

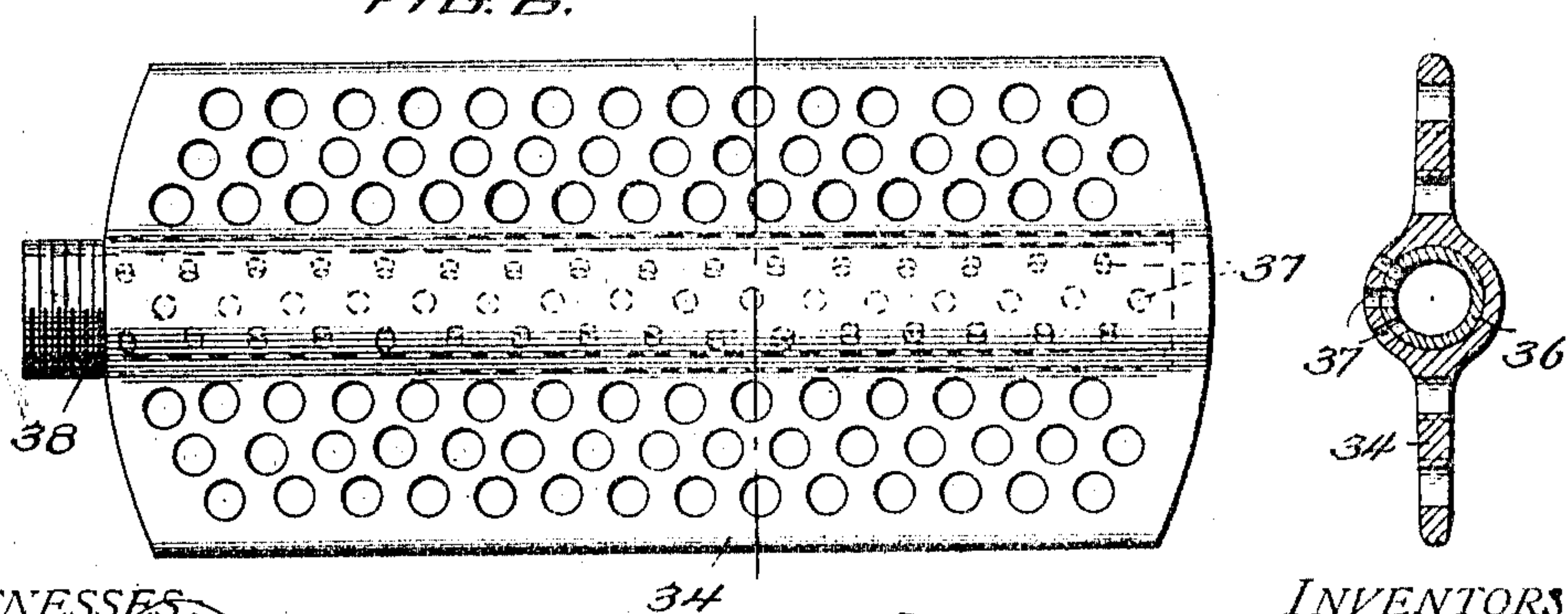
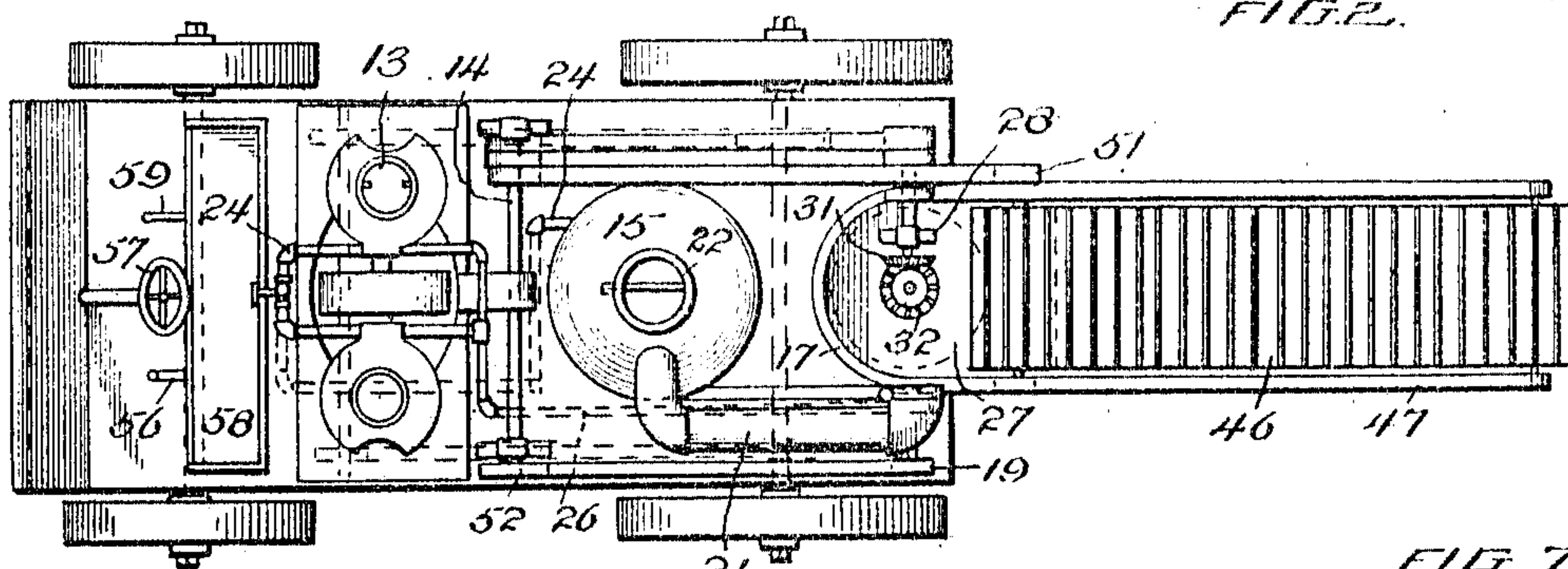
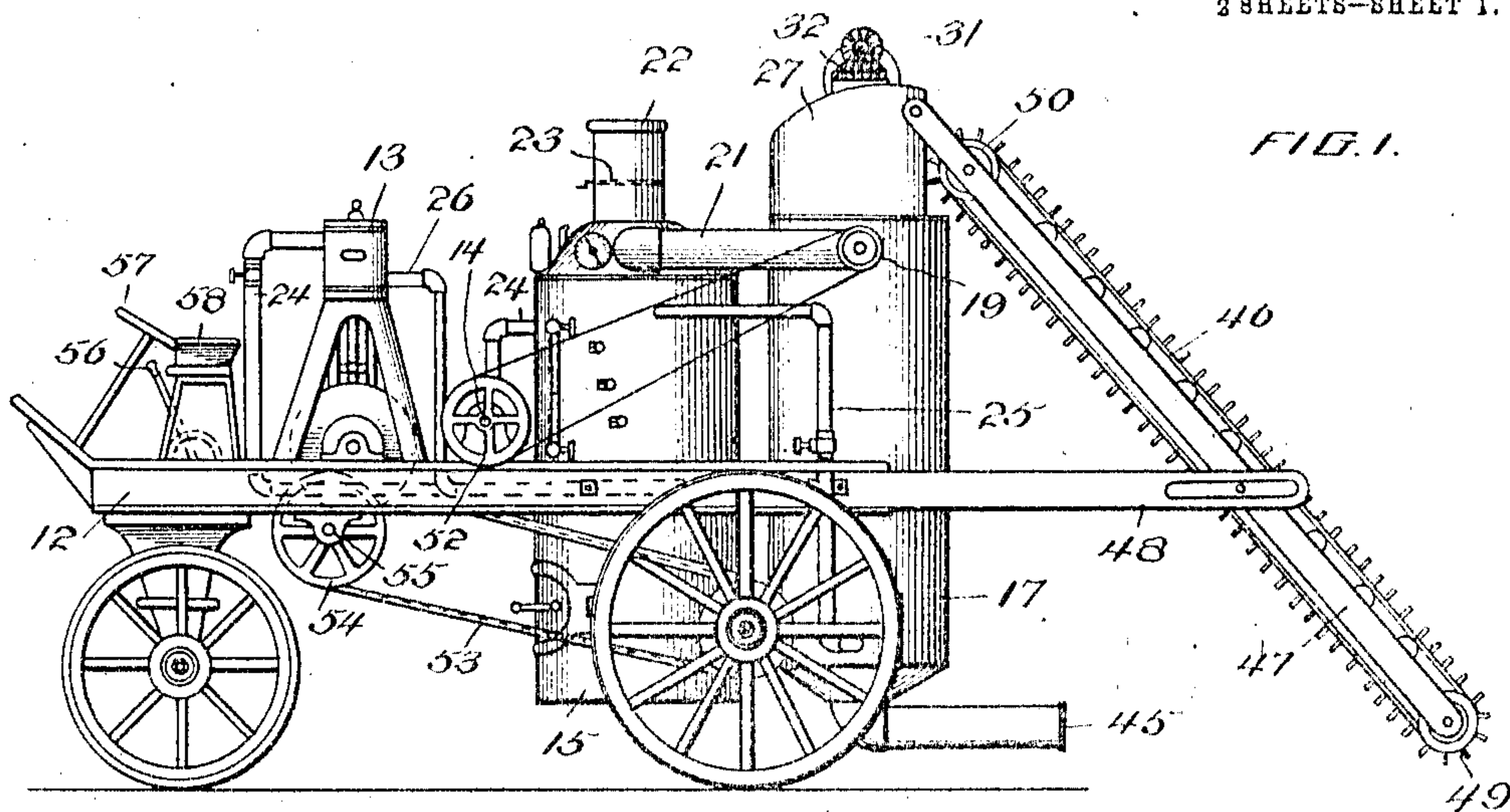
O. MÜLLER, M. WILLNUS & C. WEISHAAR.
SNOW MELTING MACHINE.

APPLICATION FILED MAR. 14, 1910.

969,716.

Patented Sept. 6, 1910.

2 SHEETS—SHEET 1.



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3 SHEETS-SHEET 2.

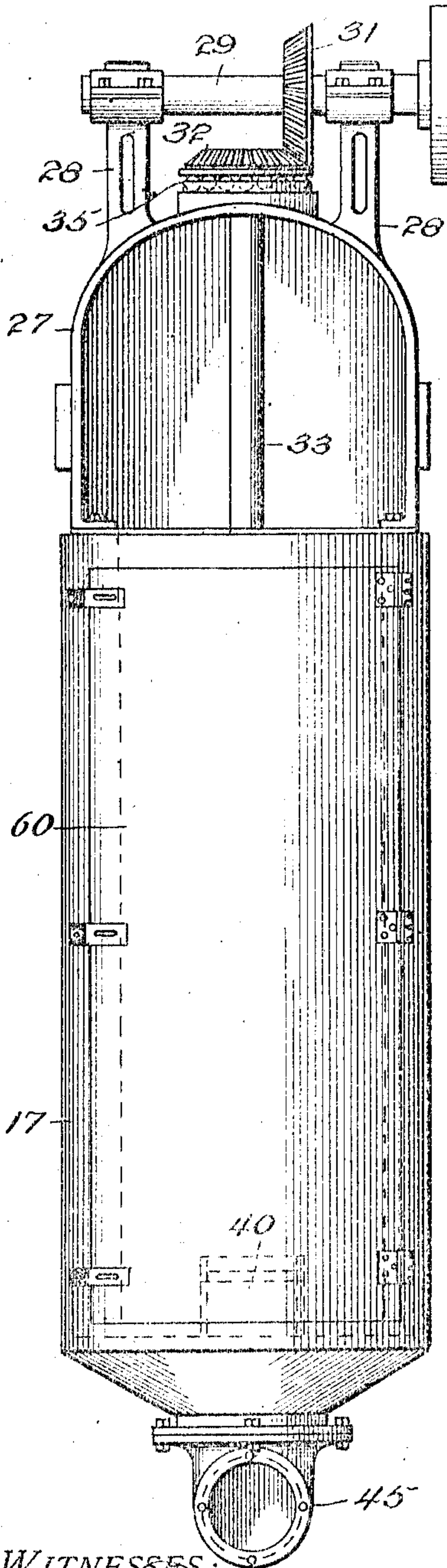


FIG. 3.

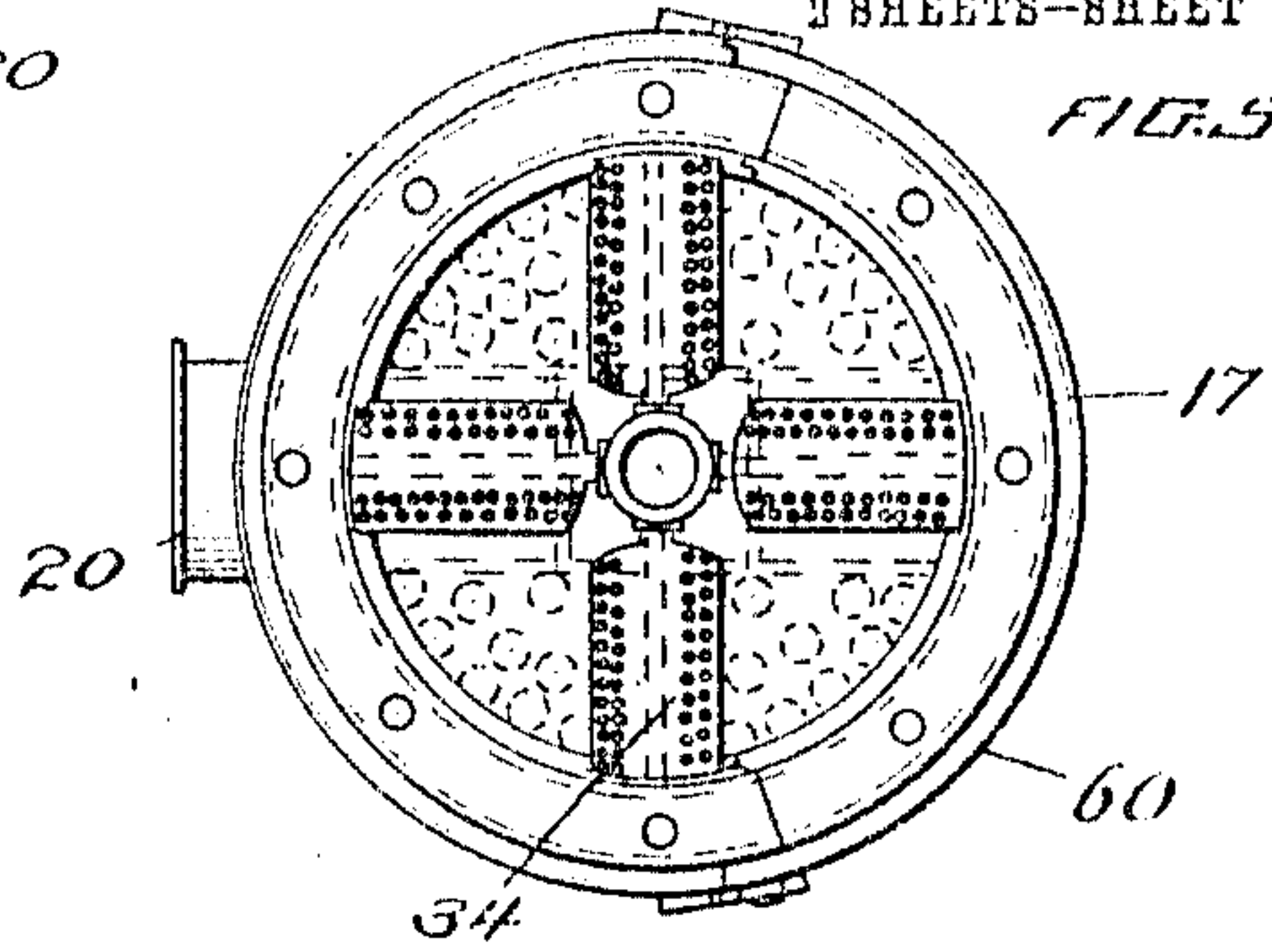


FIG. 5.

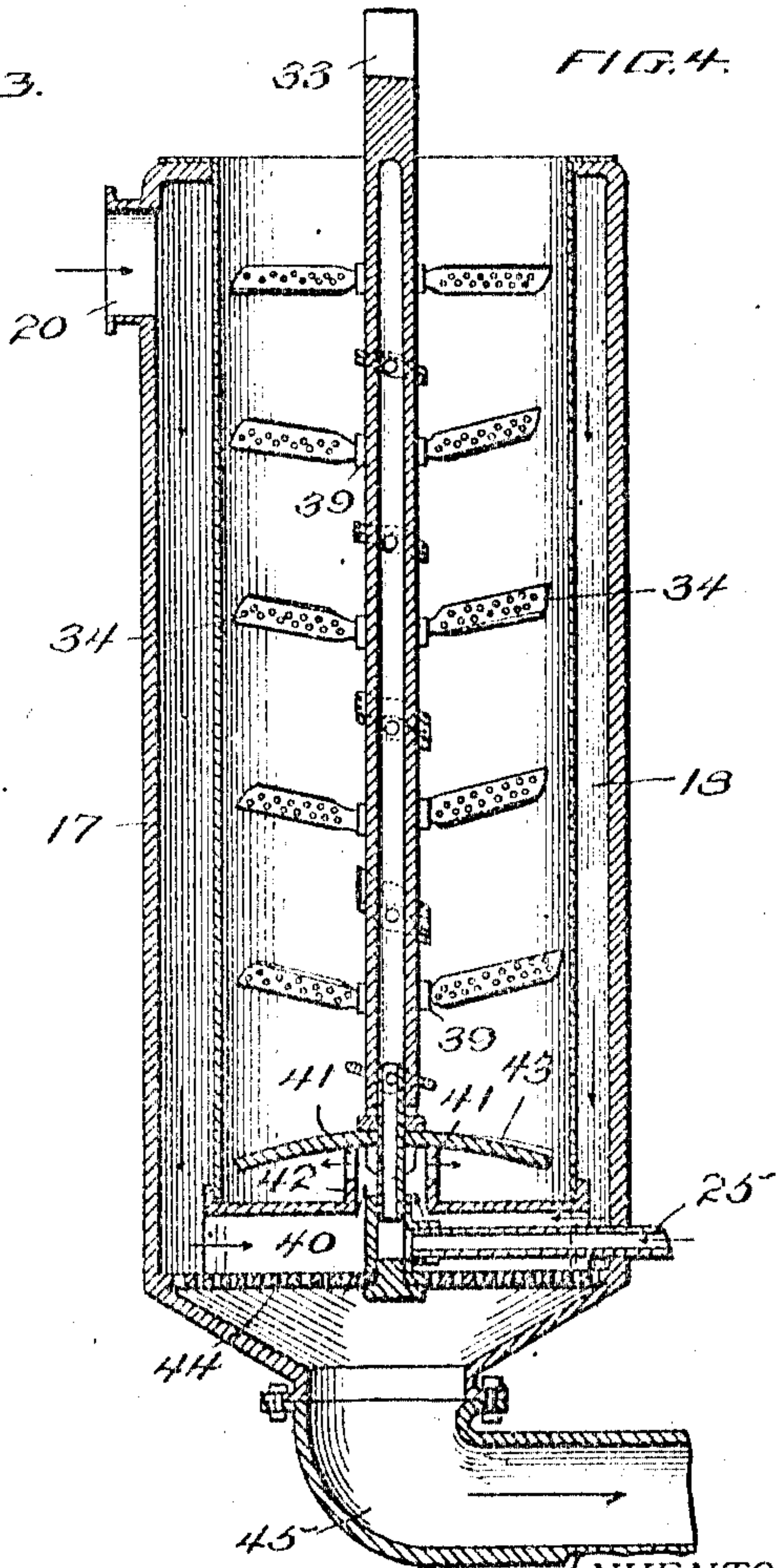


FIG. 4.

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UNITED STATES PATENT OFFICE.

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SNOW-MELTING MACHINE.

969,716.

Specification of Letters Patent.

Patented Sept. 6, 1910.

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To all whom it may concern:

Be it known that we, OSCAR MÜLLER, MICHAEL WILLNUS, and CHRISTIAN WEISHAAR, all citizens of the United States, said MÜLLER residing at New York city, New York, and said WILLNUS and WEISHAAR both residing at Elizabeth, in the county of Union and State of New Jersey, have invented or discovered certain new and useful Improvements in Snow-Melting Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to a portable snow melting machine which will preferably be mounted on a self-propelling vehicle carrying a steam boiler for developing power, to drive the machine, and heat for melting the snow, the snow being carried by an elevator into a melting tank inside of which is a revolving agitator of peculiar construction, and in which tank the snow to be melted is subjected to the action of the smoke and products of combustion from the boiler fire, as also preferably to the action of live steam from the boiler and exhaust steam from the engine.

In the accompanying drawings, Figure 1 is a side view of the improved machine, and Fig. 2 is a plan view of the same. Fig. 3 is a detail elevation of the melting tank; Fig. 4 is a vertical section, and Fig. 5 a top plan view of the same. Figs. 6 and 7 are detail views of one of the agitator blades.

Referring to the drawings, the wheeled vehicle is provided with a suitable frame or platform 12 on which is mounted an engine 13 preferably comprising two cylinders, the said engine being geared in any suitable manner to a main or driving shaft 14. Suitably supported on the vehicle frame is an upright boiler 15 having beneath it, as usual, a suitable fire box. Also supported on the frame of the vehicle is a melting tank 17, which preferably comprises inner and outer walls, as shown in Fig. 4, and between which is an annular chamber or flue 18 through which the smoke and products of combustion are forced by a rotary blast fan which is driven from a pulley 19 and is located, adjacent the smoke inlet 20 to the said chamber, in a pipe 21 connecting the boiler jacket with the said melting tank. The boiler jacket is provided, as usual, with a

smoke pipe 22 having a damper 23 which may be opened when the fire is started, but which will preferably be closed when the blast fan is in operation.

The boiler 15 is connected with the engine 13 by a steam-admission pipe 24, and is also connected with the melting tank by a pipe 25 by which live steam from the boiler may be admitted to the melting tank and through which the exhaust steam from the engine may also pass into the melting tank through the exhaust pipe 26 connecting the engine with the pipe 25.

Mounted on the melting tank 17 is a hood 27 having standards 28 which afford bearings for a shaft 29 provided with fast and loose pulleys 30 and with a bevel gear 31. The bevel gear 31 meshes with a similar bevel gear 32 secured to the top of a suspended agitator shaft 33 extending down through the melting tank and provided with a series of perforated and partly hollow agitator blades 34; the weight of said shaft and of said blades being preferably supported by ball bearings 35 beneath the bevel gear 32. Each of the agitator blades consists preferably of a pipe or tubular steel core 36 on which is cast the perforated body of the blade 34, and the said blade is also provided at its lower side with perforations 37 forming steam outlets passing through the hub of the blade and the said steel pipe or core. Also the steel pipe or core is provided at one end with a threaded portion 38 by which the blade may be screwed into the shaft 33. The agitator blades 34 will preferably be so feathered or inclined in the chamber of the tank 17 that the blades in the upper portion of the tank will have a tendency to force the snow downward, while the blades in the lower portion of the tank will have a tendency to force the snow upward, and the lower blades will also be tilted upward, as shown in Fig. 4, for the purpose of counteracting the effect of centrifugal force. The agitator blades will preferably be so staggered or arranged as to be out of register with each other in vertical series, although for convenience of illustration, the blades are shown in Figs. 4 and 5 as being merely at right angles to each other. The screw-threaded portions 38 of the shanks of the agitator blades are preferably provided with set-nuts 39 by which, when

the blades have been set at any desired angle of inclination, they may be permanently secured in place.

The steam pipe 25 communicates with the bottom of the hollow agitator shaft 33 so that steam entering the said pipe will pass into said shaft and then outward through the hollow shanks of the agitator blades, and through the perforations in the lower portions of the cores of said blades into the tank, to act on the snow being melted. The chamber or flue 18, through which the blast fan forces the smoke, gases and heat from the boiler into the melting tank, communicates with a diametric smoke channel or passageway 40 in the bottom of the melting tank, and which passageway communicates through openings 41 with the bottom of the chamber of said tank. The openings 41 are formed in a boss 42 surmounted by a protecting plate 43. The bottom plate 44 of the tank 17 is perforated for the egress of the water which flows into a water outlet spout 45.

The snow to be melted is conveyed to the melting tank by an endless apron elevator 46 supported by a suitable frame 47 attached at its top to the hood 27, and partly sustained by supports 48 attached to the vehicle frame; the endless apron elevator being of any usual or well-known construction and comprising moving slats, buckets or blades and running on rollers 49 and 50. The roller 50 is provided with a driving pulley 51 which is belted to the main or driving shaft 14, and the driving pulley of the agitator shaft 31 is also belted to said main or driving shaft 14, as will be understood from Fig. 2; while the pulley 19 of the blast fan is also driven from the said main shaft 14 by means of the pulley 52 on said shaft and which is belted to the said pulley 19.

The vehicle on which the snow melting apparatus is mounted is preferably self-propelling, by virtue of the fact that the wheels of said vehicle are connected by chain belts 53 with pulleys 54 on a shaft 55 which is geared to the engine shaft, and which will preferably have a friction clutch connection, controlled by a clutch lever 56, with a driving part connected with the engine shaft. The vehicle is preferably provided with a steering wheel 57, adjacent a seat 58 for the driver, and also with a brake 59 adjacent the said seat.

In the form of the invention shown the vehicle will preferably be driven to the place where the melter is to be operated, running forward so that the elevator will be in the rear, as shown in Fig. 1; but as the engine is of a reversible type the vehicle may be reversed when it is desired to set it into operation, or to locate it adjacent banks of snow to be melted. The snow to be melted may be shoveled on to the ele-

vator, or be otherwise caused to be engaged by the elevator, as will be understood.

From the foregoing it will be seen that the invention provides a portable snow melting machine of compact and convenient form, and in which the heat from the boiler fire and boiler may be utilized, without waste, in melting the snow, both by the utilization of the products of combustion, and also by live steam from the boiler and exhaust steam from the engine. As a matter of fact practical tests of the invention have demonstrated that snow can be melted at the rate of a cubic yard per minute at a cost of two cents per cubic yard for power and heat, and at a cost not to exceed five cents per cubic yard for power, heat and labor.

The melting tank 17 is preferably provided with one or more doors which may be opened to permit access to the inside of the tank for repairs or other purposes. One of such doors, 60, in the outer wall of the tank is shown in Fig. 3, and the inner wall of the tank will preferably be provided with a similar door.

By providing the bodies of the horizontally extending agitator blades 34 with vertical openings or perforations said blades act somewhat as sieves through which the snow is sifted in a fine or comminuted condition, so that it may be melted more rapidly than it would be if it were not thus finely broken up or comminuted.

The invention is not to be understood as being limited to the details of construction herein shown and described, as these may be varied widely, within the province of mechanical skill, without departing from the scope of the invention.

Having thus described our invention we claim and desire to secure by Letters Patent:

1. A portable snow melting machine comprising a wheeled vehicle, and a boiler, engine and melting tank mounted thereon, combined with an elevator for carrying snow into said tank, a rotary agitator for stirring the snow in the tank, means for conveying steam from the boiler into the said tank, means for conveying the smoke and products of combustion from the boiler fire into said tank, and means for rotating said agitator and for driving said elevator.

2. A portable snow melting machine comprising a wheeled vehicle, and a boiler, engine and melting tank mounted thereon, combined with an elevator for carrying snow into said tank, a rotary agitator for stirring the snow in the tank, means for conveying steam from the boiler into the said tank, means for conveying the smoke and products of combustion from the boiler fire into said tank, means for rotating said agitator and for driving said elevator, and mechanism operated by said engine for propelling the said vehicle.

3. In a snow melting machine, the combination with a melting tank, of an agitator for stirring the snow in said tank, said agitator consisting of a hollow rotary shaft centrally arranged in the melting chamber of said tank and provided with a series of radially projecting partly hollow blades communicating with the chamber of said hollow shaft and provided with steam outlet openings, a boiler, and connections between said boiler and said hollow shaft whereby steam from the former may be admitted to the latter.

4. In a snow melting machine, the combination with a melting tank, of an agitator for stirring the snow in said tank, said agitator consisting of a hollow rotary shaft centrally arranged in the melting chamber of said tank and provided with a series of radially projecting partly hollow blades communicating with the chamber of said hollow shaft and provided with steam outlet openings, a boiler, and connections between said boiler and said hollow shaft whereby steam from the former may be admitted to the latter, the blades in the upper portion of the said melting chamber being arranged to force the snow downward, and the blades in the lower portion of said tank being arranged to force the snow upward.

5. In a snow melting machine, the combination with a melting tank, of an agitator for stirring the snow in said tank, said agitator consisting of a hollow rotary shaft centrally arranged on the melting chamber of said tank and provided with a series of radially projecting partly hollow blades communicating with the chamber of said hollow shaft and provided with steam outlet openings, a boiler, and connections between said boiler and said hollow shaft whereby steam from the former may be admitted to the latter, said tank comprising an annular flue or chamber encircling the melting chamber and communicating with the bottom of the latter, and means for forcing smoke and products of combustion from the boiler fire through the said annular flue or chamber into the said melting chamber.

6. In a snow melting machine, the combination with a melting tank, of an agitator for stirring the snow in said tank, said agitator consisting of a hollow rotary shaft centrally arranged in the melting chamber of said tank and provided with a series of radially projecting partly hollow blades communicating with the chamber of said hollow shaft and provided with steam outlet openings, a boiler, connections between said boiler and said hollow shaft whereby steam from the former may be admitted to the latter, an elevator for conveying snow into said tank, and means for operating said elevator and said rotary agitator shaft.

7. In a snow melting machine, the combination with a melting tank, of an agitator for stirring the snow in said tank, said agitator consisting of a hollow rotary shaft centrally arranged in the melting chamber of said tank and provided with a series of radially projecting partly hollow blades communicating with the chamber of said hollow shaft and provided with steam outlet openings, a boiler, connections between said boiler and said hollow shaft whereby steam from the former may be admitted to the latter, the blades in the upper portion of the said melting chamber being arranged to force the snow downward, and the blades in the lower portion of said tank being arranged to force the snow upward.

8. In a snow melting machine, the combination with a melting tank, of an agitator for stirring the snow in said tank, said agitator consisting of a hollow rotary shaft centrally arranged in the melting chamber of said tank and provided with a series of radially projecting partly hollow blades communicating with the chamber of said hollow shaft and provided with steam outlet openings, a boiler, connections between said boiler and said hollow shaft whereby steam from the former may be admitted to the latter, said tank comprising an annular flue or chamber encircling the melting chamber and communicating with the bottom of the latter, and means for forcing smoke and products of combustion from the boiler fire through the said annular flue or chamber into the said melting chamber, an elevator for conveying snow into said tank, and means for operating said elevator and said rotary agitator shaft.

9. In a snow melting machine, the combination with a melting tank and means for conveying snow thereto, of a boiler, means for conveying smoke and products of combustion from the boiler fire to said tank, and means for agitating the snow in said tank.

10. In a snow melting machine, the combination with a melting tank and means for conveying snow thereto, of a boiler, an engine, means for conveying smoke and products of combustion from the boiler fire to said tank, means for agitating the snow in said tank, and means for conveying live steam from the boiler and exhaust steam from said engine into said tank.

11. In a snow melting machine, the combination with a melting tank and means for conveying snow thereto, of a boiler, means for conveying smoke and products of combustion from the boiler fire to said tank, means for agitating the snow in said tank, and means for conveying live steam from the boiler into said tank.

12. In a snow melting machine, the combination with a melting tank and means for heating the same, of a hollow suspended shaft centrally arranged in said tank and provided with radially-projecting, partly hollow, agitating blades, an anti-friction bearing which supports the weight of said shaft and blades from above, and means for rotating said shaft.

10 13. In a snow melting machine, the combination with a melting tank, means for heating the chamber of said tank, and means for conveying snow thereto, of an agitator in said tank for stirring and comminuting the snow, said agitator consisting of a rotating, vertical shaft provided with a series of horizontally extending, perforated blades by which the snow is broken up and through which it is sifted.

20 14. In a snow melting machine, the combination with a melting tank, means for heat-

ing the chamber of said tank, and means for conveying snow thereto, of an agitator in said tank for stirring and comminuting the snow, said agitator consisting of a hollow, rotating, vertical shaft provided with a series of horizontally extending, perforated blades by which the snow is broken up and through which it is sifted, said blades having hollow, perforated cores communicating with said hollow shaft, so that steam entering the latter may pass through said perforated cores into the melting chamber of said tank.

In testimony whereof we affix our signatures, in presence of two witnesses.

OSCAR MÜLLER.
MICHAEL WILLNUS.
CHRISTIAN WEISHAAR

Witnesses:

HENRY MOCK,
FRANZ SIMMAT.