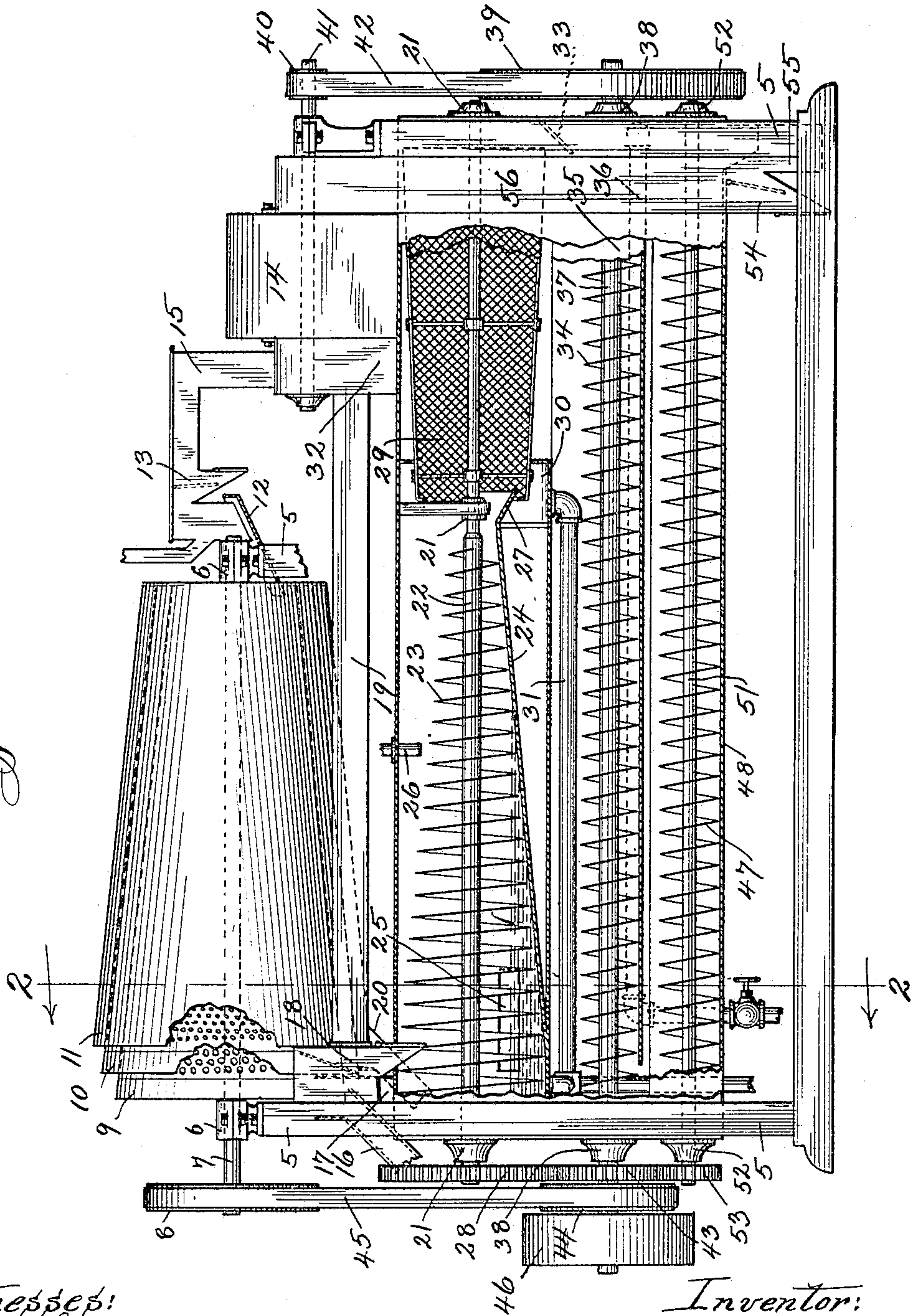


C. E. OLIVER.  
GRAIN CONDITIONER.  
APPLICATION FILED JAN. 11, 1904.

2 SHEETS—SHEET 1.

*Fig. 1.*



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2 SHEETS—SHEET 2.

Fig. 3.

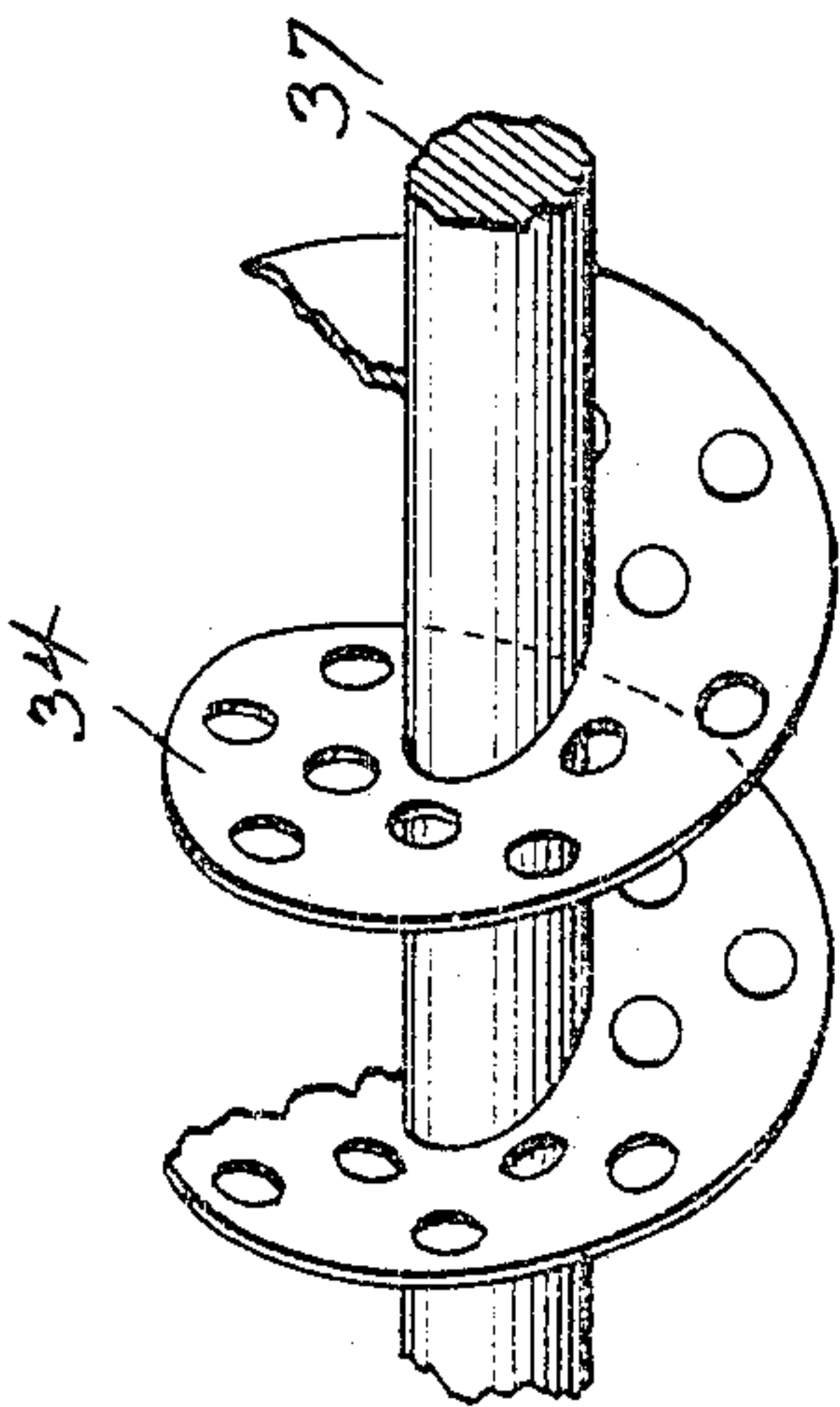


Fig. 4.

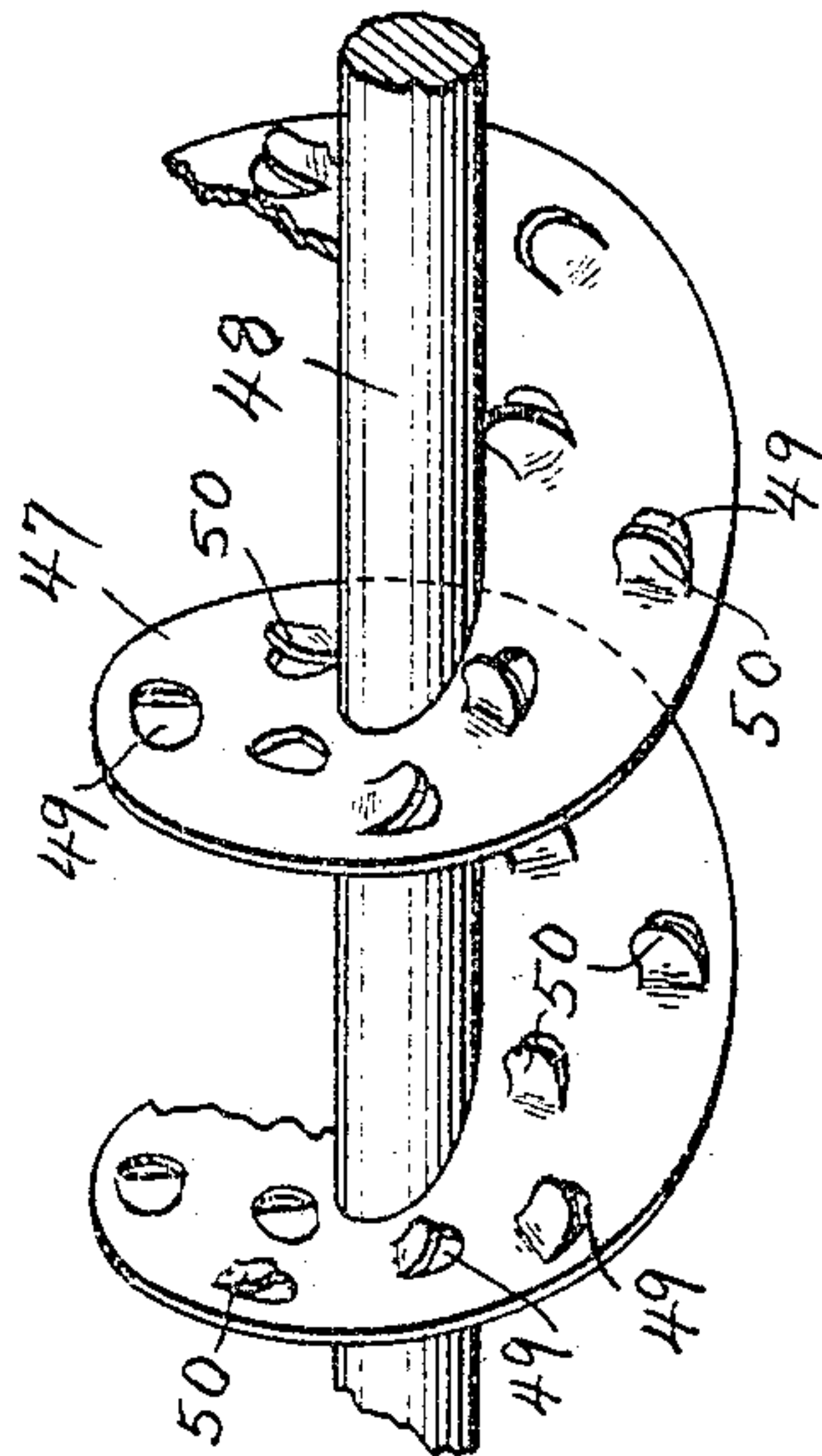
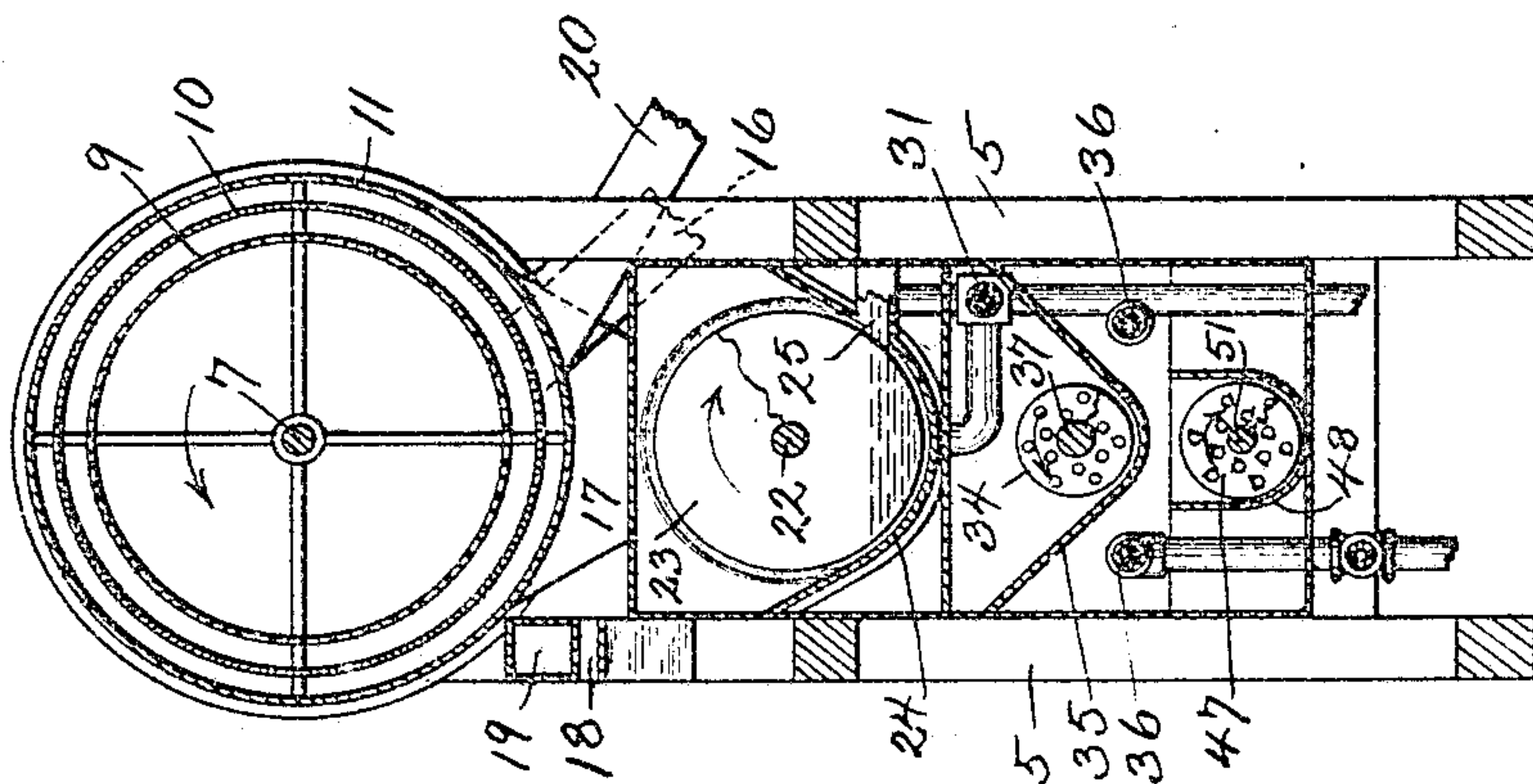


Fig. 2.



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# UNITED STATES PATENT OFFICE.

CHARLES E. OLIVER, OF NORTHWOOD, NORTH DAKOTA.

## GRAIN-CONDITIONER.

SPECIFICATION forming part of Letters Patent No. 787,108, dated April 11, 1905.

Application filed January 11, 1904. Serial No. 188,490.

*To all whom it may concern:*

Be it known that I, CHARLES E. OLIVER, a subject of King Edward VII of Great Britain, residing at Northwood, in the county of Grand Forks and State of North Dakota, have invented a new and useful Grain-Conditioner, of which the following is a specification.

My invention relates to combining into one machine a temperer, separator, cleaner, washer, drier, heater, steamer, and scourer and to new and novel constructions of the several parts; and the objects of my improvements are, first, to combine several machines in one, thus economizing in space and power; second, to provide a new and novel separator; third, to provide a new washer and drier; fourth, to provide a newly-constructed scourer, and, fifth, to provide a suction-fan in connection with the several parts, all being mounted on a suitable frame.

I have illustrated my invention in the accompanying sheets of drawings, in which—

Figure 1 is a vertical longitudinal section through the complete machine, showing some parts in elevation for convenience of illustrating. Fig. 2 is a cross-section on line 2 2 of Fig. 1 viewed in the direction indicated by the arrows. Fig. 3 is a detail of one of the conveyers, and Fig. 4 is a detail of another one of the conveyers.

Similar reference characters refer to similar parts throughout the several views.

*The separator.*—Mounted on the upper part of a suitable frame 5 in the journal-bearings 6 is a shaft 7, which is revolved by means of a belt passing around the pulley 8, which is secured to the shaft 7. Secured on the shaft 7 between the bearing 6, so as to rotate therewith, are the three tapering cylinders 9, 10, and 11, held rigidly to the shaft and to each other by suitable braces.

The cylinder 9 is provided with perforations and is somewhat smaller in diameter than the cylinder 10, so that there is a certain amount of circumferential space between the two cylinders. The cylinder 10 is also provided with perforations and is somewhat smaller in diameter than the cylinder 11, so that there is a certain amount of circumfer-

ential space between the two cylinders 10 and 11.

The two cylinders 9 and 10 may be made of woven wire instead of perforated metal.

The outer cylinder 11 is made of solid sheet metal.

The cylinders 9, 10, and 11 are one within another. The discharge end of cylinder 9 extends beyond the discharge end of cylinder 10, and the discharge end of cylinder 10 extends beyond the discharge end of the cylinder 11.

A spout 12, leading into the cylinder 9, is provided on the frame 5 at the receiving end of the cylinders 9, 10, and 11 and is provided with an air-suction device 13, of any ordinary construction, which is connected to the suction-fan 14 by the air-duct 15.

By making the cylinders 9, 10, and 11 tapering the shaft 7 can set horizontally, thus facilitating easy belt connection with other parts of the machine and also provide for the self-feeding of the material through said cylinders.

The material which does not pass through the perforations in cylinder 9 is discharged into the spout 16. The material which does not pass through the perforations in cylinder 10 is discharged into the spout 17, which is provided with the air-suction device 18 and leads to the receiving end of the washer located directly below the separator which consists of the cylinders 9, 10, and 11. The air-suction device 18 is connected with the fan 14 by the air-duct 19.

The material which passes through the perforations in the cylinder 10 are discharged out of the cylinder 11 and into a spout 20.

*The washer.*—Mounted below the shaft 7 in suitable bearings 21 on the frame 5 is a shaft 22, which has secured to it a conical spiral conveyer 23, the blades of which may be perforated, as shown in Fig. 3. A U-shaped trough 24 is secured in position below the conveyer 23 in such position that the blades of the said conveyer are nearly in constant contact with the bottom of said trough.

The shaft 22 is in a horizontal position, and the conveyer 23 is tapering from a larger di-



ameter at the receiving end to a smaller diameter at the discharging end. Thus the bottom of the trough 24 is lower at the receiving end and higher at the discharging end. The lower end of the trough 24 is closed by an end piece, so that the trough can be filled with water to a certain level.

An elongated overflow-opening 25 is provided in one side of the trough 24, and a water-supply pipe 26 is located nearer the discharge end of the trough.

At the discharge end of the trough 24 is provided a chute 27, which leads to the drier. A gear-wheel 28 is secured to the end of the shaft 22, by means of which said shaft is rotated.

*The drier.*—On an extension of the shaft 22 adjacent to the discharging end of the washer is a revolving screen 29 of a tapering cylinder form, so that material will automatically feed through the same from the smaller receiving end to the larger discharging end.

The screen 29 is secured in position by a suitable casing and to the shaft 22 by proper braces which may take the form of conveyor-blades.

Below the receiving end of the screen 29 is a drip-pan 30, provided with a drain-pipe 31.

The whole screen 29 is incased to have only its lower side exposed to the outside atmosphere, and leading from the top of this incasement to the fan 14 is the air-duct 32.

*The heater.*—At the discharging end of the screen 29 is a chute or trough 33, which delivers the grain to the heater, which consists of a rapidly-rotating conveyer 34 in a sheet-metal trough 35, the trough being heated by suitable steam-pipes 36. The conveyer 34 is mounted on a shaft 37, which is journaled in suitable bearings 38 in the frame 5.

On one end of the shaft 37 is secured a large belt-wheel 39, which transmits motion to the small belt-wheel 40 on the fan-shaft 41 by means of the belt 42. The remaining end of the shaft 37 is provided with a gear-wheel 43, meshing with the gear-wheel 28 on the shaft 22, a belt-wheel 44, which is connected, by means of the belt 45, to the belt-wheel 8 on the shaft 7, and a belt-wheel 46, by means of which the entire machine is driven. The conveyer 34 may be perforated and preferably extends the entire length of the machine, and at the discharging end the trough 35 is provided with an opening in its bottom to allow the grain to drop through and into

*The scourer.*—The scourer consists of a conveyer 47 in a trough 48, located directly below the conveyer 34. The conveyer 47 rotates more rapidly than the conveyer 34, and its wings or flanges are provided with the perforations 49, formed by bending a tongue 50 out of the metal, as shown in Fig. 4. The tongues 50 serve to more thoroughly scour and polish the grain.

The conveyer 47 is secured to a shaft 51,

which is journaled in suitable bearings 52 in the frame 5. One end of the shaft 51 has secured thereto a gear-wheel 53, which meshes with the gear-wheel 43 and is driven thereby.

At the discharging end of the trough 48 is provided an air-suction device 54 in connection with the discharging-spout 55 and is connected with the fan 14 by an air-duct 56.

In operation the shaft 37 is rotated by a belt passing over pulley 46 and driven by any source of power. The shaft 7 is rotated by the connection of the pulleys 8 and 44 through the belt 45. The shaft 22 is rotated by the intermeshing of the gears 28 and 43. The fan-shaft 41 is rotated by the connections of pulleys 40 and 39 and the belt 42, and the shaft 51 is rotated by the gear 53, meshing with the gear 43. The necessary amount of water is supplied through the supply-pipe 26, and steam is admitted into the coil 36.

It will be understood, of course, that it is not necessary to always use the water and steam, as certain grains do not require such treatment. The grain fed to the machine will, however, travel through each of the different devices described.

The purpose of the air-suction devices 13, 18, and 54 is to draw off the lighter dust and dirt and leave the grain clean.

Any kind of grain can be conditioned by this machine for rolling or any other purpose.

I will describe the course of wheat through the machine, and this will be the same with any other grain. Wheat to be conditioned is fed to the machine through the spout 12, the loose light material being drawn away by the air-suction in the duct 15. All the wheat and smaller seeds and dirt drop through the perforations in the cylinder 9, and all seeds and dirt smaller than wheat drop through the perforations in cylinder 10, the wheat alone being discharged from cylinder 10 through chute 20 into the water in the trough 24. The conical conveyer 23 conveys the wheat along through the water, at the same time stirring it, and finally carries it out at the discharging end of the trough 24. Any material lighter than water will float with the current of water out of the overflow-opening 25. The wet wheat is discharged into the receiving end of the revolving drying-screen 29, the surplus water dripping through into the pan 30 and flows away through the pipe 31. While the wheat is being tumbled about in the screen 29, the heat rising from the steam-coil 36 and the air-currents caused by the suction through the duct 32 dry the wheat. From the revolving screen 29 the wheat is discharged into the heating-trough 35, where it is thoroughly heated by the steam-coil 36 and secured by the conveyer 34, while all the material which has been loosened from the wheat by washing and drying is carried away by the suction of air through the duct 32. From the



trough 35 the wheat is discharged into the trough 48, where it is finally scoured and polished by the conveyer 47, and as it is being discharged from said trough 48 any small amount of particles which may be polished off of the wheat by the conveyer 47 are drawn away by the suction of air through the duct 56, leaving the wheat perfectly clean and tempered ready for grinding.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a machine for conditioning grain, the combination of a revolving conical separator mounted on a horizontal shaft; a trough to contain water below said separator having an inclined bottom and an overflow-opening; a conical conveyer, mounted on a shaft in contact with said inclined bottom; a conical revolving drying-screen mounted on the shaft with said conical conveyer at the discharge end of said trough; a drying-trough below said drying-screen, provided with a conveyer and a heating-coil; a second trough below the drying-trough provided with a rapidly-running conveyer and connecting-gear to rotate the several parts simultaneously, substantially as shown and described.

2. In a machine for conditioning grain, the combination of a frame, a horizontal shaft

mounted to rotate in said frame, a conical conveyer mounted on said shaft, a trough containing water provided with an inclined bottom, said conveyer partly immersed in said water and fitting close to said inclined bottom, a conical screen secured to said shaft at the discharge end of said conveyer, a second horizontal shaft mounted to rotate in said frame below the first-named shaft, a semicylindrical trough secured below and concentric with said second-named shaft, a conveyer secured to said second-named shaft arranged to convey grain in said trough, a chute for conveying the grain from the discharging end of said conical screen to said trough, a steam-pipe below said trough for heating the same, a gear mounted on the first-named shaft meshing with a gear mounted on the second-named shaft, a fan for causing an air-current through said conveyer-trough and said conical screen, a belt connection between the second-named shaft to the fan-shaft and means for rotating said shafts.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 14th day of December, 1903, at Indianapolis, Indiana.

CHARLES E. OLIVER.

Witnesses:

HENRY D. WALFLA,  
HARRY E. KEMP.