

No. 813,191.

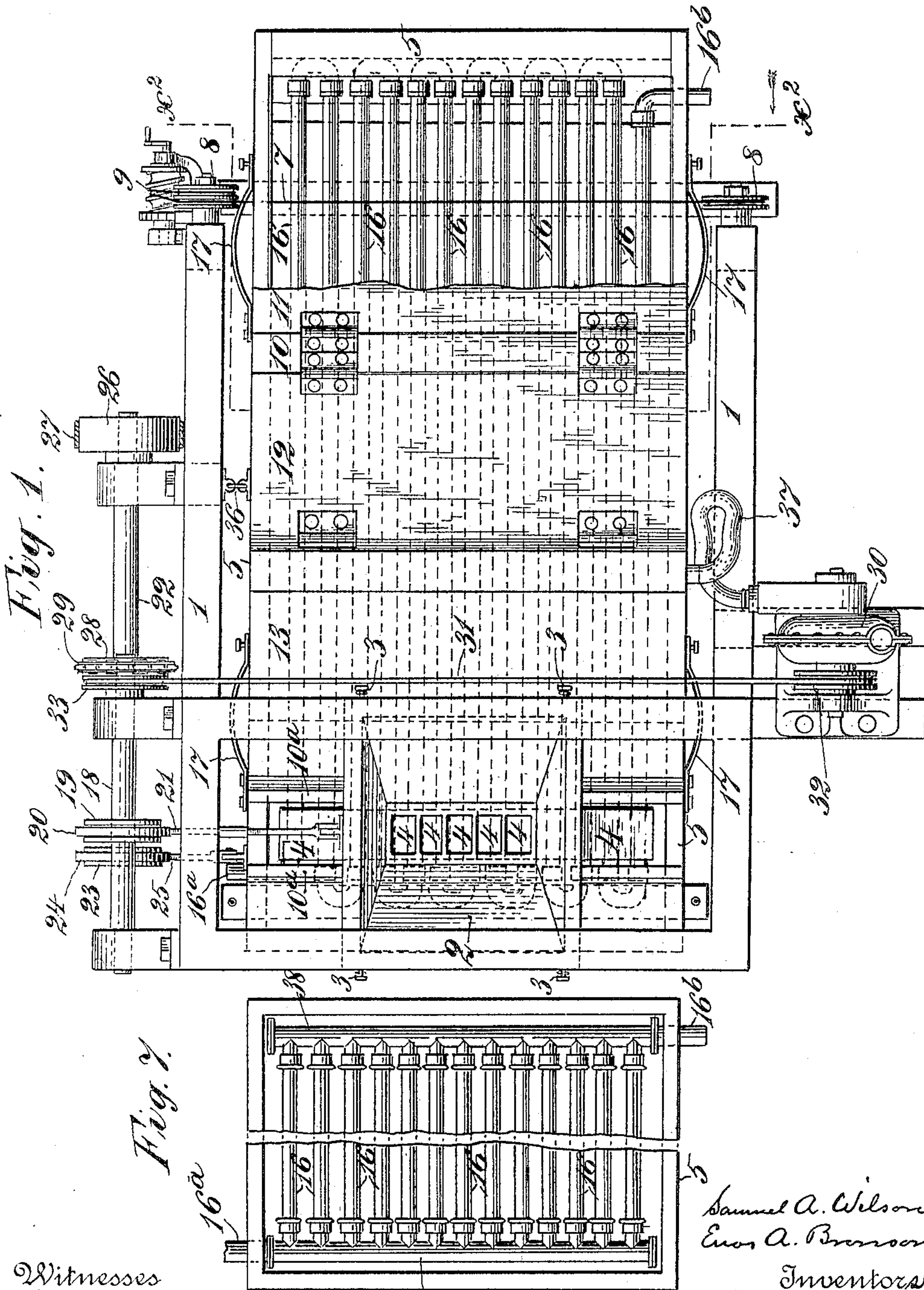
PATENTED FEB. 20, 1906.

S. A. WILSON & E. A. BRONSON.

SAND DRIER.

APPLICATION FILED NOV. 23, 1905.

3 SHEETS—SHEET 1.



Witnesses
J. H. H. H. H. H.
A. J. H. H. H.

Samuel A. Wilson
Eugene A. Bronson
Inventors
By their Attorneys *Henry C. H. H.*

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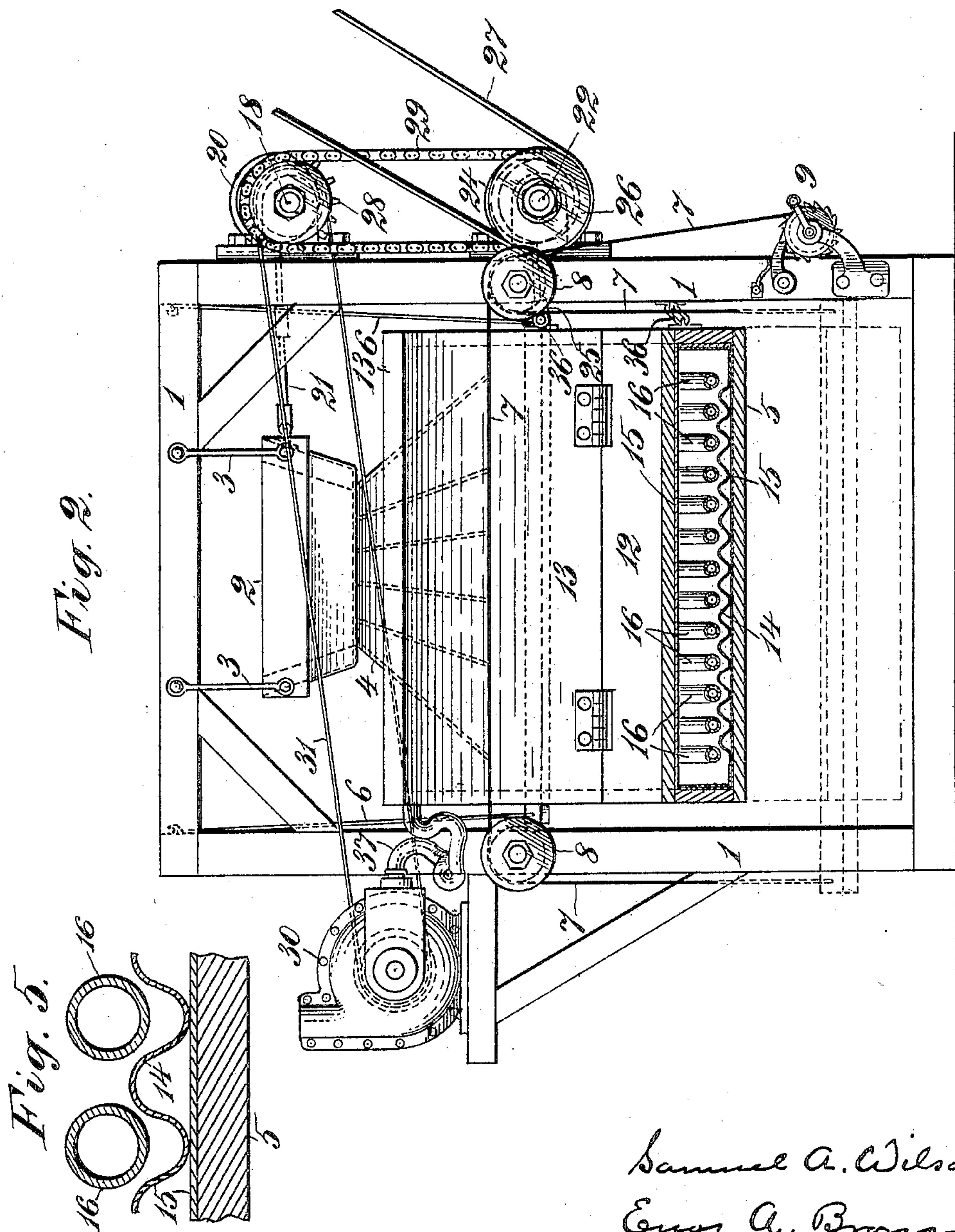
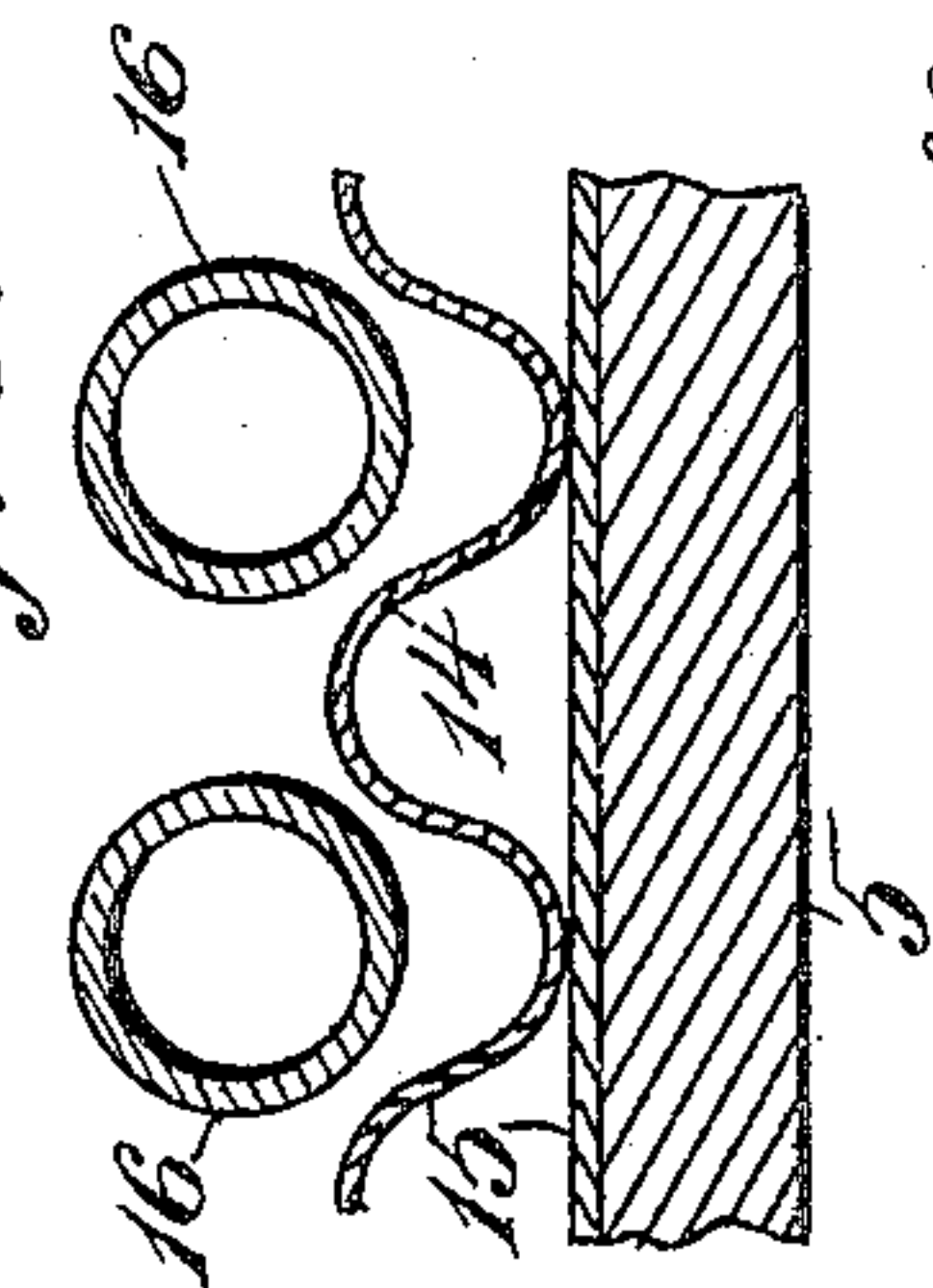


Fig. 5.



Witnesses

J. H. Plim
A. J. [unclear]

Samuel A. Wilson
E. A. Bronson

Inventors:

By their Attorney *Henry [unclear]*

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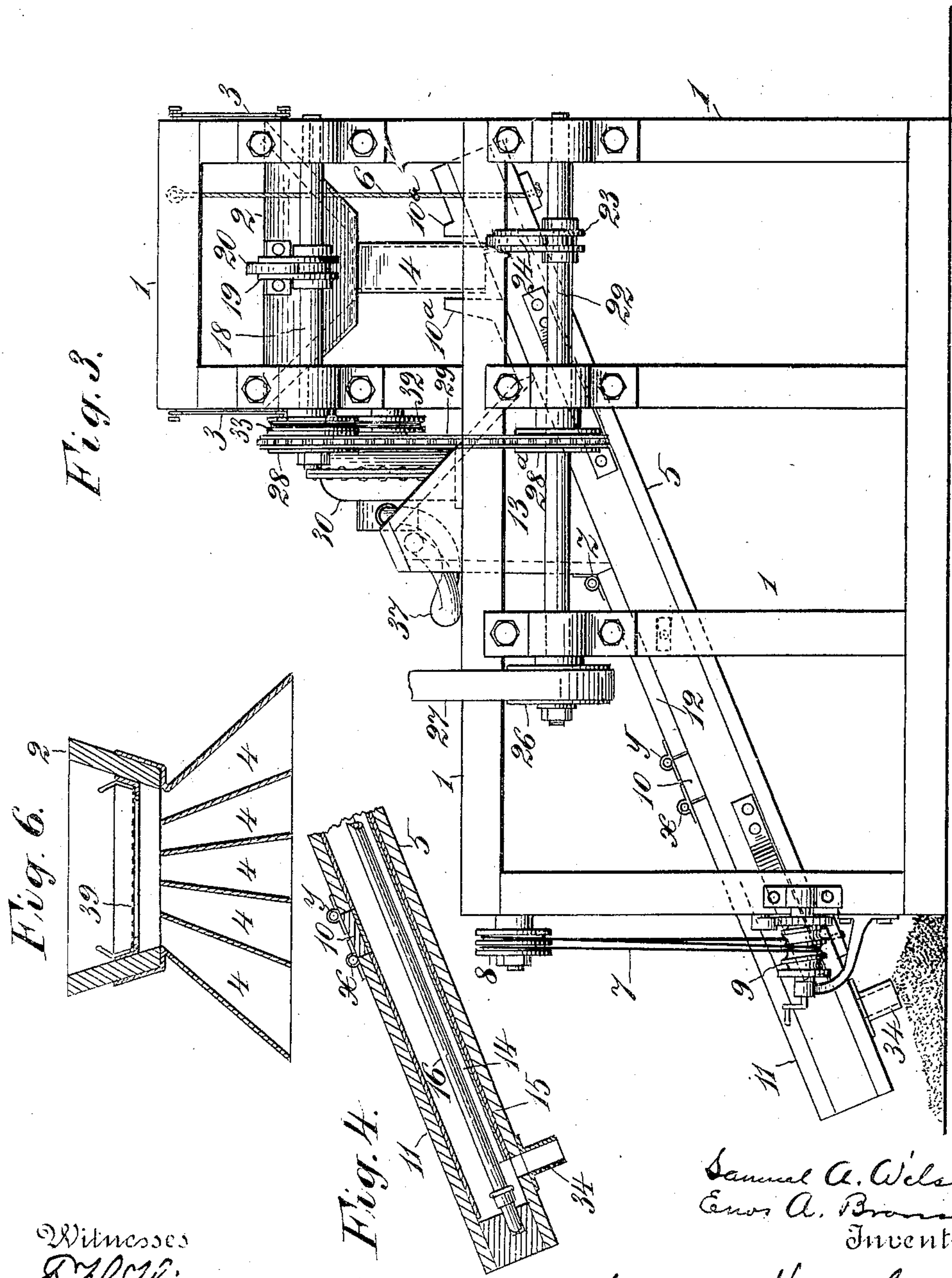
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3 SHEETS—SHEET 3.



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A. J. H. H. H.

Samuel A. Wilson
Eugene A. Bronson
Inventors
By their Attorney *Henry C. H. H.*

UNITED STATES PATENT OFFICE.

SAMUEL A. WILSON AND ENOS A. BRONSON, OF NEWBURGH, NEW YORK.

SAND-DRIER.

No. 813,191.

Specification of Letters Patent.

Patented Feb. 20, 1906.

Application filed November 23, 1905. Serial No. 288,711.

To all whom it may concern:

Be it known that we, SAMUEL A. WILSON and ENOS A. BRONSON, citizens of the United States, and residents of Newburgh, in the county of Orange and State of New York, have invented certain new and useful Improvements in Sand-Driers, of which the following is a specification.

This invention relates to the class of machines or apparatus employed for drying sand, fine gravel, or like material by artificial heat; and the object of the present invention is to provide a simple and inexpensive machine which shall be durable and easy to keep in repair and which will dry a large quantity of the material in a limited time.

The invention will be hereinafter fully described with reference to the accompanying drawings and its novel features carefully defined in the claims.

In the said drawings, which illustrate an embodiment of the invention, Figure 1 is a plan of the apparatus. Fig. 2 is a transverse vertical section at x^2 in Fig. 1, showing the machine mainly in end elevation. Fig. 3 is a side elevation of the apparatus as seen from the right in Fig. 2. Fig. 4 is a vertical longitudinal section of the lower or delivery end of the inclined drying-chute. Fig. 5 is an enlarged sectional detail of the steam-coil and corrugated metal in the chute. Fig. 6 is a vertical transverse section of the hopper and its diverging spouts. Fig. 7 illustrates a modified form of the steam-pipes in the form of a series with headers.

1 designates in general the supporting-frame of the apparatus, in the upper or more elevated part of which is suspended a hopper 2 by suitable suspenders 3. At its under side this hopper is provided with a plurality of laterally-diverging spouts 4, which gradually increase in width toward their lower or delivery ends. Below the spouts 4 there is suspended in the frame an inclined chute 5, the upper receiving end of which is disposed under the spouts 4. This chute, which is relatively broad and flat-bottomed, is carried at its elevated end by suitable suspenders 6 in the frame, and at its lower end it is carried by suspenders in the form of ropes or the like 7, which pass over sheaves 8 and down to a ratcheted windlass 9, whereby the lower end of the chute may be raised or lowered and its inclination be varied to suit circumstances.

The chute is covered, as will now be described. A strip 10 is secured in place on the

chute, and to this strip is hinged at x a flap 11, which covers the lower end of the chute. To the upper edge of this strip 10 is hinged at y a cover-flap 12, and to the upper free edge of this flap is hinged at z a hood 13, the purpose of which will be hereinafter explained. In the bottom of the chute is a sheet of corrugated metal 14, (see Fig. 5,) which may rest on a sheet of asbestos 15, interposed between the corrugated metal and the wooden bottom of the chute 5. A coil of steam-pipe 16 is supported in the chute near its bottom, the lengths of pipe corresponding, respectively, with and lying along the longitudinally-extending channels in the corrugated metal, substantially as shown in Fig. 5. The inlet end 16^a of the steam-coil 16 is coupled by some form of flexible connection with a supply-pipe from a boiler, and the outlet 16^b thereof may lead back also to said boiler through a flexible connection. At the sides of the chute are cushion-springs 17 to impinge upon the frame and produce a jar. The chute is coupled to the frame by a link 36.

The hopper and chute both receive a lateral swinging movement. At the side of the frame above is a shaft 18, having on it an eccentric 19, and the strap or yoke 20 of this eccentric is coupled by a rod 21 with the hopper 2. On a lower shaft 22, Fig. 2, is a similar eccentric 23, and the strap or yoke 24 of the eccentric is coupled to the chute 5 by a rod 25. As here shown, these shafts 18 and 22 are driven as will now be described. On the lower shaft 22 is a pulley 26, and through this pulley and a belt 27 thereon the shaft 22 may be driven from any motor or source of power. On the respective shafts 18 and 22 are sprocket sheaves or wheels 28 and 28^a , whereby the upper shaft 18 is driven from the shaft 22 through the medium of a chain 29. On a supporting-bracket on the main frame is mounted an exhaust-fan 30, and this fan is or may be driven from the upper shaft 18 through a belt 31 and sheaves 32 and 33 on the fan-shaft and the shaft 18, respectively. The fan is connected to the hood 13 by a flexible pipe 37. At the lower end of the chute 5 is an outlet 34 in its bottom, which should extend substantially across its entire width.

The apparatus operates as will now be described. The mechanism having been set in motion and the steam turned on to the coil in the chute, sand or the like to be dried is supplied to the hopper 2 in regulated quan-

tity by any suitable means. The vibrating hopper 2 and its pendent diverging spouts 4 distribute the moist material in a uniform manner across the upper part of the chute 5, and it slides by gravity down the chute along the channels in the bottom thereof in close proximity to or against the hot steam-pipes of the coil. Finally the dried material falls out at the outlet 34 at or near the lower end of the chute. The lateral vibration of the chute and the jarring produced by the impact of the springs 17 keeps the material in motion, prevents clogging, and brings all of the particles of the material in contact with or into close proximity to the hot pipes of the coil. The speed of the flow down the chute may be varied by adjusting the inclination of the chute, as before explained. The moist vapor from the material rises into the hood 13 and is drawn off continuously by the exhaust-fan 30. Access to the chute 5 for inspection, clearance from obstructions, and the like may be had at any time, even while the apparatus is in operation, through the medium of the hinged parts of the cover. The sand or other fine or granulated material to be dried may be fed in regulated quantity to the hopper 2 by means of an ordinary cup elevator. This is a well-known device and will require no illustration. The present invention is not restricted to any means of supplying the material to the hopper. Preferably the chute 5 will have a cover 10^a at its upper part about the spouts of the hopper 2 in order to keep in the heat and prevent the sand from scattering, and preferably also the whole interior of the chute will be lined with asbestos or some like non-conductor of heat.

In lieu of an actual coil of steam-pipe, as shown in the principal views, a plurality of pipes connected with headers may be employed. This is shown in Fig. 7, where 16 designate the pipes, and 38 the headers connecting the pipes in a known way at their respective ends.

There may be a screen 39 in the hopper, as seen in Fig. 6, to prevent lumps or large particles from getting into the chute.

The suspenders here used may of course be of any known or suitable kind, slender wire ropes or cords being preferred.

By connecting the chute to the frame with a link at about the middle of its length and coupling the rod 25 to the chute near one end of the same the motion imparted will be a jerking rocking motion well calculated to keep the sand moving and to bring all of its particles close to the steam-pipes. As the lower end of the inclined chute is adapted to be raised and lowered to some extent in varying the inclination of the chute and there will be some vertical movement at the point where the link is situated, this link (which may be of any suitable kind) will be

so constructed as to permit of this movement.

Obviously the invention is not restricted to all of the details of construction herein shown, as these may be varied or equivalents be substituted without departing materially from the invention.

Having thus described our invention, we claim—

1. A machine or apparatus for the purpose specified, having an inclined, vibrating chute for the material to be dried, heating means in said chute, and a vibrating hopper above the higher receiving end of said chute, said hopper having a plurality of pendent delivery-spouts disposed abreast and which diverge laterally, substantially as and for the purpose specified.

2. A machine or apparatus for the purpose specified, having a laterally-vibrating hopper, a covered, inclined, laterally-vibrating chute below said hopper, said chute being provided with a corrugated metal bottom, an outlet at its lower end, and a coil of pipe for steam, the pipes of the coil extending lengthwise of the chute, means for imparting lateral vibrations to said chute, and means for removing vapor from the covered chute.

3. A machine or apparatus for the purpose specified, having a laterally-vibrating, inclined, covered chute, provided with a heating-coil, the pipes of which extend lengthwise of the chute, and a corrugated sheet-metal bottom below said coil, cushioning-springs on the sides of said chute, means for varying the inclination of said chute, means for supplying the material to the upper end of the chute, and means for removing vapor from the chute.

4. A machine or apparatus for the purpose specified, having a frame, a receiving-hopper suspended in the frame and provided with laterally-divergent and pendent outlets, means for imparting lateral vibrations to said hopper, an inclined chute suspended in the frame and adapted to receive the material from the hopper, said chute having a corrugated metal bottom plate, a heating-coil above said bottom plate, a cover composed of hinged flaps and the hood 13, an exhausting device for removing vapor from the chute, said device being connected with the interior of said hood, and means for imparting lateral vibrations to said chute.

5. A machine or apparatus for the purpose specified, having a frame, an inclined covered chute, in said frame, steam-pipes disposed lengthwise in the chute, means for agitating the chute, means for supplying material to be dried to the upper end of said chute, and an exhaust-fan for removing from the chute the vapors arising from the drying material.

6. A machine or apparatus for the purpose specified, having a frame, a suspended and inclined covered chute in said frame, said

chute being lined with non-conducting material and having a bottom provided with channeled metal, the channels extending lengthwise of the chute, heating means comprising
5 a plurality of steam-pipes extending along the said channels in the bottom of the chute, means for supplying material to the upper end of said chute, and means for removing the vapors arising from the drying material.
10 7. A machine or apparatus for the purpose specified, having a frame, a suspended and inclined chute suspended in said frame and linked to the frame at one side near its middle, means for agitating said chute, means

for heating material flowing down said chute, 15 means for supplying material to be dried to the upper end of said chute, and means for removing from said chute the vapors arising from the drying material.

In witness whereof we have hereunto 20 signed our names, this 20th day of November, 1905, in the presence of two subscribing witnesses.

SAMUEL A. WILSON.
ENOS A. BRONSON.

Witnesses:

WILLIAM J. FIRTH,
H. G. HOSE.