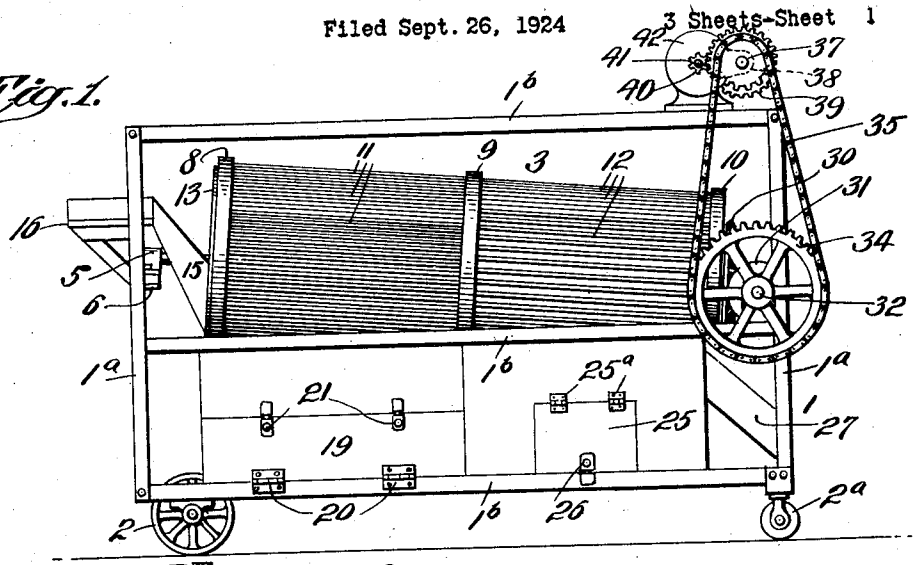
July 17, 1928. 1,677,862

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CERAMIC SORTING MACHINE

Filed Sept. 26, 1924 3 Sheets-Sheet 1

Fig. 1.



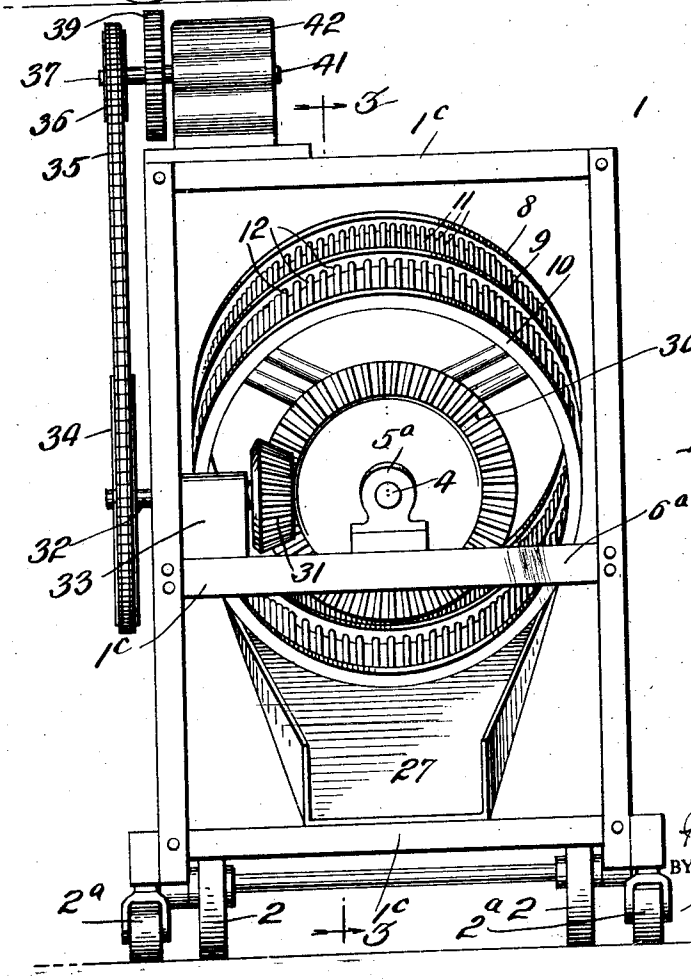


Fig. 2.

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Filed Sept. 26, 1924 3 Sheets-Sheet 2

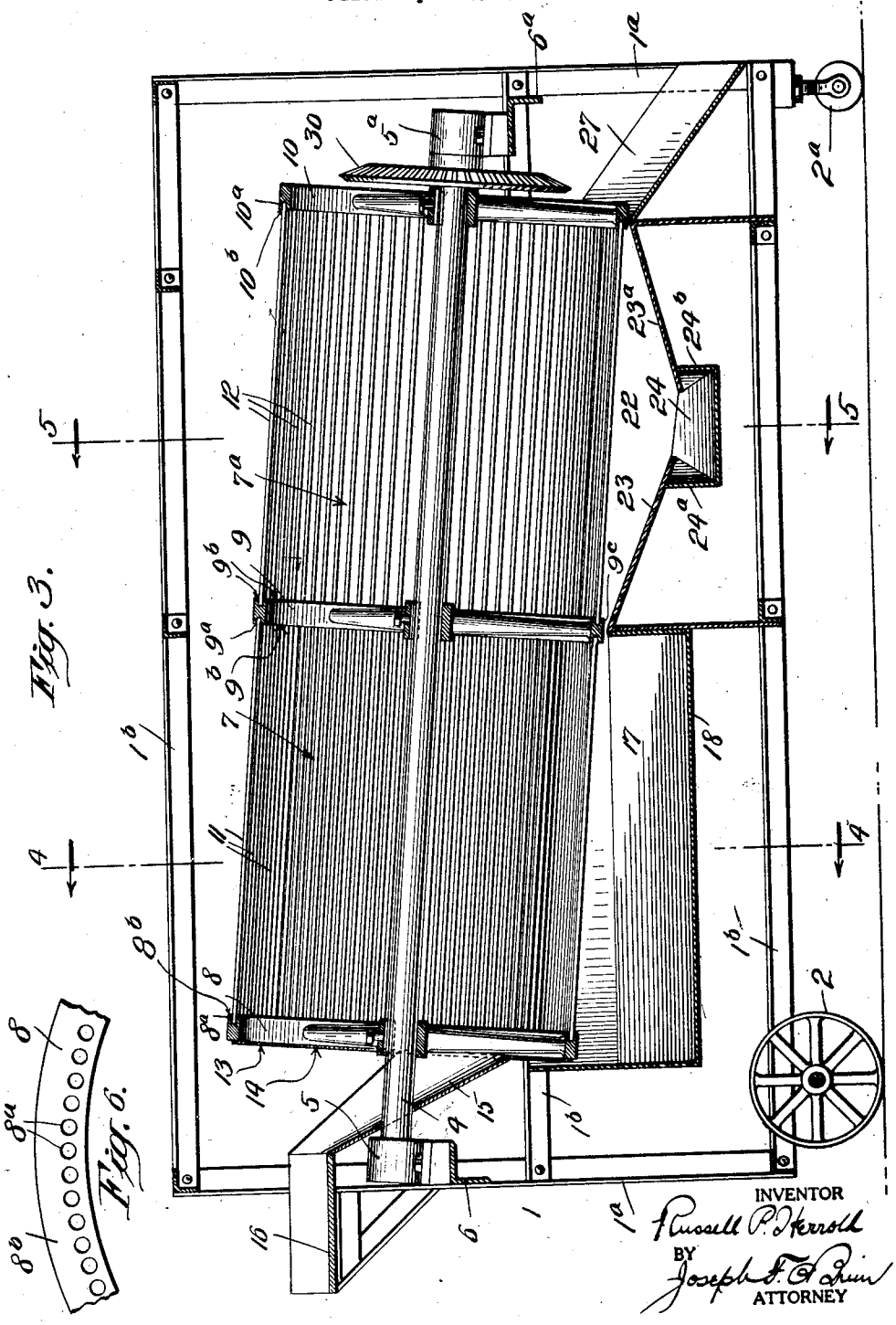


Fig. 3.

Fig. 6.

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Filed Sept. 26, 1924 3 Sheets-Sheet 3

Fig. 5.

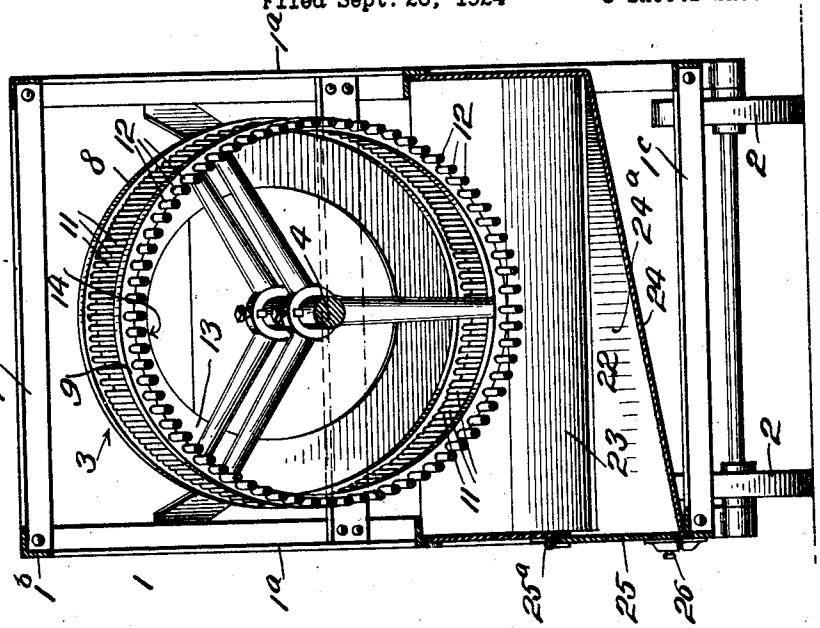
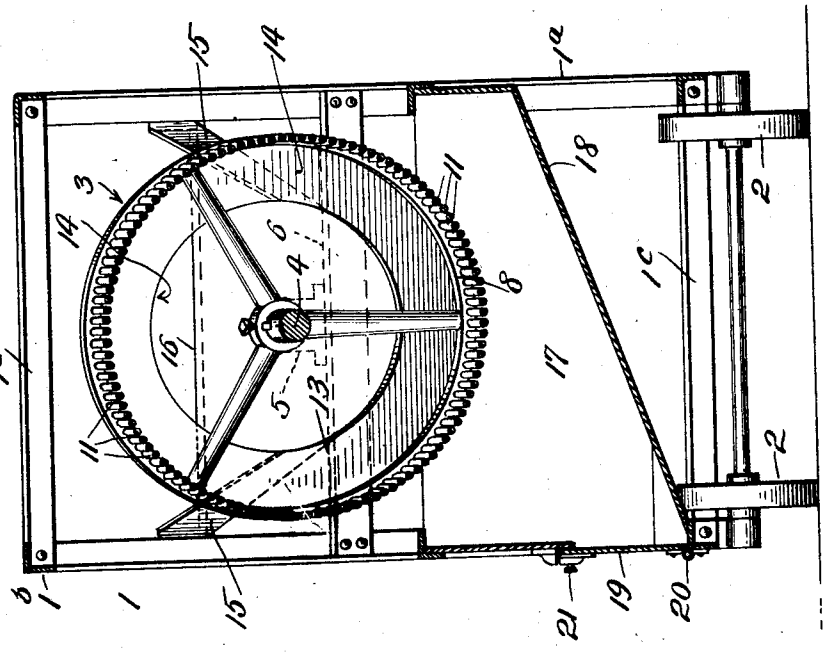


Fig. 4.



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UNITED STATES PATENT OFFICE.

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CERAMIC SORTING MACHINE.

Application filed September 26, 1924. Serial No. 740,047.

This invention relates to improvements in ceramic sorting machines.

In the process of firing or "burning" tiles, the units are stacked in a container or saggar and in order to keep the same from sticking together, they are surrounded with a layer of sand. Notwithstanding this precaution, it frequently happens that some of the units in a saggar become stuck together. It is therefore necessary to sort out or separate the unstuck units from those that are stuck together and also to separate and remove the accompanying sand.

It is one of the objects of this invention to produce a machine which will, preferably in a single continuous operation, separate the sand from the charge or load and sort out and separate the perfect individual unstuck units from the imperfect units which are stuck together.

Another object of this invention is to produce a simple machine by which a charge of fired tiles or the like fed into the machine at one end are caused to have simultaneous tumbling and travelling movements, and by which, in a single operation or passage through the machine, the sand will be first separated from the charge; the perfect individual or single units will then be separated therefrom and the residue, comprising imperfect or stuck units, will be discharged at the opposite end of the machine. To this end, I provide a rotatable charging drum having a plurality of communicating sections provided with sieving apertures of varying width over which the charge or load moves during its continuous passage through the machine, and through which apertures the sand and the perfect tiles will be sieved out of the charge and the residue or balance of the load, comprising stuck tiles or units which are too large to pass through the sieving apertures, will be passed over the same and through a discharge aperture at the opposite end of the drum.

Another object of this invention is to so mount a rotatable drum that the travelling movement of the charge through the machine and the discharge of the stuck tiles therefrom may be accomplished by gravity during the rotation of the drum.

Another object of my invention is to arrange the axis of rotation of the drum at such an inclined pitch that the sieving surfaces of the drum will be caused to have a relatively long, helicoidal line of contact with the charge or load so that all the sand and perfect tiles may be separated and segregated from the charge by a single passage through a drum of minimum length and diameter.

Another object of this invention is to produce a machine of this type which will carry its own power devices and will be readily portable so as to be movable from one kiln to another. To that end, the rotatable drum is supported in a suitable frame mounted on wheels and carrying a motor and power-transmission mechanism for rotating the drum.

With these and other objects in view, the invention comprises the combination of members and arrangement of parts so combined as to co-act and cooperate with each other in the performance of the functions and the accomplishment of the results herein contemplated, and comprises in one of its adaptations the species or preferred form illustrated in the accompanying drawings, in which:—

Fig. 1 is a side elevation of a machine embodying my invention;

Fig. 2 is a rear view in elevation of the machine shown in Fig. 1;

Fig. 3 is an enlarged longitudinal section substantially on the line 3—3 of Fig. 2;

Fig. 4 is a section on the line 4—4 of Fig. 3;

Fig. 5 is a section on the line 5—5 of Fig. 3, and

Fig. 6 is a detail of portion of spider rim employed.

Referring now to these drawings, which illustrate a preferred embodiment of my invention, 1 indicates a frame or skeleton comprising upright corner posts 1^a connected together by longitudinal frame members 1^b and transverse frame members 1^c. Mounted within the frame 1 is a rotatable sieving drum 3 divided into a plurality of communicating sieving compartments having cylindrical screen walls of varying mesh for the purpose hereinafter specified. In the embodiment shown, the drum 3 is fixed on a shaft 4 mounted at opposite ends to rotate in bearing brackets 5—5^a resting upon transverse shelves 6—6^a supported on the frame 1. The shaft 4 may be rotated from any suitable source of power but I prefer, as in the preferred embodiment illustrated, to drive

the shaft from a motor mounted on the frame so that the machine will be a self-contained power unit. As illustrated, the shaft 4 has fixed thereon a bevelled gear 30 which meshes with a bevelled pinion 31 fixed on a shaft 32 supported in a bearing 33 and having also fixed thereon a sprocket wheel 34 which is rotated by a sprocket chain 35 driven by sprocket 36 fixed on a shaft 37 supported in a bearing bracket 38 and having also fixed thereon a gear 39 which meshes with a pinion 40 on the shaft 41 of the motor 42.

In the preferred embodiment shown, the rotatable drum 3 is divided into two cylindrical tumbling compartments 7—7ª and the cylindrical screen walls of these compartments are formed by mounting upon the shaft 4 at the front and rear ends and also intermediate such ends spiders 8—9 and 10 respectively, and mounting on the annular edges of such spiders two sets of circumferentially spaced round rods, which when so arranged form the cylindrical screen walls of the compartments 7—7ª of the drum. As illustrated, the opposite rims or annular edges of the spiders are bored with two circumferential series of apertures and the opposite ends of the round rods 11 are inserted into these apertures so as to provide a cylindrical wall formed of such spaced rods for the said compartment 7. Said rods are so spaced a distance less than the thickness of a tile so that when a load comprising a saggar full of tiles which have been fired or burned are inserted therein and rotated or tumbled, the sand, dust and small pieces will be separated from such load without, however, permitting any of the tiles to pass through the space or slots between the said rods. The opposite rims or edges of the spiders 9 and 10 are likewise pierced with spaced holes or apertures 9ᵇ and 10ª and a series of round rods 12 have their opposite ends inserted in such apertures, so as to provide a cylindrical wall formed of such spaced rods for the said compartment 7ª. These rods 12 are spaced apart a distance slightly greater than the thickness of a tile, so that when a load or charge of tiles are tumbled in this compartment the spaces between the rods will serve as gauging apertures or slots and the single perfect tiles will be caused to pass between the same while all imperfect or stuck together tiles will not be passed through such apertures.

The charge or load is preferably caused to travel longitudinally through the machine while it is being tumbled in the tumbling compartments and in order that all the sand, as well as the perfect tiles, may be separated and segregated from the charge by a single passage through a tumbling drum of minimum length and diameter the load is, during such tumbling action, caused to have a contact with the spaced rods which comprise the cylindrical walls of the drum in a relatively long helicoidal line. This is preferably accomplished by causing the load to be moved by the action of gravity assisted by the tumbling movement thereof, and in the preferred form shown the shaft 4 is mounted to have a pitch inclining downwardly from the charging to the discharging end of such a degree as to procure the most effective sieving and gauging action in a single passage of the charge through the machine, it being apparent that the pitch of the helicoidal line of contact with the screen walls of the drum will be proportionate to the angle of inclination of the shaft 4.

The forward or charging end of the drum 3 is provided with a plate 13 which has a circular charging opening 14 with which the lower end of an inclined charging chute 15 connects. The chute 15 connects at its upper end with a platform 16, on which a saggar or other receptacle filled with fired or "burned" tiles may be supported before dumping. When a saggar is so dumped the charge will pass down through the chute 15 and into the sand-sieving compartment 7 where it will, as aforesaid, be tumbled and caused to travel forwardly, the combined movements causing the load to have a helicoidal line of contact with the bars 11 forming the walls of the drum. All the sand, dust or broken pieces in the charge will thus be sieved out of and caused to drop through the spaces between the bars during its travel through this compartment 7. The length and diameter of the compartment 7 as well as the angle of inclination are preferably so proportioned as to enable a thorough sieving out of the sand, etc., from a charge during a single passage of such charge through the said compartment so that when said charge reaches the communicating compartment 7ª it will be substantially free of such dust and small pieces. Arranged beneath said sand-sieving compartment 7 is a sand bin or compartment 17 having a floor plate 18 inclined transversely and downwardly toward one side of the machine. The sand, dust and broken pieces sieved out between such bars are thus caused by gravity to be shifted to one side of the machine where they may be removed through a door 19 hinged at 20 and preferably having at its upper end spring latches 21 adapted to latch the door-way in its closed position.

In said compartment 7ª, the gauging spaces between the rods 12 are, as aforesaid, arranged to permit only single or perfect tiles to pass therethrough and the length and diameter of the compartment are such as to cause all the single units or perfect unstuck tiles in a load to be gauged and passed through such apertures between the bars 12. When so passed through the bars 12 the major portion of the perfect tiles in

the load will successively drop by gravity into a perfect tile bin or compartment 22 and on longitudinally and oppositely-inclined floor plates 23—23ª located therein and will thereafter slide by gravity on such plates toward the center of the compartment into the transversely inclined chute 24 into which a relatively few tiles will have also dropped from the drum. All of the perfect tiles will thus be gathered in said chute 24 which, as shown, has sides 24ª—24ᵇ extending upwardly to the bottom of the plates 23—23ª. Thereafter the tiles will by gravity slide in the chute 24 to the side of the machine where they may be removed through a door 25 which is hinged at 25ª and has a latch bolt 26.

All tiles in the charge which are stuck together or are otherwise so deformed as to prevent the passage through the gauging grooves between the rods will be caused to travel forwardly and will be discharged from the rear end of the drum, passing through a chute 27 to any suitable receptacle which may be positioned beneath the same.

The machine is preferably portable to enable movement from one kiln to another and, as shown, the frame 1 is for this purpose mounted upon front and rear wheels 2—2ª.

The operation of the device will be apparent from the foregoing description.

Having described my invention, I claim:—

1. A sorting machine for ceramic units embodying a tumbling-drum having a charging opening at one end, a discharge opening at the opposite end, and being divided into communicating sand-sieving and unit-gauging compartments, said sand-sieving compartment having a screen wall provided with apertures of less width than the thickness of the unit to be sorted and said unit-gauging compartment having a screen wall unobstructed on its interior surface and provided with elongated gauging apertures of slightly greater width than the thickness of the units to be sorted, means for supporting said drum with its axis in inclined position, means for rotating said drum about said inclined axis, a sand-receiving bin arranged below the sand-sieving compartment, and another independent bin having means arranged closely adjacent to the bottom of the unit-gauging compartment for receiving without breakage units passing through the gauging apertures of said unit-gauging compartments.

2. A sorting machine for ceramic units embodying a drum having a charging opening at one end, a discharge opening at the opposite end, and being divided into communicating sand-sieving and unit-gauging compartments, said sand-sieving compartment having a screen wall composed of a series of longitudinally-disposed round bars spaced from each other to provide screening apertures of less width than the thickness of a unit to be sorted and said unit-gauging compartment having a screen wall unobstructed on its interior surface and also composed of a series of longitudinally disposed round bars spaced from each other to provide gauging apertures of slightly greater width than the thickness of the units to be sorted, means for supporting said drum with its axis in inclined position, a sand receiving bin arranged below the sand sieving compartment and another independent bin having inclined longitudinally-extending bottom members arranged closely adjacent to the bottom of the gauging compartment and means for rotating said drum about said inclined axis, whereby the charge will be caused to have a helicoidal line of contact with the screen walls of said compartments and all the sand, dust, small pieces and like matter will in the first compartment be separated, all perfect units will be gauged and separated in the second compartment and imperfect and stuck-together units will be discharged through the discharge opening.

In witness whereof, I have signed my name to the foregoing specification.

RUSSELL P. HERROLD.