S. J. BINGHAM.

ROTARY SAND DRIER.

APPLICATION FILED JAN. 11, 1911.

997,896.

Patented July 11, 1911.

2 SHEETS—SHEET 1.

Fig. 1.

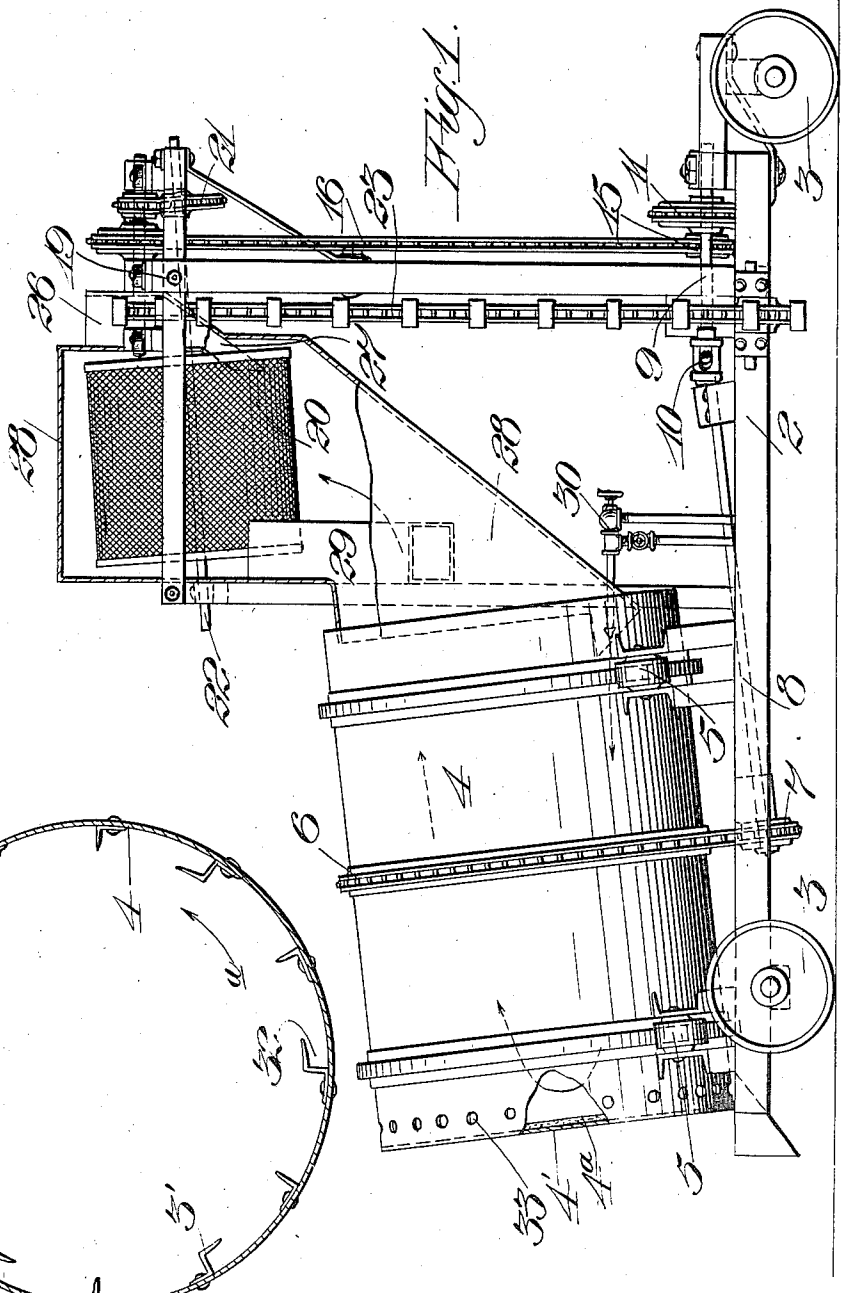
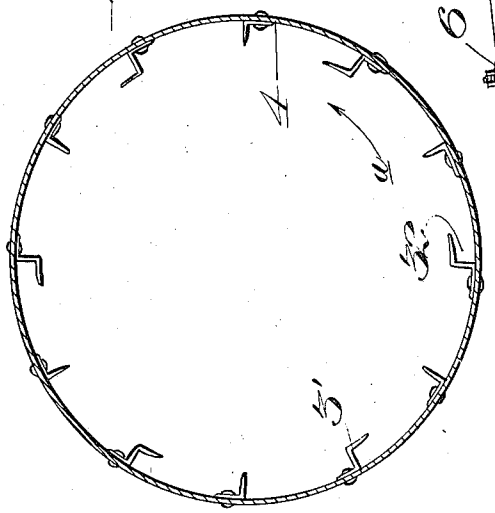


Fig. 5.



Witnesses.
Thos. Eastberg.
F. E. Maynard.

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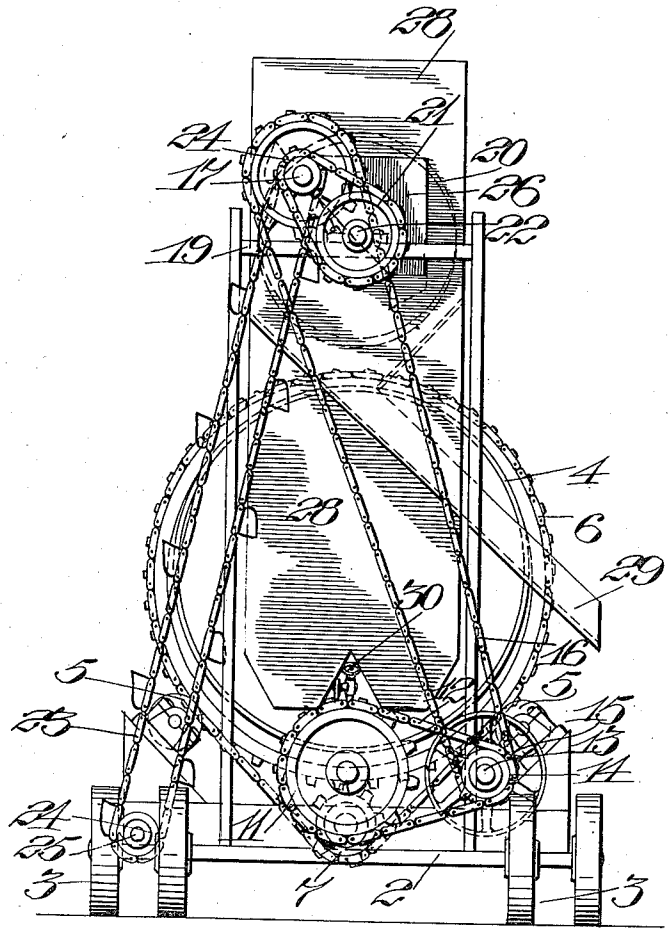
2 SHEETS—SHEET 2.

Fig. 2.



Witnesses:
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UNITED STATES PATENT OFFICE.

SAMUEL J. BINGHAM, OF SAN MATEO, CALIFORNIA.

ROTARY SAND-DRIER.

997,896. Specification of Letters Patent. Patented July 11, 1911.

Application filed January 11, 1911. Serial No. 602,022.

To all whom it may concern:

Be it known that I, SAMUEL J. BINGHAM, a citizen of the United States, residing at San Mateo, in the county of San Mateo and State of California, have invented new and useful Improvements in Rotary Sand-Driers, of which the following is a specification.

This invention relates to sand driers and particularly to rotary driers.

The object of this invention is to provide an apparatus for the drying and heating of sand and other materials in large volumes continuously and effectively; and to provide in combination a portable vehicle supporting a preliminary screening device in which the material is screened and heated, and a device for heating the material to the desired temperature and also including means to make the apparatus self-feeding.

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

Figure 1 is a side elevation of the apparatus partly broken away. Fig. 2 is an end view of the apparatus showing the driving gear. Fig. 3 is a transverse section through the main heating drum showing the carrier blades.

In the present embodiment of my invention 2 is a truck frame mounted upon suitable wheels 3 and carrying a main rotary drying and heating drum 4, supported at a suitable inclination upon roller bearings 5, appropriately journaled on the frame 2. Power is transmitted to the drum 4 by means of a suitable gearing, here shown as comprising a sprocket chain 6 running around the drum body and over an appropriate sprocket wheel 7 secured upon a shaft 8 which is coupled to a driving shaft 9 by a suitable universal joint 10. The driving shaft 9 is provided with a gear 11 whereby power is derived from any suitable source or prime motor. There is also connected to the shaft 9 by means of a sprocket chain or equivalent device 12 a countershaft 13 suitably journaled on the truck and carrying a sprocket wheel 14 over which is led the sprocket chain 12.

By means of a sprocket wheel 15, secured on the shaft 13, and its respective sprocket chain 16, power is led to a head shaft 17 supported in journals mounted upon a superstructure 19 carrying a rotary screen 20. The chain 16 drives a sprocket wheel 18 fastened on the head shaft 17, and from the shaft 17 power is transmitted by suitable sprocket gearing or equivalent mechanism 21 to drive a shaft 22 suitably connected to and driving the rotary screen 20.

By the system of gearing hereinbefore described, it is apparent that the main drum 4 and the rotary screen can be driven simultaneously from one driving shaft at proper speeds determined by the proportion of the respective gears.

Material to be screened is carried upwardly from a suitable source of supply by a conveyer belt 23 driven by upper and lower sprocket wheels 24, the former of which is secured upon the head shaft 17 and driven thereby, and the lower is secured upon a foot shaft 25 which is preferably arranged to one side of the truck 2 and projects beyond the fore wheel 3 so that the truck can be adjusted closely beside a pile of sand or other material to be treated. By this convenient arrangement of the sand conveyer 23 a single operator can attend to all the requirements of the machine and keep the conveyer supplied by simply shoving the sand in a pile over to the foot wheel 24.

The sand from the conveyer 23 falls from the conveyer pockets into a head chute 26 secured upon the upper structure and provided with a spout 27 which leads the sand into the interior of the rotary screen 20.

For the purpose of partially drying the sand while it is being screened in the drum 20, the latter is inclosed by a suitably shaped housing or stack 28, the lower portion of which is inclined and discharges into the interior of the large main heater 4. The coarse particles of material which fail to pass through the perforations of the screen 20 are discharged at its lower end into a waste trough 29 and such material as passes through the screen walls falls into the inclined portion of the housing 28 and travels downwardly into the drum 4.

For the purpose of heating the material in the drum 4 during its rotation a suitable oil burner or other equivalent device for supplying heat to the interior of the drum is provided, as indicated at 30. When an oil burning heater is utilized, oil and fluid under pressure is led to the same from convenient sources and the rear end 4′ of the

rotary drum is preferably closed and provided with a heat-resisting lining, as at 4^a. The incoming jet of flame striking against the rear fireproof wall 4^a is deflected and rises to the upper portion of the drum, then flows forwardly and eventually escapes through the housing or stack 28 and during which escape it contacts with and heats the sand screening member 20.

Since by this drier large volumes of material can be continuously handled it is necessary to accelerate the heating and drying to the greatest extent thus producing an efficient, practical, large capacity drier, and I have found that by providing the interior of the drum 4 with a plurality of radially projecting longitudinal flanges 31 these will pick up the sand or other material discharged into the drum from the housing 28 and carry it upwardly, as indicated by the arrow *a* Fig. 3, and precipitate it in a constant shower throughout the area of the drum. As shown some of these flanges 31 are simple angle irons appropriately secured to the interior of the drum, while others are in the form of Z bars which form pockets 32 to catch sand on the upwardly revolving side of the drum and later gradually spill the sand as the pocket is inverted. By this means the sand is given a preliminary drying treatment in the screen from which the finer particles fall into the housing 20, thence gravitate into the rotary drum 4, by which it is elevated and showered through the heating gases from the combustion of the oil at the burner and finally discharged, heated to a proper degree, through a series of perforations 33 formed in the periphery of the lower end of the drum.

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

1. A drying apparatus comprising a rotary screen, a rotary drying drum, a burner whereby heated gases can be generated within said drum, and a housing for conveying the products of combustion from said drum around and to heat the screen, said drum having its rear end closed and said closed end adapted to deflect the products of combustion and cause the same to return to the burner end of the drum.

2. A drying apparatus comprising a rotary screen, a rotary drying drum, a burner whereby heated gases can be generated within said drum, a housing for conveying the products of combustion from said drum around and to heat the screen, said drum having its rear end closed and said closed end adapted to deflect the products of combustion and cause the same to return to the burner end of the drum, and a driving mechanism for said rotary members.

3. A drying apparatus comprising a rotary screen, a rotary drying drum, a burner whereby heated gases can be generated within said drum, a housing for conveying the products of combustion from said drum around and to heat the screen, said drum having its rear end closed and said closed end adapted to deflect the products of combustion and cause the same to return to the burner end of the drum, a driving mechanism for said rotary members, and a portable supporting truck.

4. A portable drying apparatus comprising a screen, means for revolving said screen, a heating drum, means for revolving said drum, means for heating the interior of the drum, a housing conveying the heated air of the drum to and around the screen, said drum having its rear end closed and said closed end adapted to deflect the products of combustion and cause the same to return to the burner end of the drum, and a conveyer to deliver material to the screen.

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

SAMUEL J. BINGHAM.

Witnesses:
F. E. MAYNARD,
J. H. HERRING.