Dec. 21, 1926. 1,611,389

H. R. STRAIGHT

PUG MILL

Filed June 17, 1925

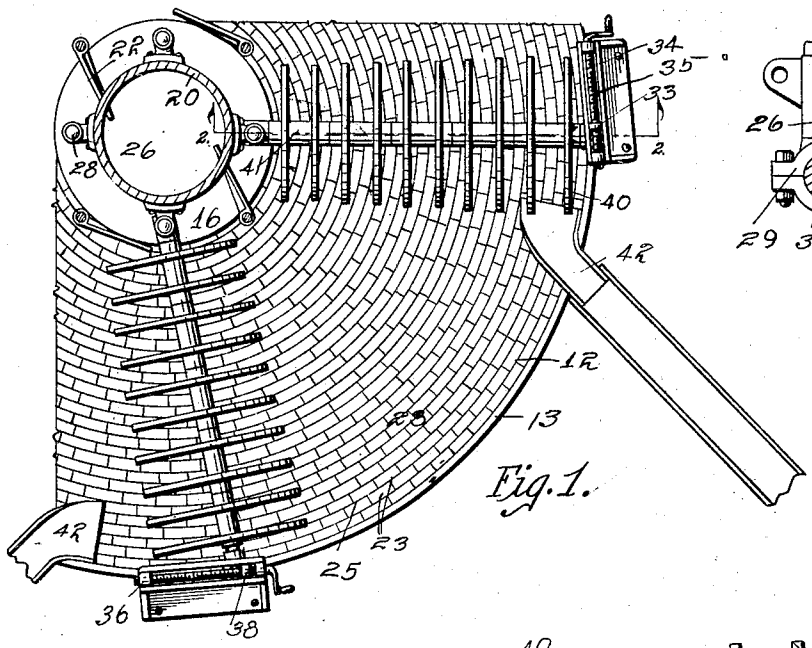


Fig. 1.

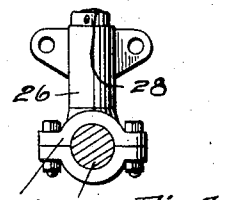


Fig. 3.

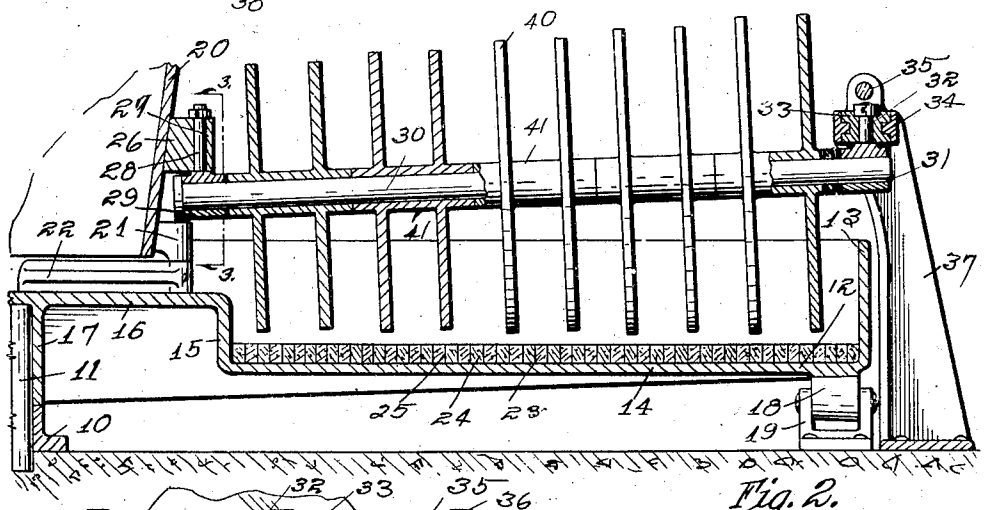


Fig. 2.

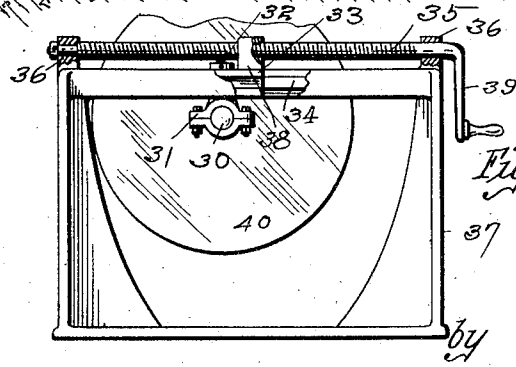


Fig. 4.

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Patented Dec. 21, 1926. 1,611,389

UNITED STATES PATENT OFFICE.

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PUG MILL.

Application filed June 17, 1925. Serial No. 37,739.

The object of my invention is to provide a pug mill of simple, durable and inexpensive construction, which is especially adapted to handle large quantities of material.

A further object is to provide a pug mill, which is adapted to handle large quantities of material and to feed a number of tile machines simultaneously, having pugging mechanism which may be adjusted to deliver the proper amount of material to each of said machines as is desired, whether one or a number of the tile machines are in operation.

A further object is to provide in a pug mill improved means for supporting and mounting the muller wheels.

A further object is to provide in a pug mill means whereby the life of the muller wheels will be greatly increased.

A further object is to provide in a pug mill an improved pan having its bottom wearing surface formed of a series of small detachable wearing members, so that the bottom of the said pan may be renewed as often as necessary without having to provide an entirely new pan.

My invention consists in the construction, arrangement and combination of the various parts of the device, whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claims, and illustrated in the accompanying drawings, in which:

Figure 1 is a segmental plan view of my improved pug mill,

Figure 2 is a detail sectional view taken on the line 2—2 of Figure 1,

Figure 3 is a detail sectional view taken on the line 3—3 of Figure 2; and

Figure 4 is an end elevation of one of the bearing members.

My improved device comprises a base member 10 having an upright pivot 11 on which is rotatively mounted the pan 12 which is provided with cylindrical sides 13 having a bottom 14, the central portion of which is provided with an upright annular wall member 15, the top edge of which is provided with a plate 16. Said plate 16 forms what I shall term a supply table, the central portion of which is provided with a downwardly extending sleeve 17 designed to rest over the pivot 11.

The pan 12 is of comparatively large diameter, the outer edges of which are supported by means of rollers 18 mounted in suitable bearings 19. Any means might be provided for imparting rotary movement to said pan.

Above the supply table 16 I have provided a hopper 20 which has its lower edge a slight distance above the table 16, the lower end of said hopper being also of smaller diameter so that material may rest on the plate 16 without falling over the edges of the annular walls 15.

Pivotally mounted, preferably at four points adjacent to the lower edges of the hopper, I have provided brackets 21, each of which is provided with a scraper 22 arranged in a somewhat tangent manner with the center of the hopper in such a manner that as the plate 16 is rotated beneath it, material will be discharged over the top edge of the flange 15 into the annular trough between the walls 13 and 15. The bottom plate 14 is provided with a removable lining 23 which is composed preferably of paving brick 24 set on edge, the brick being formed circular and provided with a filler 25 between them, which serves to anchor the brick and yet permit them to be easily removed when so desired. This filler might be some asphalt or tar composition.

The hopper 20 is provided with a number of bearing members 26 secured to its outer face, each of the bearing members being provided with a vertical opening 27 designed to receive a pivot pin 28. The lower end of the pin 28 is provided with a bearing member 29, said bearing member being designed to rotatively receive one end of a shaft 30, which has its outer end slightly elevated. The said shaft is arranged radially when in a normal position. The outer end of the shaft 30 is provided with a bearing member 31 supported from an upright pivot pin 32, and which is pivotally mounted in a slide block 33. This slide block is mounted in parallel guide members 34 which are arranged tangentially with the center of the pan, the shaft being slidably mounted in the bearing 31 in such a manner that as the block 33 is moved longitudinally of the guides 34, the shaft 30 will be moved from a radial position to a position at a considerable angle with said radial position, the movement being about the pivot 28 to a position assumed by the left hand shaft 30, as shown in Figure 1, for the purpose hereinafter made clear.

The block 32 is moved longitudinally with

the guides by means of a screw threaded shaft 35 mounted in bearings 36 in each end of the guides. Said guides are supported by uprights 37 located adjacent to one side of the pan 12. The block 32 is provided with a screw threaded lug 38 to travel on the said shaft 35 by means of which movement is imparted to the said block from the said shaft. The outer end of the shaft 35 is provided with a crank 39. The shaft 30 is provided with a series of muller wheels 40 which are arranged in pairs, each pair of wheels being secured to a hub 41, said hub being rotatively mounted on the shaft 30 with the hub of one pair of wheels resting adjacent to the hub of the next pair of wheels.

On account of the shaft 30 being inclined relative to the floor of the pan 12, it will be seen that the inner sets of wheels will be smaller in diameter than the outer sets, the wheels of each pair being substantially the same diameter.

By arranging the wheels 40 in pairs on a single supporting hub, I have provided means whereby the peripheries of the wheels will be supported rigidly against lateral movement. It will also be seen that by providing the said wheels in pairs and rigidly connected to the same hub, I have provided means whereby a certain amount of dragging or slipping will result between the bottom of the pan and the engaging edges of said wheels, inasmuch as the circumference of the wheels is substantially the same, while the length of the circular path over which they travel is varied considerably due to the fact that one of the said wheels is nearer the center of the pan than the others. By this arrangement it will be seen that as the material to be pugged travels beneath the said muller wheels, a dragging or tearing action will be imparted between the bottom of the pan and said wheel, which greatly assists in rapidly producing the desired mixture.

It will further be seen that by providing smaller wheels at the inner end of the shaft, I have provided means whereby when the peripheries of the wheels have become worn excessively, I may drop the shaft 30 by simply removing the lower half of the bearings 29 and 31, permitting the shaft to be rolled from beneath the upper half of said bearings, at which time the inner pair of wheels may be removed and the shaft moved longitudinally and outwardly through the remaining wheels, and a new pair of wheels mounted on the said outer end. When the shaft has been replaced, that portion of the wheels which has been worn away will be compensated for, thus providing means whereby the wheels may be utilized for a greater length of time without having to be renewed.

By shifting the outer end of the shaft 30 at an angle relative to its radial position, I have provided means whereby the wheels 40 will serve to move the material being pugged outwardly toward the outer edge of the pan. The amount of this outward movement is regulated by the amount of angular adjustment of said shaft, so that the material may be moved outwardly as fast as used. This is especially advantageous when being used in connection with a pug mill where there are a number of tile machines operating from a single pan. The chutes or plows 42 are shown to illustrate means whereby material may be removed at a point adjacent to each of the pairs of muller wheels.

Assuming that one of the tile machines is thrown out of operation, then it will be seen that it is necessary to reduce the outward flow of material from the center of the pan, which is easily and quickly accomplished by simply moving one of the pairs of muller wheels to position where its shaft is radial with the center of said pan, at which time no outward movement of the material will be caused by said wheels.

It will further be seen that by elevating the outer end of the shaft 30, the wheels 40 will operate in planes slightly inclined from the vertical, and when the said shaft has been adjusted to an angle relative to its radial position, the forward edge of said disk will have a tendency to enter beneath the material and impart a rolling movement to the material as it is moved outwardly. This also assists in agitating and moving the material about in such a manner that it may be brought into contact with another pair of muller wheels.

By providing the floor with a detachable lining, which is formed of cheap material such as paving brick, which is further cheapened by the fact that it may be made usually by the company operating the machine, I have provided means whereby the floor of said pan may be renewed as often as desired at a very slight expense.

I claim as my invention:

1. A pug mill comprising an annular pan, a hopper for feeding material to the central portion of said pan, a radially arranged shaft having one end pivotally connected near said hopper adapted to swing in a substantially horizontal plane, and a series of muller wheels for said shaft.

2. A pug mill comprising an annular pan, a hopper for feeding material to the central portion of said pan, a radially arranged shaft having one end pivotally connected near said hopper adapted to swing in a substantially horizontal plane, a series of muller wheels for said shaft, said muller wheels being arranged in groups, each group being secured rigidly to a single hub, and said hub being rotatively mounted on said shaft.

3. A pug mill comprising a horizontal

pan, a shaft extending across and above said pan, one end of said shaft being slightly above its opposite end, a series of muller wheels rotatively mounted on said shaft, said wheels being of various diameters so that the inner side of their peripheries lies in a plane substantially parallel with the bottom of the pan.

4. A pug mill comprising a horizontal pan, a shaft extending across and above said pan, one end of said shaft being slightly above its opposite end, a series of muller wheels rotatively mounted on said shaft, said wheels being of various diameters so that the inner side of their peripheries lies in a plane substantially parallel with the bottom of the pan, and means for detachably mounting said shaft relative to said pan.

5. A pug mill comprising a horizontal pan, a shaft extending across and above said pan, one end of said shaft being slightly above its opposite end, a series of muller wheels rotatively mounted on said shaft, said wheels being of various diameters so that the inner side of their peripheries lies in a plane substantially parallel with the bottom of the pan, and means for pivotally mounting said shaft so it will swing at an angle relative to its transverse position of movement, said pan and said muller wheels being movably mounted relative to each other.

6. In a pug mill comprising an annular pan having a feed table at its central portion, a hopper above said feed table, means for moving material from the bottom of said hopper to said pan, a bracket secured to one side of said hopper, a bearing member pivotally mounted on a vertical axis, a shaft rotatively mounted in said bearing member, a bearing member slidably and rotatively mounted on the opposite end of said shaft, guide members, a block for pivotally supporting the last said bearing member, said block being slidably mounted on said guides, and means for moving said block.

7. In a pug mill comprising an annular pan having a feed table at its central portion, a hopper above said feed table, means for moving material from the bottom of said hopper to said pan, a bracket secured to one side of said hopper, a bearing member pivotally mounted on a vertical axis, a shaft rotatively mounted in said bearing member, a bearing member slidably and rotatively mounted on the opposite end of said shaft, guide members, a block for pivotally supporting the last said bearing member, said block being slidably mounted on said guides, and means for actuating said block, said means comprising a screw threaded shaft having a crank on one end.

8. A pug mill comprising an annular and rotatively mounted pan, a series of shafts mounted normally in a radial position above said pan, means for pivoting the inner ends of said shafts to swing in a horizontal plane, means for mounting the outer ends of each of said shafts, and means for independently imparting movement to each of the last said mountings, each of said shafts being provided with a series of muller wheels.

Des Moines, Iowa, June 2, 1925.

HALVER R. STRAIGHT.