

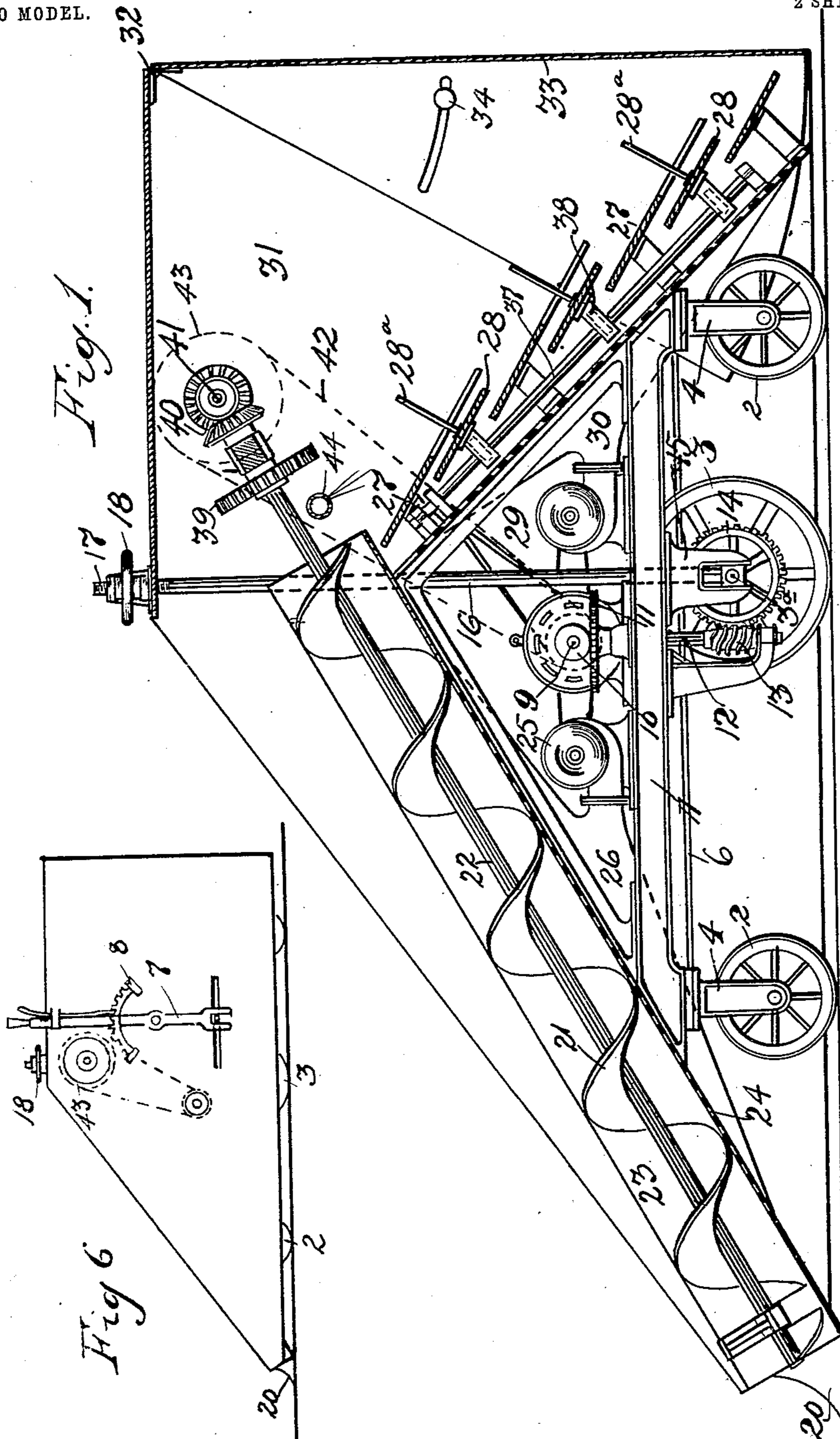
No. 751,026.

PATENTED FEB. 2, 1904.

H. J. SULZEN.
MALT MAKING MACHINE.
APPLICATION FILED AUG. 17, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



Inventor

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By Geo. H. Strong.

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J. H. Morse

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Fig. 2.

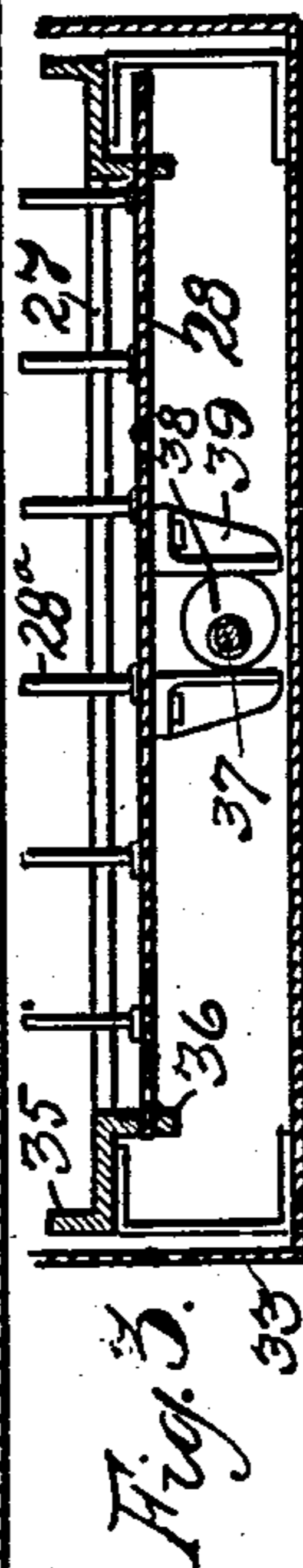
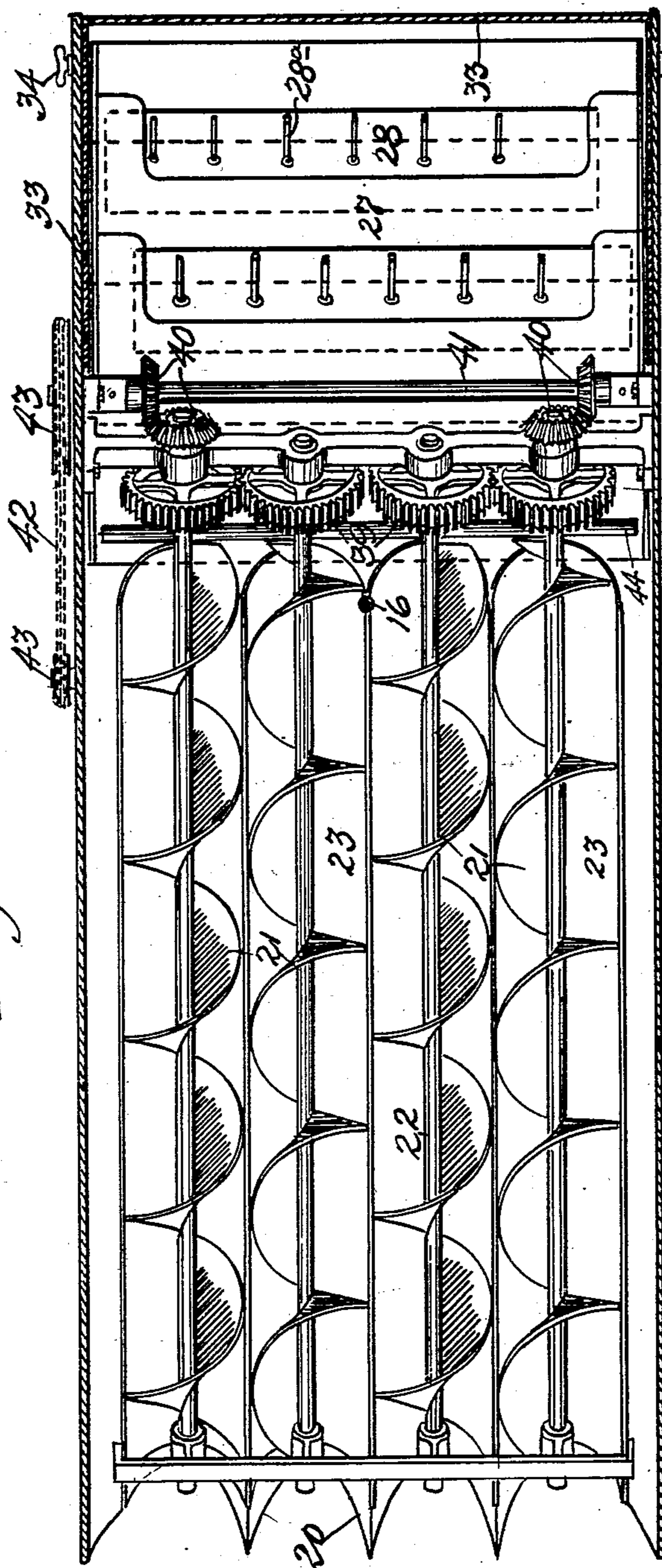


Fig. 5.

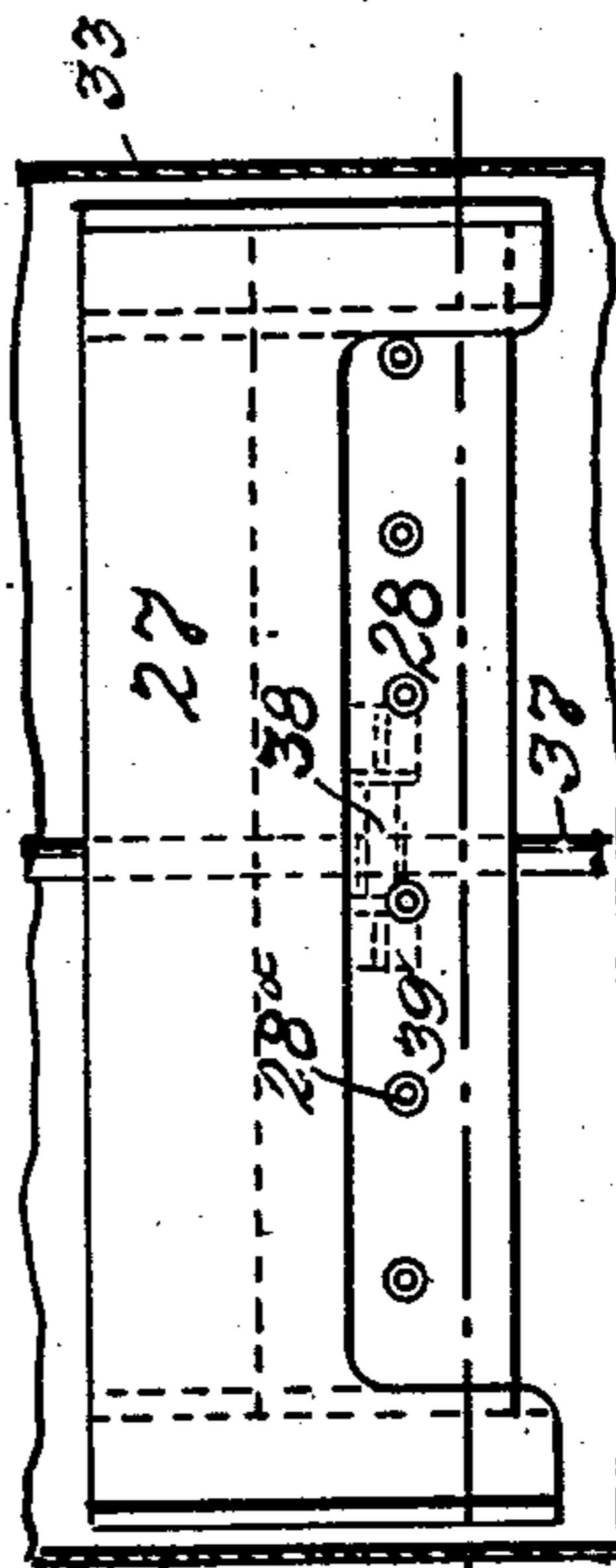
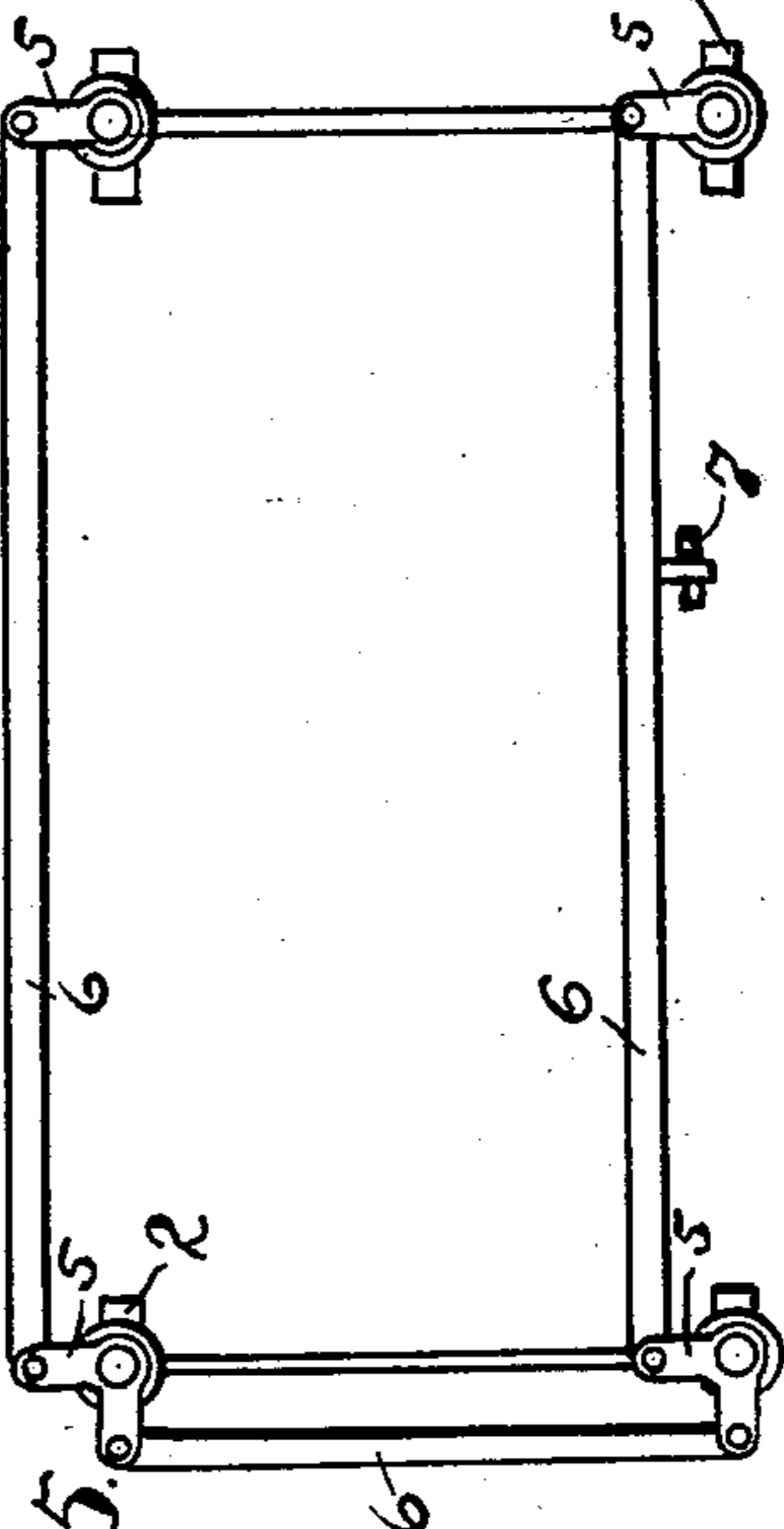


Fig. 4.

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UNITED STATES PATENT OFFICE.

HERMAN J. SULZEN, OF SACRAMENTO, CALIFORNIA.

MALT-MAKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 751,026, dated February 2, 1904.

Application filed August 17, 1903. Serial No. 169,739. (No model.)

To all whom it may concern:

Be it known that I, HERMAN J. SULZEN, a citizen of the United States, residing at Sacramento, in the county of Sacramento and State of California, have invented new and useful Improvements in Malt-Making Machines, of which the following is a specification.

My invention relates to a malt-making apparatus. Its object is to provide a machine which may be propelled and guided over the floor as desired and which is adapted to agitate, lift, aerate, and collect the malt or redistribute it upon the floor.

It consists of the parts and the construction and combination of parts, as hereinafter more fully described, having reference to the accompanying drawings, in which—

Figure 1 is a side elevation, in partial section, of my invention with one side of the apparatus removed. Fig. 2 is a plan of the conveying and shaking mechanism. Fig. 3 is a detail of a shaker and operating-cam. Fig. 4 is a plan of a shelf and shaker. Fig. 5 is a plan of steering connections for bearing-wheels. Fig. 6 is a side elevation of the carriage, showing steering-lever.

For the purpose of properly making malt it is commonly spread upon suitably-constructed floors where moisture may be applied, and it is necessary to also turn the malt from time to time and provide for passing air through it.

My apparatus consists generally of plows and means for propelling them along the floor so that they will take up and turn the malt and elevators or carriers by which the malt is raised and subjected to a blast of air and afterward again discharged and distributed upon the floor.

Various mechanisms may be employed in carrying out my invention.

I have in the present case shown an effective device which consists of a carriage A of any suitable construction having bearing and steering wheels 2 and driving-wheels 3. The steering-wheels may be of any suitable number (here shown as four) mounted in forked frames 4. These frames are shown as vertical standards mounted in suitable guides. To the upper ends of these standards are fixed bell-crank levers 5, and these are connected

by suitable intermediate rods, as shown at 6, so that the movement of all the steering-wheels may be made in unison and with such relation that the front wheels being turned in one direction and the rear wheels in the opposite direction the apparatus can be easily turned about without using too much space. These steering-wheels may be all actuated by a single operating-lever, as at 7. This lever, being fulcrumed to a convenient point on the carriage extending to a point within reach of the operator, may be held in any position by the usual spring-actuated pawl and segmental rack, as at 8.

The propulsion of the apparatus may be effected by any suitable motor mounted upon a driving-shaft, as at 9, and power may be transmitted from this shaft by any suitable or desired means to the shaft of the main driving-wheels 3. I have here shown a flat-faced wheel 10, mounted upon the motor-shaft, a friction-wheel 11, mounted upon a shaft 12, journaled radially and at right angles from the shaft or axis of the motor. This shaft 12 is provided with a worm 13, engaging a corresponding toothed gear 14 upon the shaft 3^a of the driving-wheels 3. By means of a friction-clutch or any suitable adjusting device the wheel 10 may be moved toward the center or the periphery of its driver 11, and the speed transmitted through it can thus be regulated, so that the motion of the carriage can be correspondingly made fast or slower. I have here shown the shaft 3^a of the driving-wheels 3 journaled in boxes which are slidable in guides, as shown at 15. Rods 16 are connected with the ends of the wheel-shaft 3^a of the journal-boxes, and their upper ends are screw-threaded, as shown at 17. The screw-threaded upper ends of rods 16 carry each an operating hand-wheel 18. The rods 16 not being turnable, when the wheels 18 are turned they cause the rods to advance up or down. When advanced upwardly, these rods raise the driving-wheels 3 until the gear 14 is disengaged from the floor, when motion will cease to be transmitted to the carriage. The apparatus can then be turned about upon its wheels 2, as previously described, after which the driving-wheels 3 may be again let down by

reversing the gear 18 until they contact with the floor, and power to propel the wheel may be again transmitted through these wheels.

At the front of the machine are a series of
5 plows 20, so formed and mounted that they will move along the floor and will raise and turn the malt which is spread thereon. These plows may have any suitable well-known or desired shape which will produce the required
10 result.

21 represents carriers extending upwardly and backwardly from the plows and adapted to receive the malt as it is turned by the plows and to afterward transmit it upwardly. These
15 carriers may be of various forms. I have here shown them made in the form of spiral blades mounted upon a central shaft, as at 22, and these spirals form screw-augers turnable in grooved channels 23, so that when power
20 is applied to rotate these auger conveyers the malt which has been turned into the path of the conveyers by the advancing plows will be transmitted to the upper end of the incline at which the conveyers stand. During this lift-
25 ing and stirring process air is forced through the malt. Accordingly I have shown the bottom of the channels in which the malt travels as being perforated, as at 24, for the admission of the air. The air is furnished from a
30 fan-blower 25 or equivalent air-forcing apparatus, which drives the air through a divergent trunk 26, the mouth of which fits against the perforated bottom of the carrier, so as to inclose the perforations 24, and the blast of air
35 is thus driven through these perforations and through the malt which is being carried up the incline. From the upper end of the auger conveyers the malt is delivered upon a series of alternately-inclined rigid shelves 27 and
40 transversely-reciprocating similarly-inclined shakers 28, the malt falling first on a shelf 27, thence onto a shaker 28, and again onto a shelf, and so on to the bottom, where it is either redistributed over the floor or is con-
45 fined within the inclosed back portion of the carriage and carried along with it. During its passage over the alternating shelves and shaker the malt is again exposed to an air-blast from a second blower 29 and its diver-
50 gent trunk 30. The disintegrating action of the shakers is assisted by the projecting pins 28^a. The end wall of chamber 31 is hinged at the top, as shown at 32, and this end, with its lateral wings coöperating with the sides of
55 the chamber, forms a door or valve 33, sweeping close to the floor and adapted to be held in more or less open position by suitable means, as the screw-clamps 34, to permit a greater or less quantity of malt to pass from
60 the shelves and shakers back onto the floor. By leaving the door only partly open a "piece" of malt may be thinned out as desired. By closing the door against the lowermost shelf all the malt will be held within the chamber
65 31. In such case the motion of the shakers

would be discontinued and the malt would be supported upon them and on the shelves.

To prevent the malt falling down between the sides of the chamber and the ends of the shakers and shelves, the latter have the lateral
70 guides 35 and the shakers slide in suitable rigid guides 36.

The reciprocation of the shakers is effected by means of a shaft 37, which extends transverse to the shakers and carries the eccentric
75 cam-surfaces 38, engaging guides 39 on the shakers. The shaft is suitably driven from motor-shaft 9. Power is transmitted in any suitable or desired manner from the motor to the various movable parts. The auger-shafts
80 22 are here shown as having spur-gears 39 meshing in pairs, the outer shafts carrying beveled gears 40, engaging similar gears on the horizontal shaft 41. The latter is connected with the motor-shaft by means of the
85 chain 42 and sprockets 43 or by any other suitable driving connections.

The operation of the device will be as follows: The malt being spread upon a large
90 floor, the apparatus will first be caused to travel close to one side of the wall, so that the outermost of the plows 20 will turn the material inwardly from that wall and from the opposite side of the machine. The carriers 21, of whatever description, receive the
95 malt as it is thus turned and transmit it upwardly and backwardly, as shown. The carriers also agitate and turn the malt continually as it passes up, and it is at the same time subjected to the current of air which is forced
100 through it, as previously described. At the upper end of these carriers, either directly or by the interposition of the shelves 27 and shakers 28, the material may be again dropped and distributed upon the floor. By the com-
105 bined action of the shelves, shakers, and air-blast from trunk 30 the malt is further agitated, disintegrated, and aerated, and should the malt need moistening it could be subjected to a spray from a suitably-disposed perfo-
110 rated pipe 44 in chamber 31. A sufficient water-supply may be carried on the vehicle. The apparatus when reaching the end of the floor is turned by means of the operating-lever 7
115 acting upon the steering-wheels, as previously described, and then returned over the floor just overlapping the space previously passed over, and thus the whole of the floor may be gone over and the malt turned. This operation can be repeated as often as may be de-
120 sired until the malt is in the proper or desired condition.

It will be understood that an apparatus of this character may be used for turning and aerating any material which is spread upon the
125 floor and to which it is desirable to apply it.

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

1. A malting apparatus comprising a mov- 130

able support, a perforated incline, means proximate to the lower end of the incline for lifting and turning the malt delivered thereto, means for causing malt to traverse said in-

cline and means for forcing a blast of air through the perforations in the incline and the incumbent malt body.

2. A malting apparatus comprising a movable support, a series of plows thereon, a conveyer, succeeding the plows, and means for forcing air through the material during transportation by said conveyers.

3. An apparatus for turning malt consisting of a series of plows, a carriage upon which said plows are mounted, a carrying mechanism approximate to the plows upon which the material is delivered, means for forcing air through the material, mechanism by which power is applied to propel the carriage and means for turning the carriage at the end of its journey.

4. An apparatus for turning malt, consisting of a series of plows, a carriage upon which they are mounted so as to move in close proximity with the floor upon which the material is spread, a carrying mechanism approximate to the plows upon which the material is delivered, means for forcing air through the material, steering-wheels mounted at the corners of the carriage, and having vertically-journaled yokes, bell-crank levers and connections by which said wheels may be turned in unison to change the direction of motion of the apparatus.

5. An apparatus for the turning and aeration of malt consisting of a plurality of turning-plows adapted to travel over the floor, carriers by which the turned material is received, said carriers extending upwardly and rearwardly, means for forcing air through the material, a carriage upon which the plows and carriers are mounted, a motor and connections by which the carriage and the carriers are propelled.

6. An apparatus for the turning and aeration of malt consisting of a carriage, plows mounted at the front adapted to turn the material upon the floor, carriers extending upwardly and rearwardly upon the front of which the turned material is delivered, a perforated surface over which the material is moved by the carriers, and an air-forcing apparatus by which air is forced through the moving material.

7. An apparatus for the turning and aeration of malt consisting of a carriage, steering and bearing wheels upon which it is mounted, plows carried at the front of the carriage and adapted to turn the material upon the floor, a series of carriers extending upwardly and backwardly adapted to receive the malt as it is turned by the plows and transmit it, a perforated surface, an air-forcing mechanism and a trunk connecting said mechanism with the said perforated surface whereby a blast of air

is delivered through the passing material and means for discharging the material and again distributing it upon the floor.

8. An apparatus for turning and aerating malt consisting of a carriage, the carriage having driving and steering wheels, plows mounted upon the front of the carriage adapted to turn the material, rearwardly and upwardly traveling carriers upon which the turned material is received and by which it is transmitted, mechanism by which a blast of air is delivered through the passing material, a motor, means for transmitting motion therefrom to the carriers, and to the propelling-wheels of the carriage, and means for regulating the speed of the driving-wheels.

9. In an apparatus for turning and aerating malt, turning-plows and carriers by which the material is received and transmitted upwardly and rearwardly, means for discharging a blast of air through the passing material, a carriage upon which the apparatus is mounted, said carriage having independent steering and driving wheels, a motor from which power is transmitted to the driving-wheels, a disk carried upon the motor-shaft, a friction-wheel mounted upon a shaft radial to the motor-shaft, means for moving said wheel to or from the center of the disk whereby the speed of the supplemental shaft is varied, and a worm-gear connection by which motion is transmitted from said shaft to the driving-wheel shaft.

10. In an apparatus for turning and aerating malt, plows carried by the front end of the apparatus, carriers and air-forcing mechanism, a carriage upon which said mechanism is mounted, said carriage having independent steering and driving wheels, and a motor, means for transmitting motion from the motor to the shaft of the driving-wheels, including a gear upon the driving-wheel shaft, and an intermeshing worm upon the counter-shaft and means for raising the driving-wheels from the floor.

11. In a malting apparatus the combination of a movable carriage, a conveying apparatus at the front end thereof, said apparatus having its lower end approximately in the plane of the surface traversed by the carriage, means at the front end of the apparatus for stirring up the material in advance of the conveyer, a series of inclined successively-arranged shelves upon which material from the conveyers is delivered, and means for forcing air between said shelves and through the malt as it falls from one shelf to the other.

12. In a malting apparatus, the combination of a movable carriage, means for lifting and turning the malt and for forcing air there-through, a series of successively-arranged inclined shelves upon which the malt is delivered and a series of shakers intermediate of said shelves, and means upon the carriage for giving motion to the latter and to the shakers.

13. In a malting apparatus, the combination

of a movable carriage, means thereon for lifting and turning the malt and a series of alternating inclined shelves and reciprocating shakers upon which the malt is delivered, and
5 means for forcing air through the malt in its passage over the shelves and shakers.

14. In a malting apparatus, the combination in a movable carriage, means thereon for lifting and turning the malt, means for forcing
10 air through the malt while being lifted, means for returning the malt to the floor behind the carriage and means for forcing air through the malt during its return passage.

15. In a malting apparatus, the combination
15 of a movable carriage, plows carried thereby, conveyers operating contiguous to the surface traversed by the carriage, means for forcing air through material carried by said conveyers, an inclined support upon which the malt
20 is delivered from said conveyers, means for

agitating the malt in its passage over said support, and means for forcing air therethrough during said passage and an adjustable inclosure for said support whereby the discharge of the malt from said support may be regulated. 25

16. In a malting apparatus, the combination of a movable carriage, means thereon for lifting the malt from the surface traversed by the movable carriage, means for forcing air through material so lifted, a receiving-chamber upon the carriage into which malt may be delivered, and means for spraying the malt in said chamber. 30

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses. 35

HERMAN J. SULZEN.

Witnesses:

SIMON STURMER,
B. GESSNER.