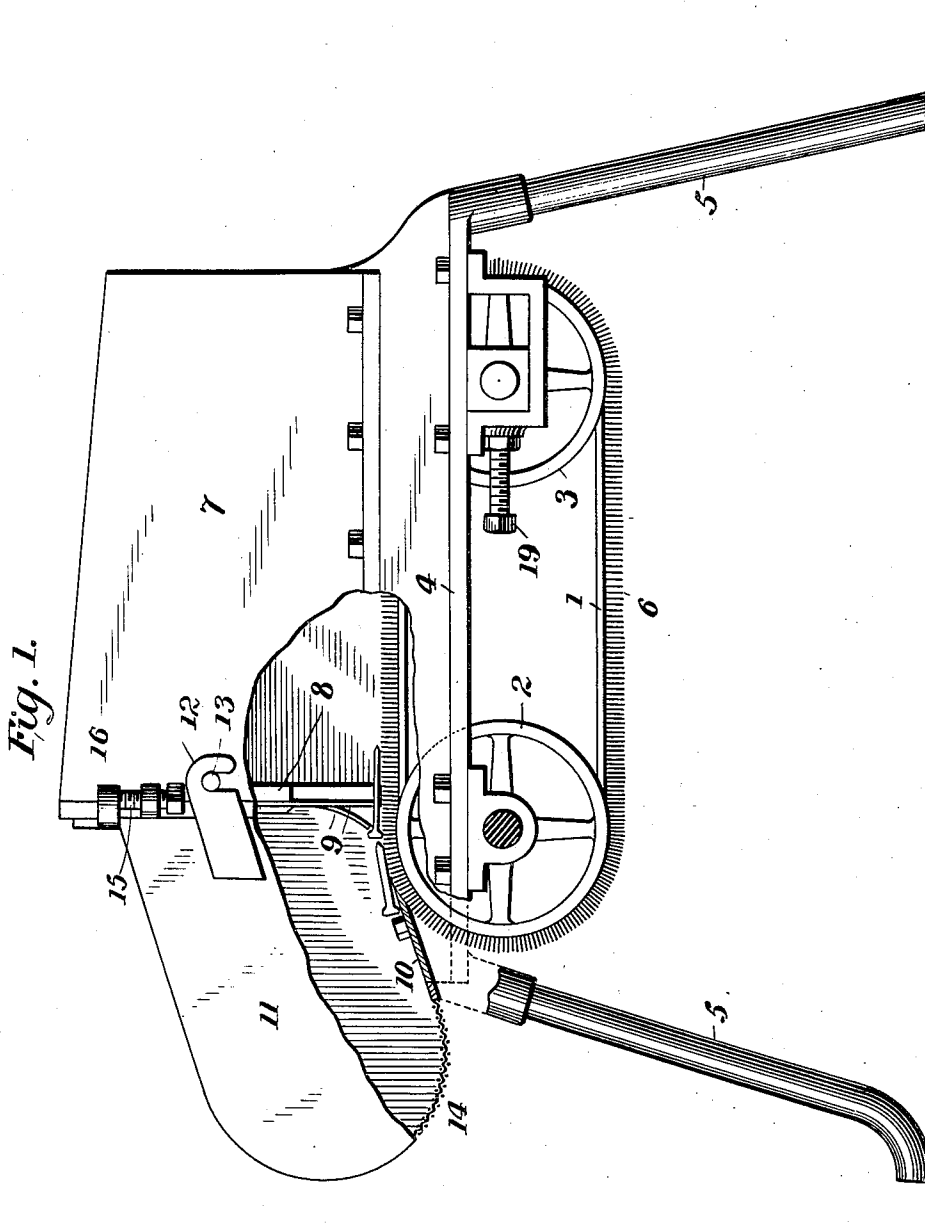


G. F. ROYER.  
 APPARATUS FOR TREATING GRANULAR MATERIAL.  
 APPLICATION FILED JUNE 18, 1908.

977,478.

Patented Dec. 6, 1910.

2 SHEETS—SHEET 1.



Witnesses  
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Fig. 3.

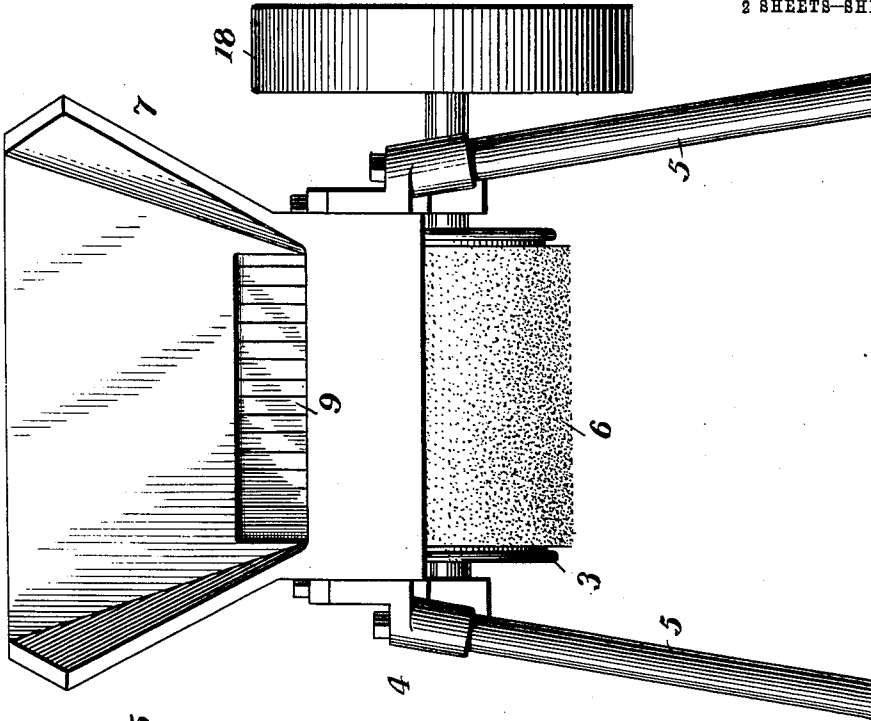
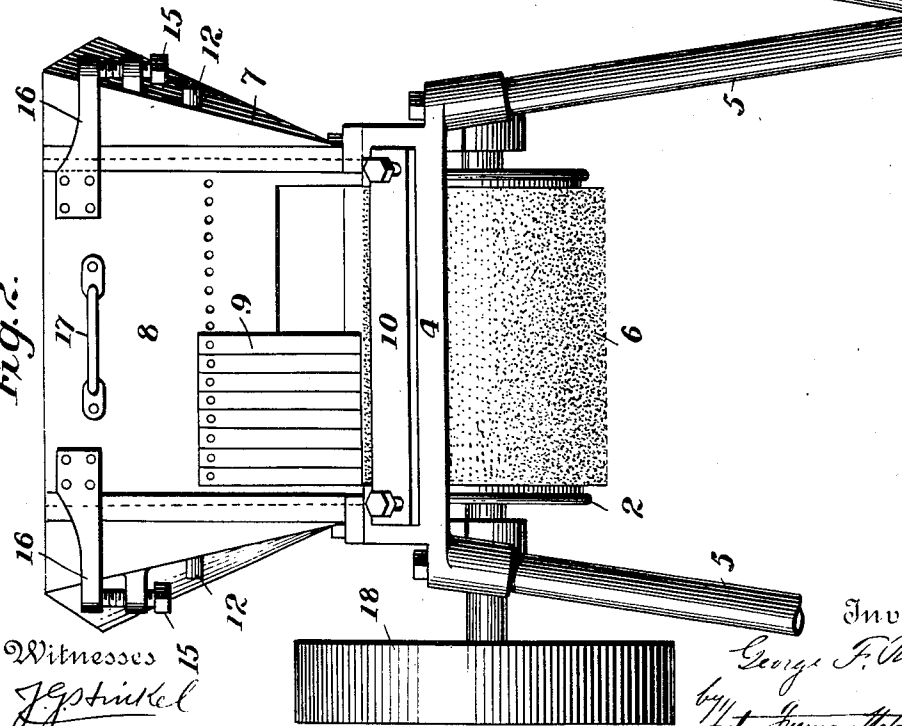


Fig. 2.



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# UNITED STATES PATENT OFFICE.

GEORGE F. ROYER, OF WILKES-BARRE, PENNSYLVANIA.

## APPARATUS FOR TREATING GRANULAR MATERIAL.

977,478.

Specification of Letters Patent.

Patented Dec. 6, 1910.

Application filed June 18, 1908. Serial No. 439,177.

*To all whom it may concern:*

Be it known that I, GEORGE F. ROYER, a citizen of the United States, and resident of Wilkes-Barre, Pennsylvania, have invented certain new and useful Improvements in Apparatus for Treating Granular Material, of which the following is a specification.

The present invention relates to improvements in apparatus for treating granular material and is particularly adapted for preparing molders' sand for use. In the preparation of such sand it is customary to intimately mix a certain proportion of "new" sand, or sand not previously used, with sand that has been obtained from discarded molds, and it is also necessary to remove from the sand undesirably large particles or foreign substances.

The object of the invention is to provide an apparatus by which such sand may be more expeditiously and satisfactorily prepared than by the forms of screens commonly employed.

The invention is illustrated in the accompanying drawing, in which:

Figure 1 is a side elevation of an apparatus constructed in accordance with the present invention, a portion of the side wall of the hopper and receptacle for foreign substances being removed; Fig. 2 is an end elevation of the hopper with the receptacle for undesirable material removed; Fig. 3 is a sectional view at the opposite end of the machine.

As shown the apparatus consists essentially of a substantially horizontally arranged endless belt conveyer 1, which is supported on suitable guide drums or pulleys 2, 3, mounted in bearings carried by a frame 4, that is supported by legs 5, said belt having on its outer surface a body of fine pins 6. In practice the belt has been constructed of material commonly known as "card clothing" consisting of a fabric body or backing strip through which extend a series of fine wires or pins, although it will be understood that the belt and pins may be of other material and the term "pins" is intended to include any projections on the surface of the belt which will have the function hereinafter referred to.

The upper run or section of the conveyer 1 travels through a suitable hopper 7, and it will be seen that the particles or grains of material which do not exceed in size the spaces separating the pins 6 will fall into

such spaces and be carried along with the belt. As the belt travels about the guide and supporting pulley or drum 2, the relative positions of the pins will be slightly varied so that the spaces separating adjacent pins will be increased and therefore the particles or grains contained in such spaces will be permitted to fall or be discharged from the conveyer. Therefore the size of the particles or grains which will be separated from the mass supplied to the hopper 7 will depend upon the arrangement of the pins 6 on the conveyer and by using different belts particles of any desired size may be separated.

Means are provided whereby particles or grains too large to enter the spaces or interstices between the pins 6 will be prevented from being carried over the curved surface of the drum 2 by the belt. As shown a vertically adjustable gate or slide 8 is provided adjacent the end of the hopper through which the conveyer withdraws material, said slide supporting at its lower end a series of yielding or flexible blades or strips 9, the lower ends of which extend substantially to the surface of the upper or outer ends of the pins 6 so that the conveyer can only withdraw from the hopper particles or grains which are entirely within the spaces separating the pins and do not project above the outer ends thereof. As the material may contain hard foreign substances which may become engaged with the pins 6 and which if brought against a fixed unyielding stop or wall would break or disarrange the pins, the strips 9 are preferably made of resilient material so that they can yield outwardly and thus permit such particles or grains to pass from the hopper. However means are provided by which such particles cannot be carried over the guide drum 2 and allowed to mix with the fine particles or grains discharged from the conveyer. To effect this a shield or deflecting plate 10 is provided the forward edge of which is tapered and positioned to extend partially about the drum 2 at sufficient distance merely to permit the belt and its projecting pins to pass between it and said wheel, and any material supported simply on the ends of the pins 6 which passes the yielding stops 9 will by said deflecting plate be caused to travel away from the conveyer. As shown this deflecting plate 10 forms a portion of the bottom of a removable receptacle 11 which is sup-

ported by hooks 12 from studs or lugs 13 projecting laterally from the sides of the hopper. If desired a portion of the wall or exterior casing of this receptacle may be formed of netting or perforated so that the interior thereof can be readily inspected and also so that coarser particles of sand which may be carried into the receptacle can escape and be separated from foreign substances such as nails, bits of iron, etc., which are frequently mixed with molders' sand.

The slide 8 is guided in suitable grooves formed in opposite sides of the hopper and is supported by adjustable screws 15 engaging ears or lugs 16 thereon. By adjusting the screws 15 the distance separating the conveyer and the lower ends of the stops 9 may be varied. A handle 17 may also be provided for raising the slide 8 when desired.

The shafts of the guide wheels or pulleys 2, 3 are mounted in bearings depending from the frame 4, and one of said shafts is provided with a suitable driving or band wheel 18 by means of which the conveyer is moved. Adjusting means 19 for regulating and varying the tension of the conveyer belt may also be provided.

It will be understood that there can be various modifications of details of the embodiment of the apparatus herein illustrated without departing from the spirit of the invention and that the illustration of many of the parts is more or less conventional.

The manner of using and the advantages incident to such a construction will be readily understood and may be briefly referred to as follows:

The hopper 7 is supplied with the material to be treated, containing grains or particles of varying sizes and, in the case of molders' sand, frequently mixed with foreign substances which must be removed before the sand is adapted for use in the preparation of molds. As the conveyer moves through the hopper the fine particles or grains will be collected in the spaces separating the pins 6 and by the action of the stops 9 and deflector 10 effectually separated from the coarser or larger and from any other bodies with which they may have been mixed. As the belt or conveyer travels about the curved surface of the wheel 2 the particles or grains carried thereby will be discharged into a suitable receptacle placed beneath said wheel or piled on the surface upon which the apparatus stands.

In operation the apparatus has been found to act more rapidly and effectively than the various forms of screens which have been heretofore employed for a similar purpose.

By supplying the hopper simultaneously with "new" and "old" sand the two different qualities will be thoroughly mixed. That is, as the belt has a relatively long travel

through the hopper it is adapted to take up particles from each of two bodies of sand within the hopper and thus intimately mix the material as well as separate the undesirably large particles and other substances from those suitable for use.

Having thus described the invention what is claimed is:

1. In an apparatus for treating granular material, the combination of a hopper, an endless carrier belt having a section extending through the hopper and provided in its outer surface with means for receiving and supporting particles not exceeding a certain size and adapted to automatically discharge outwardly from said surface such particles at a point outside of the hopper, means, adapted to yield in the direction of movement of the carrier, acting to obstruct the passage of coarser particles from the hopper, and means for removing from the belt such coarser particles as may be carried thereby from the hopper.

2. In an apparatus for treating granular material, the combination of a hopper, an endless carrier belt forming the bottom of the hopper and provided on its outer surface with a body of fine pins, drums supporting said belt, whereby the spaces separating the pins are increased after passing from the hopper to automatically discharge particles contained therein, means, adapted to yield in the direction of movement of the belt, obstructing the passage from the hopper of particles too large to be received in the spaces separating the pins on the belt, and a deflector beneath which the belt passes between said yielding means and the drum which supports the belt adjacent the discharge point.

3. In an apparatus for treating granular material, the combination of a hopper, an endless carrier belt having a section extending through the hopper and provided on its outer surface with means for receiving and supporting particles not exceeding a certain size and adapted to automatically discharge outwardly from said surface such particles at a point outside of the hopper, a plurality of spring blades or flexible stops projecting partly across the slot through which the belt leaves the hopper to obstruct the passage through said slot of undesirably coarse particles, said stops being adapted to yield in the direction of movement of the belt, and means for preventing such coarser particles as may pass said stops from being carried to the point where the belt automatically discharges the finer particles carried thereby.

4. In an apparatus for treating granular material the combination of an elongated hopper, an endless carrier belt provided on its outer surface with a body of fine pins, the spaces between which are adapted to receive and support particles not exceeding a

certain size, drums supporting said belt, so  
that the upper section thereof forms the bot-  
tom of and travels throughout the length of  
the hopper, and causing the particles con-  
5 tained in the spaces between said pins to be  
automatically discharged outwardly from  
said surface outside of the hopper, means  
acting to obstruct the passage from the hop-  
per of particles too large to be received in  
10 the spaces separating the pins on the belt,

and means acting to remove from the belt  
particles carried thereby from the hopper  
and not contained in said spaces.

In testimony whereof I affix my signature  
in presence of two witnesses.

GEORGE F. ROYER.

Witnesses:

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