

R. H. WARREN.
APPARATUS FOR REDUCING MATERIALS.
APPLICATION FILED AUG. 1, 1921.

1,424,697.

Patented Aug. 1, 1922.
2 SHEETS—SHEET 1.

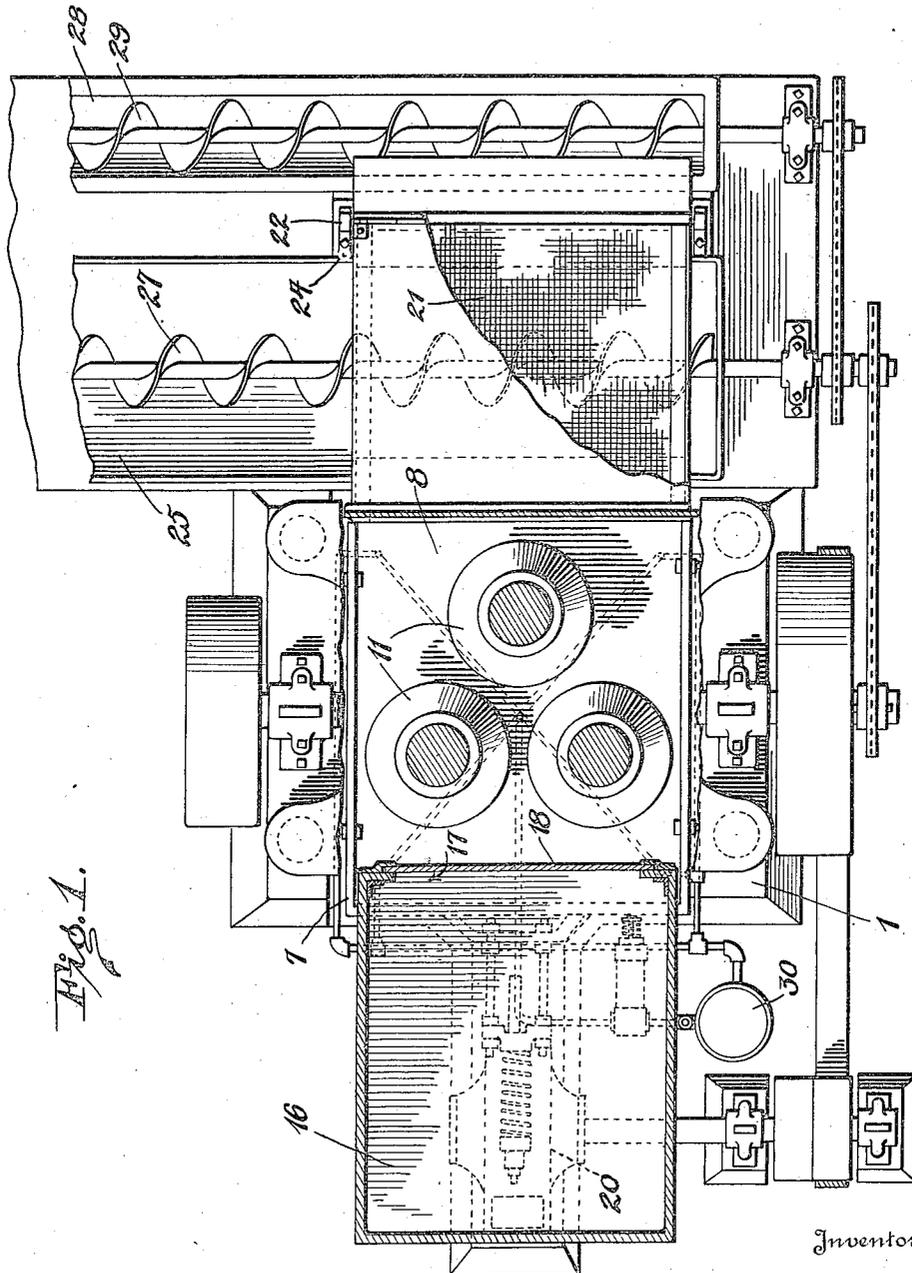


Fig. 1.

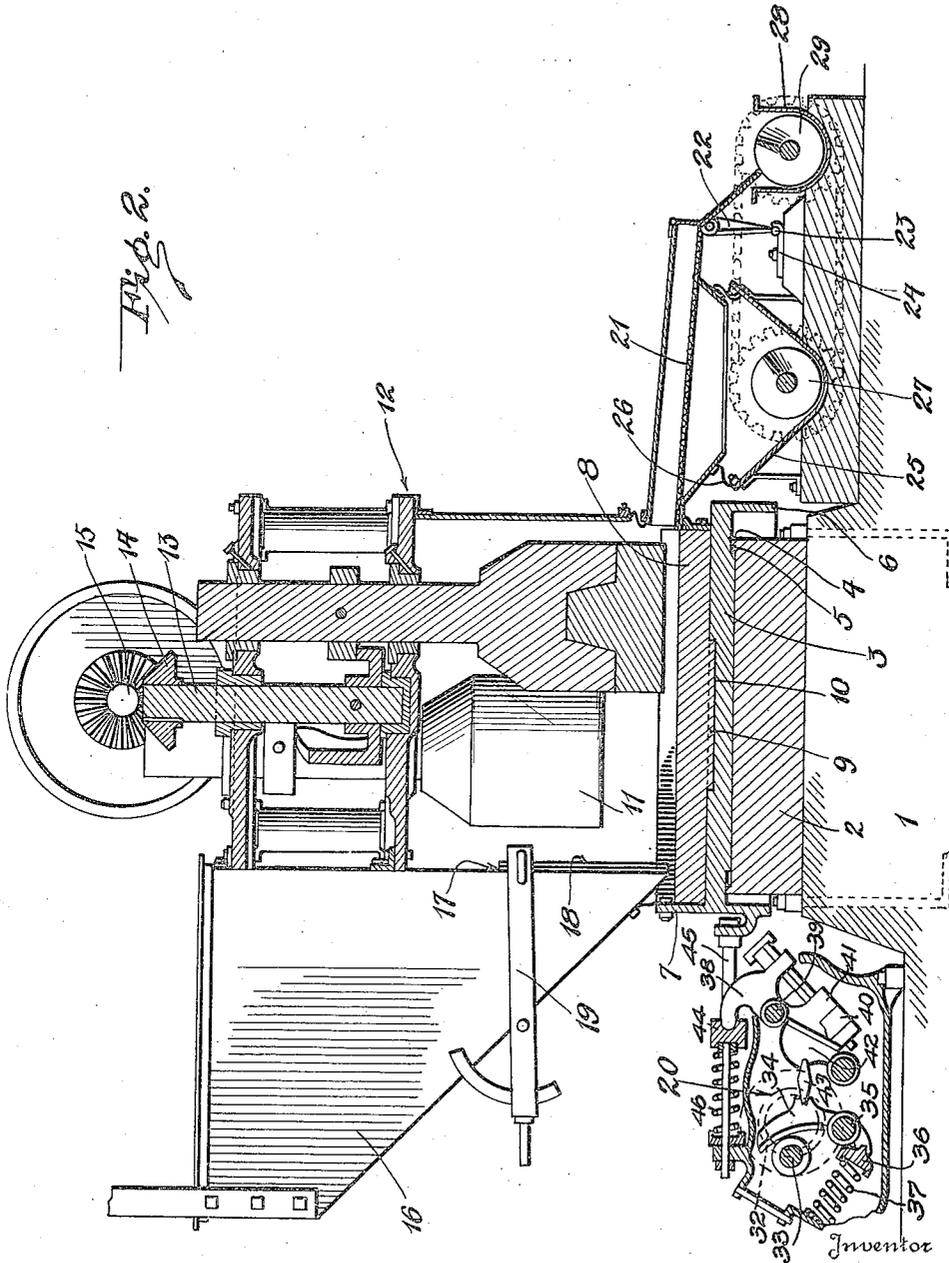
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UNITED STATES PATENT OFFICE.

RALPH H. WARREN, OF MONTCLAIR, NEW JERSEY.

APPARATUS FOR REDUCING MATERIALS.

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To all whom it may concern:

Be it known that I, RALPH H. WARREN, a citizen of the United States, residing at Montclair, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Apparatus for Reducing Materials, of which the following is a specification.

The invention is more particularly directed to apparatus or means for reducing to granular or pulverulent form, refractory materials such as, for example, cement clinker.

Objects of the invention are to provide for handling larger quantities of the clinker, or other material to be reduced, than has heretofore been possible, and to effect the reduction expeditiously and uniformly and with a minimum of rejections.

With such and other objects in view, the invention resides in the construction, arrangement, and combination of parts hereinafter described and claimed, reference being had to the accompanying drawings, wherein—

Figure 1 is a plan view of one embodiment of the invention; and

Fig. 2 is a vertical sectional view of the same.

The improved machine is mounted upon a suitable support, involving, as here shown, a concrete or other foundation 1, to which is rigidly secured a metal base 2. A bed-plate 3 is mounted for reciprocatory or endwise movement on the base 2, the latter having a suitable edge projection 4 which co-operates with a correspondingly reduced part 5 of the bed-plate to limit said movement. The bed-plate may also have a depending skirt 6 adapted to co-operate with the base to prevent undue play of the bed-plate. The bed-plate is formed or provided on three sides with a marginal upstanding flange 7, the open side operating to discharge the reduced material. A table 8 is removably positioned upon the bed-plate, being preferably detachably secured thereto by an extension 9 accommodated in a recess 10 of the bed-plate.

The table 8 constitutes one element of a sizing or reduction apparatus, the other element being here shown as embodying stamps 11, the number of which may vary, but of which three are shown, mounted for reciprocation in a frame 12 supported above the table and operated by a cam shaft 13 geared, as at 14, to a power shaft 15.

A hopper 16, to receive the material to be

crushed, is supported by the frame 12 at one side of the stamps. The hopper has an outlet 17 controlled by a gate 18 through the medium of a lever 19, to supply material onto that edge of the table remote from the discharge. The gate 18 may obviously by the means shown be set to have a predetermined discharge area with respect to the hopper so that the clinker or other material will be more or less continuously delivered to the table 8.

A jolting or quick return mechanism, indicated generally at 20, driven from a moving part of the machine, for example, by a belted connection with the power shaft 15, is connected to the bed 3 so as to induce a jolting or rapid reciprocatory movement thereof in synchronism with the reduction action. The quick return mechanism indicated at 20, forms no material part of the present invention, and is of well-known construction. For a better understanding of the part performed thereby, however, such quick return mechanism may be briefly described as follows: A power driven element 32 is provided with a crank pin 33, having a freely rotatable collar thereon. A bell-crank 34 is pivotally supported within the casing of this mechanism at 35, and the upper end of such bell-crank is engaged by the collar of crank pin 33 as the power element is revolved. The lower end of the bell-crank 34 is provided with a loosely bearing block 36, between which and the adjacent wall of the casing is arranged a spring 37. A second bell-crank 38 is pivotally supported at 39 in the casing, the lower end of which has a bearing nut 40, adjustable with respect to the pivot 39 through a rod 41 threaded in the bell crank and connected with the nut. A crank 42 is also pivotally supported in the casing, and is adapted to engage the nut 40, and a toggle 43 has a bearing in the bell crank 34 and crank 42. The upper end of bell crank 38 bears against a nut 44, connected through a rod 45 with the table 8. A spring 46 maintains contact between said bell crank 38 and nut 44. A complete revolution of the element 32 gives a reciprocating movement to the table 8. At the end of one stroke of pin 33 the toggle 43 is at an angle to the horizontal and at this part of the movement the movement transmitted to the table is slowed up, being obviously accelerated, however, at the end of the opposite stroke.

The effect of the jolting is to subject the

material being acted upon by the primary reducing elements to a rubbing or attrition action, to feed fresh material, and to discharge the material already acted upon.

- 5 A screen 21 is connected at one end to the discharge edge of the table 8, the screen being at this point in line with the top surface of the table so that the material discharged will be delivered onto the screen through the jolting of the table. The opposite end of the screen is supported in rocker arms 22 terminating at their lower ends in balls 23, seating in an appropriately shaped recess in an adjustable slide plate 24.
- 10 Through movement of the latter the screen may be adjusted as to height and thus the shaking action of the screen due to the jolting of the table 8 may be controlled at will.
- 20 Immediately below the screen is a material trough 25 which receives material passing through the screen, the trough being connected to the screen by flexible strips 26 which serve the dual function of a guide for the material and also a guard to exclude foreign material. A screw conveyor 27 is located in the trough to remove the screened material. A trough 28 and complementary screw conveyor 29 take care of the rejections.
- 30 A pump 30 is provided to supply oil or other lubricant to channels in the base 2 to thereby maintain a film or sheet of lubricant between the base and bed-plate. The details are unimportant so long as the system
- 35 is such as to maintain the desired film of lubricant.

Since the bed-plate and table are under

constant jolting or rapid reciprocatory movement, it is evident that the stamps or other reducing elements act on material which is always in motion. This makes for a more effective action of the stamps and a finer and quicker reduction of the material, as obviously there is produced by this machine a combined crushing and rubbing or attrition action. Otherwise stated, the reciprocal traverse of the table develops a shearing action which is conducive to extremely fine reduction.

Having described the nature and objects of the invention, I claim:—

1. In a stamp mill, the combination of a vertically reciprocating stamp, a horizontal table with a die thereon, means for moving said table in one rectilinear direction and spring means for rapidly moving the table in the opposite direction.

2. In a stamp mill, the combination of a reciprocating stamp, a table with a die thereon, means for moving said table in one rectilinear direction, spring means for rapidly moving the table in the opposite direction, and a screen operatively disposed with relation to and moving in unison with the table.

3. In a stamp mill, the combination with stamping means, of a table, a die removably arranged thereon, means for moving the table in one rectilinear direction, and spring means for moving the table in the opposite direction, the spring means operating more rapidly than the first-mentioned means.

In testimony whereof I affix my signature.

RALPH H. WARREN.