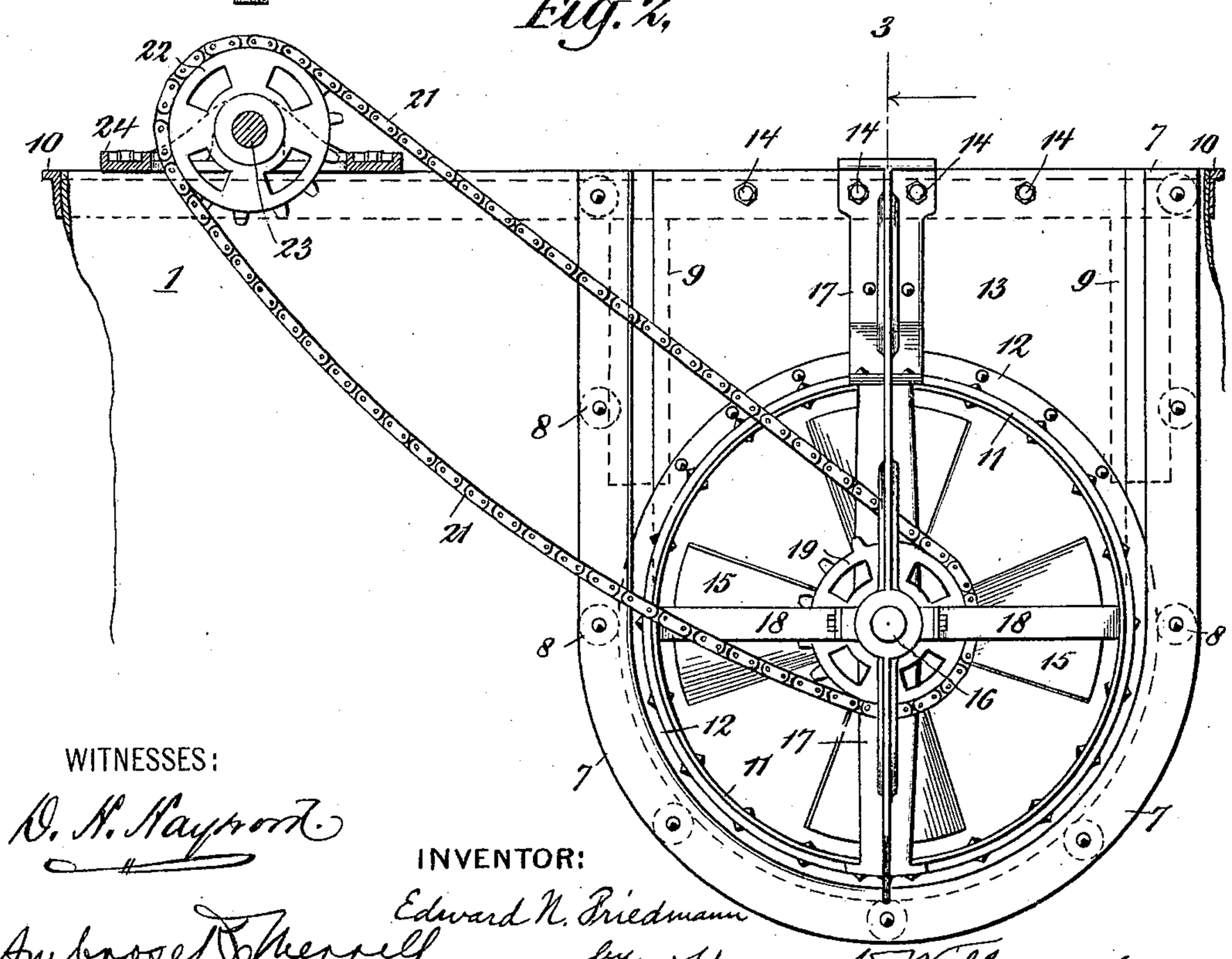

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Fig. 3.

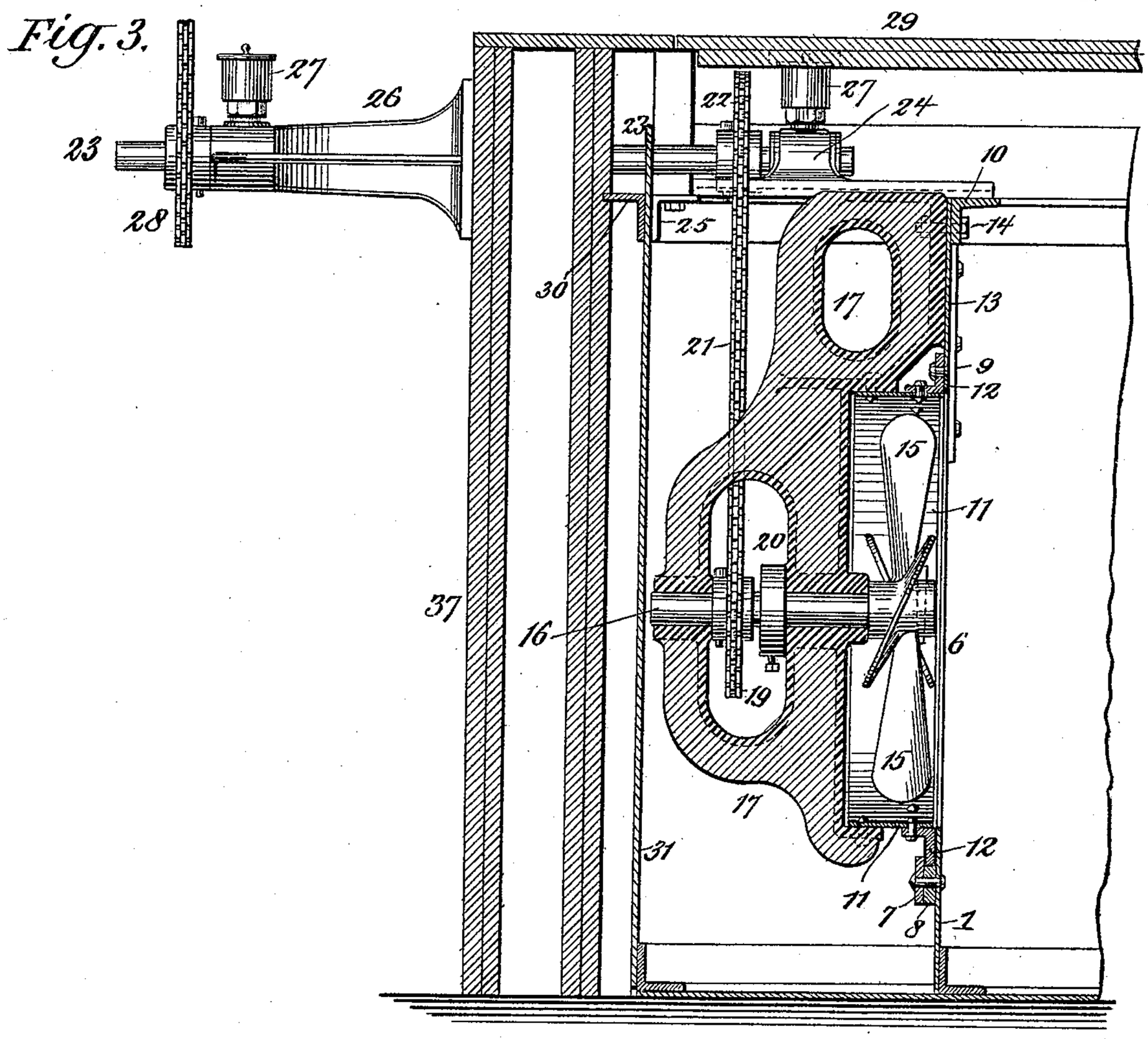


Fig. 4.

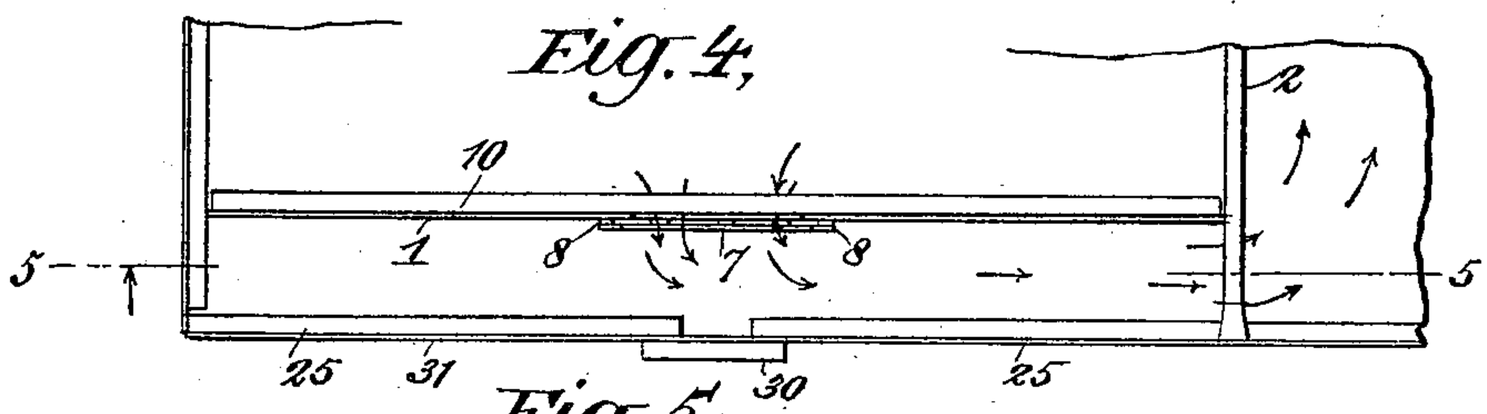
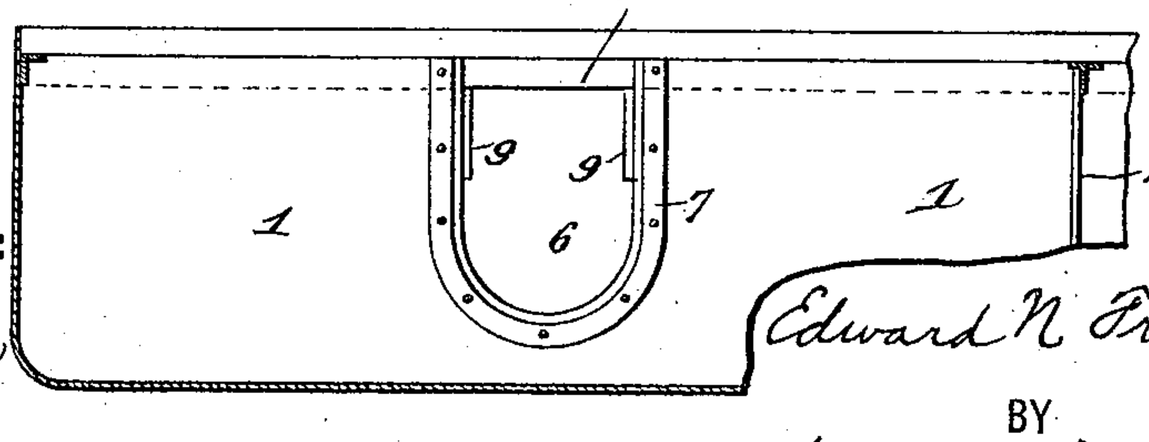


Fig. 5.



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UNITED STATES PATENT OFFICE.

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AGITATOR FOR REFRIGERATING AND ICE MANUFACTURE.

SPECIFICATION forming part of Letters Patent No. 641,446, dated January 16, 1900.

Application filed April 22, 1899. Serial No. 714,079. (No model.)

To all whom it may concern:

Be it known that I, EDWARD N. FRIEDMANN, a citizen of the United States, and a resident of the city of New York, borough of Manhattan, county and State of New York, have invented certain new and useful Improvements in Agitators for Refrigerating and Ice Manufacture, of which the following is a specification, reference being had to the accompanying drawings, forming part hereof.

This invention relates to agitators such as are employed in the brine-tanks of refrigerating and ice-making plants. The propeller-shafts of such agitators as heretofore constructed have extended through the sides of the tank, and the necessary location of the propeller within the body of the fluid has caused this shaft and the opening in the side of the tank therefor to be located at a considerable distance below the level of the fluid, necessitating the employment of a long stuffing-box for the propeller-shaft and not even thereby preventing leakage of brine. Whenever cleaning or repacking or repairs have been required, it has been necessary to lower the level of the fluid below the opening for the propeller-shaft, and this in an ice-making tank has usually required the removal of about half of the numerous freezing-cans immersed in the brine, as well as the practical suspension of the operation of the tank. Among other objections it is to be noted that a very long shaft has been necessary, which under the conditions of use has been easily bent, and that a very irregular cutting away of the insulation about the tank has been required to admit the brackets of the bearing of the propeller-shaft.

My invention has for its object to obviate these objectionable features. According to my invention the agitator does not require any openings in the side of the tank below the fluid-level and the propeller and all movable immersed parts may be removed for any purpose without lowering the level of the fluid in the tank, so that all parts are accessible without lowering the fluid-level, no stuffing-box is required, the only outwardly-extending bracket may be secured at the outer side of the insulation, and there are other advantageous features which will appear from the following full description of the brine-agitator embodying my invention, which is shown in the accompanying drawings.

Figure 1 is a plan view of the agitator and adjacent portions of the tank with the covers and upper frame of the tank removed. Fig. 2 is a transverse vertical section of the same on the line 2 2, Fig. 1. Fig. 3 is a longitudinal vertical section of the same on the line 3 3, Figs. 1 and 2. Fig. 4 is a reduced plan view of part of the tank with the agitator removed. Fig. 5 is a transverse vertical section of the same on the line 5 5, Fig. 4.

The tank partly shown is such as would be employed in an ice-making plant and has a longitudinal partition 2, (see Figs. 4 and 5,) which meets a transverse partition 1, the transverse partition 1 having a single opening 6, provided with guides, in which opening the propeller and its carrying-frame are located, and the longitudinal partition 2 terminating at the transverse partition 1, so as to leave an opening for the flow of the fluid. The movement of the fluid through the tank (partly indicated by arrows in Fig. 4) is forwardly in the part to the left of the longitudinal partition, through the opening in the transverse partition in which the propeller is located, and then to the right in front of the transverse partition, and then rearwardly in the part of the tank to the right of the longitudinal partition. As usual, the fluid would pass to the left of the longitudinal partition at the rear of the tank and then forwardly again, and another agitator would in many instances, and especially in very large tanks, be located at the rear end of the tank to assist in maintaining the circulation of the fluid. The freezing-cans would be immersed in the tank, as usual, and the cooling-coils would traverse the tank in any desired manner.

The opening 6 in the transverse partition 1 is in the form of an inverted arch, with a front guide 7 for the propeller-frame, said front guide extending around substantially parallel to the opening and spaced at a suitable distance therefrom by washers 8, arranged at intervals, the guide and washers being shown as secured to the partition by rivets. Rear guides 9 9 are also provided, the front surfaces of which are flush with the front

surface of the upper angle-bar 10 of the partition 1 and which extend from the same downwardly a short distance, one on each side of the opening. The rear guides 9 9 and the angle-bar 10 constitute an upper guide for the propeller-frame and guide the propeller-frame when it is being inserted or removed. When the propeller-frame is in position, the rear face of its upper or top margin is against the angle-bar 10 and the rear faces of the upper portions of its side margins are against the rear guides 9 9. The propeller-frame includes a short cylindrical part or housing 11, provided with an annular rim 12, and a flat plate 13, extending from the line of the top of the partition down to the housing 11, the flat plate and upper part of the annular rim being shown as riveted together and the annular rim being shown as riveted to the housing. The annular rim 12 fits between the front guide 7 and the partition and rests upon the spacing-washers 8, and the plate 13 fits within and fills the upper part of the opening 6 and rests against the rear guides 9 and upper angle-bar 10. The propeller-frame is held in place by bolts 14 14 passing through the upper angle-bar 10 of the partition and through the plate 13, these bolts being readily accessible. When the bolts 14 have been removed, the propeller-frame may be lifted upwardly out of the tank. The propeller is located within the housing 11 and is shown as comprising a screw-propeller 15 upon a shaft 16, fitted to revolve in bearings formed in the bracket 17, this bracket 17 being secured to the housing 11 and to the plate 13 and acting as a vertical brace to the propeller-frame. Side braces 18 18 are also provided, extending obliquely from the housing 11 to the front of the bracket 17, one on each side of the propeller-shaft 16. The bearings of the propeller-shaft 16 are in two parts, between which are located a thrust-collar 20 and the power-receiving wheel, shown as a sprocket-wheel 19.

The construction of propeller-frame and guides above described is advantageous by reason of its simplicity, light weight, and strength, the effective closing of the opening in the partition except at the housing, the facility of insertion and removal, and the absence of any pockets in the guides liable to become filled or clogged. In the insertion or removal of the propeller-frame the annular rim 12 is guided by the guide 7 and spacing-washers 8 from or to the top of the partition, so that it is only necessary in removing the frame to pull it straight up and in inserting the frame to properly enter the annular rim in rear of the guide 7 and between the upper spacing-washers 8 and then allow the frame to move downwardly into place, care being taken to hold the frame in vertical position until the plate 13 has properly entered the opening 6 in the partition.

The power is transmitted to the propeller from moving parts arranged above the fluid-level, and in the construction shown this is accomplished by a chain 21, the driven sprocket-wheel 19 on the propeller-shaft, and the driving sprocket-wheel 22 on a driving-shaft 23, fitted to rotate in bearings at the top of the tank, these bearings being formed in a strut-bracket 24, secured to the upper angle-bar 10 of the transverse partition and to the upper angle-bar 25 of the front wall 31 of the tank and by the horizontal bracket 26, secured to the wooden insulation 37. Suitable oil-cups 27 are provided for the lubrication of these bearings, and a sprocket-wheel 28 is shown on the end of the driving-shaft, whereby power is received from some suitable source.

As will be seen, all parts of the agitator, except the front end of the driving-shaft and its horizontal bracket, are within the framework of the tank, the cover 29 (see Fig. 3) closing over the inner bearing of the driving-shaft and the driving-shaft extending through the insulation 37. It will be observed that it is only necessary to form openings in the insulation sufficiently large for the driving-shaft to pass through.

The upper angle-bar 25 of the front of the tank is shown as discontinued, leaving an opening directly above the front end of the propeller-shaft and bearing, so as to offer no obstruction to the insertion and removal of the propeller and its frame, a corresponding short angle-bar 30, secured at the front face of the front wall 31 of the tank, bridging this opening, so that the tank will not be weakened by this opening.

It is evident that various modifications may be made in the construction above particularly described within the purview of my invention.

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

1. In combination, a tank having an inner substantially vertical partition with an opening therein, and a fluid-propeller the axis of which does not extend through the walls of the tank and a frame carrying the same, said frame constructed to fit into the opening in said partition and partly close the same, and means for actuating said propeller from above the fluid-level of the tank, substantially as set forth.

2. The combination with a tank of a fluid-propeller located therein below the fluid-level and fitted to rotate on a substantially horizontal axis the shaft of which does not extend through the walls of the tank, a driving-shaft wholly above the fluid-level and means for actuating the propeller from the driving-shaft, substantially as set forth.

3. The combination with a tank having an inner substantially vertical partition with an opening therein, of a fluid-propeller located in said opening below the fluid-level and fitted to rotate on a substantially horizontal axis the shaft of which does not extend through the walls of the tank, a driving-shaft above the fluid-level and means for actuating the pro-

peller from the driving-shaft, substantially as set forth.

4. In combination, a tank having a substantially vertical inner partition with an opening therein, a fluid-propeller and a frame carrying the same, said frame constructed to fit said opening and slide-guides about the edges of said opening whereby the propeller-frame has a sliding connection with the inner partition, and means for actuating said propeller, substantially as set forth.

5. In combination, a tank having a substantially vertical inner partition with an opening therein, a fluid-propeller and a frame carrying the same, said frame constructed to fit said opening and slide-guides about said opening whereby the propeller has a sliding connection with the inner partition, an independent driving-shaft at the upper part of the tank and means for actuating said propeller from the driving-shaft, substantially as set forth.

6. A removable agitator comprising a fluid-propeller fitted to rotate on a substantially horizontal axis, a housing for the same, a bracket secured to said housing and constituting the sole support of the propeller-shaft and a plate secured to said bracket and housing, substantially as set forth.

7. In combination, a tank having a substantially vertical inner partition with an opening therein, a fluid-propeller, a removable frame carrying said propeller and constructed to fit said opening and comprising a housing for the propeller, a bracket secured to said housing and having one or more bearings for the propeller, and a plate secured to said bracket and housing, substantially as set forth.

8. In combination, a tank having a substantially vertical inner partition with an opening therein, a guide about said opening, a fluid-propeller, a housing for the propeller, said housing having a rim fitting said guide, a bracket secured to the housing and having one or more bearings for the propeller, and a plate fitting the upper part of the opening and secured to said bracket and housing, substantially as set forth.

9. In combination, a tank having an inner partition with an opening therein, a front guide about said opening and spacing means at intervals between said guide and partition, and an upper guide, a fluid-propeller, a housing for the propeller, said housing having a rim fitting said front guide, a bracket secured to the housing and having one or more bearings for the propeller, and a plate fitting the upper part of said opening and bearing against the upper guide, said plate being secured to said bracket and housing, substantially as set forth.

10. In combination, a tank having an inner partition with an opening therein, the front guide 7 and spacing-washers 8 about said opening, rear guides 9, 9, and upper angle-bar 10, a fluid-propeller, the propeller-shaft 16, a power-receiving wheel on said propeller-shaft, the housing 11 for said propeller and the rim 12 of said housing, the bracket 17 having bearings for the propeller-shaft 16, the plate 13 secured to the bracket 17 and to the rim 12, and a driving-wheel connected to said power-receiving wheel and fitted to rotate at the upper part of the tank, substantially as set forth.

11. In combination, a tank having an inner partition with an opening therein, the front guide 7 and spacing-washers 8 about said opening, the rear guides 9, 9, and upper angle-bar 10, a fluid-propeller, the propeller-shaft 16, the sprocket-wheel 19 on said propeller-shaft, the housing 11 for said propeller and the rim 12 of said housing, the bracket 17 having bearings for the propeller-shaft 16, the plate 13 secured to the bracket 17 and to the rim 12, the side braces 18, 18, connecting the housing and bracket, the driving-shaft 23 fitted to rotate in bearings at the top of the tank, the driving sprocket-wheel 22, on the driving-shaft 23, and the chain 21 connecting the sprocket-wheels 22 and 19, substantially as set forth.

Signed at the city of New York, State of New York, this 20th day of April, 1899.

EDWARD N. FRIEDMANN.

Witnesses:

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ALEX. CAMERON, Jr.