

[54] **CRUSHING MACHINES FOR GLASS ARTICLES**

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[58] Field of Search 241/55, 36, 92, 99,
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[56] **References Cited**

UNITED STATES PATENTS

3,171,605 3/1965 Knapp et al. 241/278 R

3,151,814 10/1964 Morgan et al. 241/99
3,655,138 4/1972 Luscombe 241/99
3,123,312 3/1964 Palyi 241/55
2,064,245 12/1936 Dittmar 141/68
2,322,306 6/1943 McLaren 241/278 R
2,682,374 6/1954 Rietz 241/188 R

FOREIGN PATENTS OR APPLICATIONS

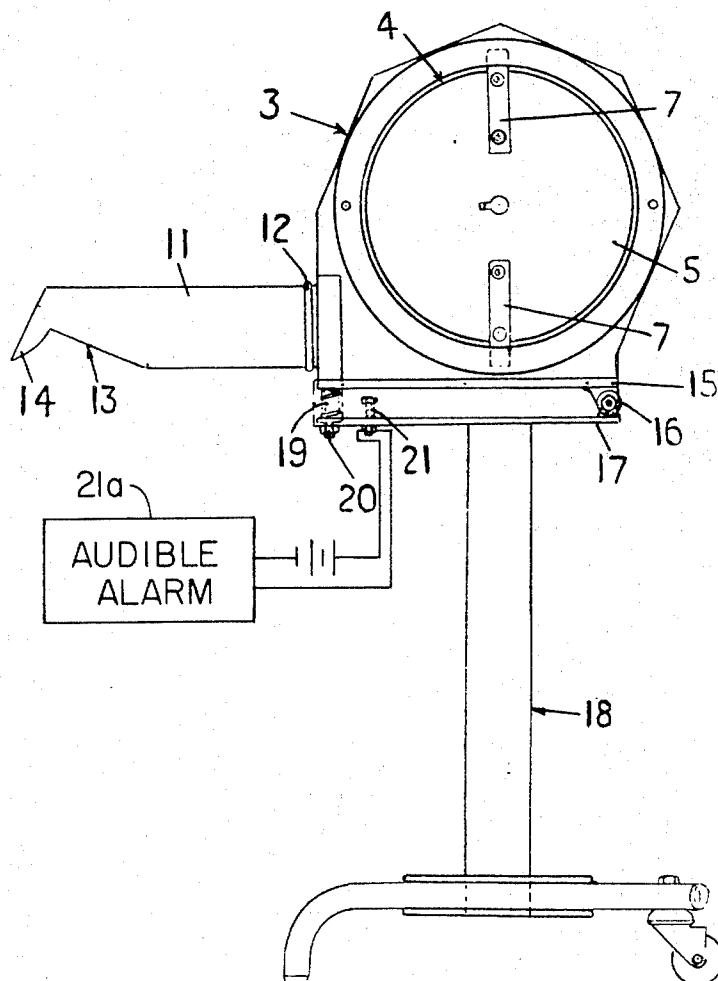
225,504 4/1958 Australia 241/36

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[57] **ABSTRACT**

A machine for crushing elements such as glass bottles having a chute into which the bottles are fed to a rotor chamber for crushing. The crushed material is fed from the chamber by the action of the rotor along a substantially horizontal outlet spout extending tangentially from the chamber. The rotor has a three-fold action consisting of (a) crushing action (b) creating a suction action in the chute and (c) feeding the crushed material from the chamber.

9 Claims, 2 Drawing Figures



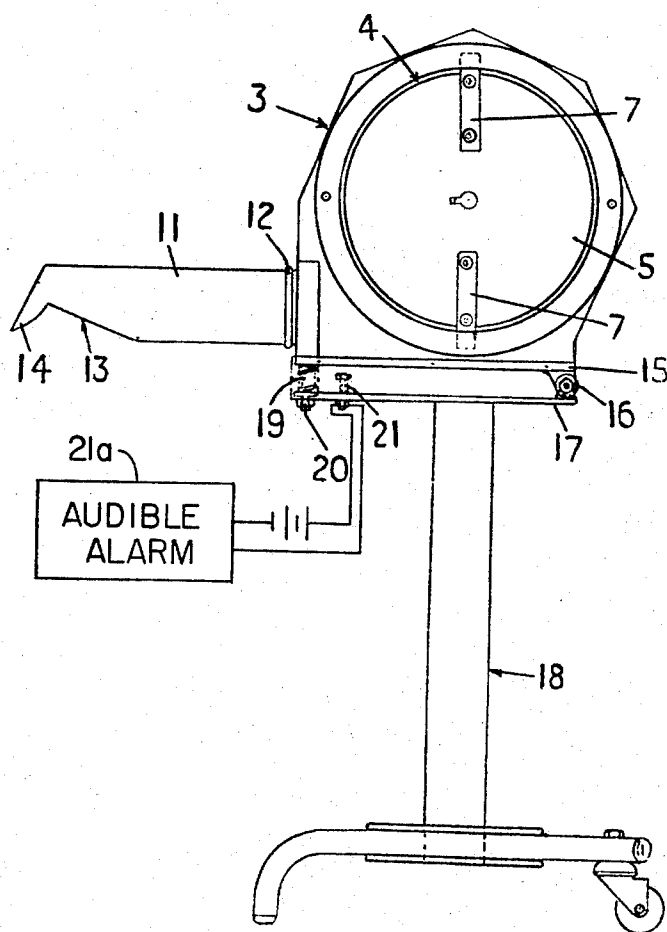


FIG. 1

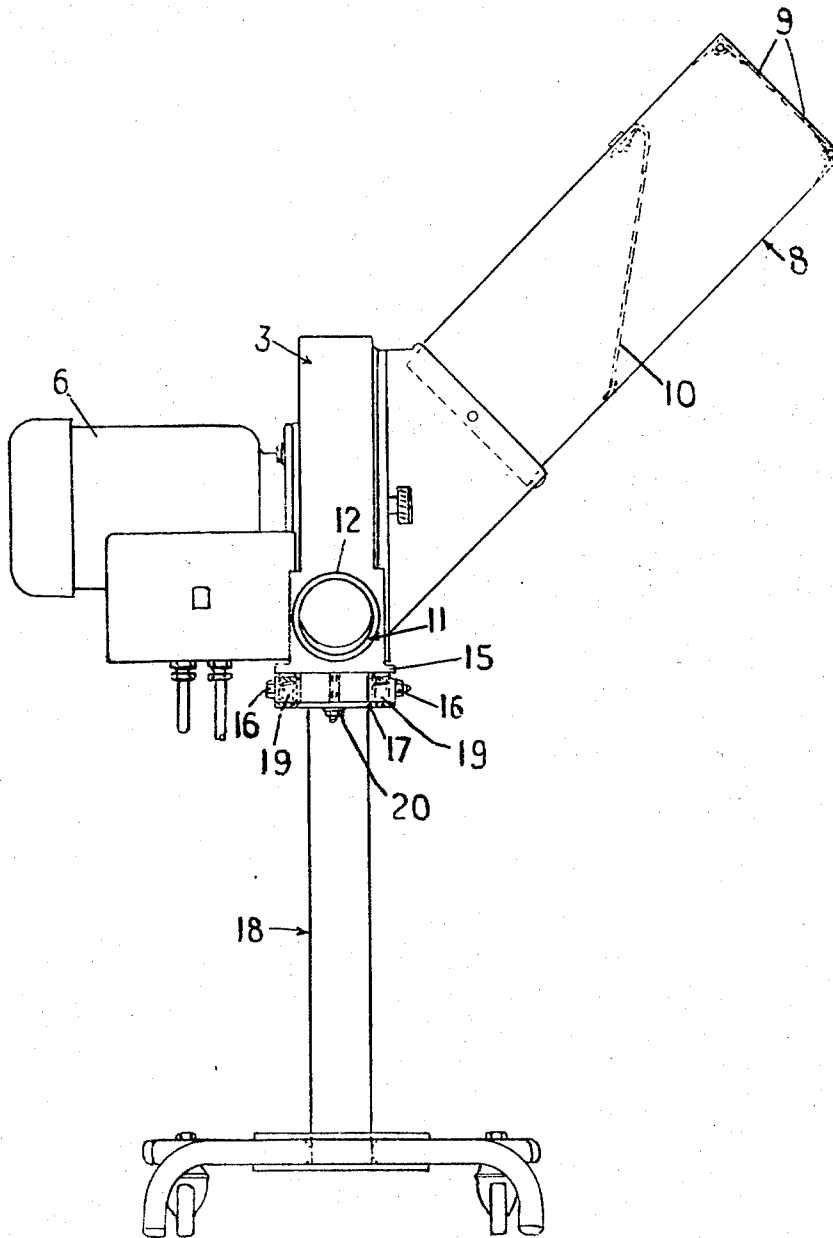


FIG. 2

CRUSHING MACHINES FOR GLASS ARTICLES

BACKGROUND OF THE INVENTION

This invention relates to crushing machines for glass articles, e.g., bottles or the like.

PRIOR TECHNIQUES

The disposal of empty glass bottles is a serious problem both for bottle suppliers and consumers and considerable thought has been given to achieving a satisfactory method of disposing of such glass bottles. One method of disposal is to crush the bottles into small pieces thereby reducing the volume to be handled and thereby facilitating subsequent handling processes. Previous proposed crushing machines have not been satisfactory and in many cases have not been acceptable from a safety standpoint in view of the serious danger to human health of powdered glass.

OBJECTS AND SUMMARY OF THE INVENTION

An object of the present invention is to provide an improved form of bottle-crushing machine.

According to the present invention, there is provided a glass-crushing machine comprising a chamber into which glass elements can be fed, a driven rotor within said chamber and having a plurality of blades for crushing said glass elements, and an outlet extending substantially tangentially from said chamber into which crushed material is adapted to be fed by the action of the rotor.

An embodiment of the invention will now be described, by way of example, with reference to the accompanying drawing.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an end view of a bottle crushing machine in which the end cover of the crushing chamber and the inlet chute have been removed; and

FIG. 2 is a front view of the machine.

DETAILED DESCRIPTION OF THE INVENTION

Referring to the drawings, a bottle-crushing machine comprises a polygonal rotor housing 3 defining a chamber 4 within which a rotor 5 is mounted for rotation about a horizontal axis. The rotor 5 is driven by a coaxial electric motor 6 and one side face is provided with two radial crushing blades 7. The rotor and blades are preferably of a hard nickel/iron alloy having a Brinell hardness of around 600.

A downwardly angled chute 8 of rectangular section leads into the crushing chamber 4 on the blade side of the rotor 5. The chute 8 is provided at its upper end with a pair of hinged, spring-loaded, one-way metal flap valves 9 and with a further valve formed by a rubber strip curtain 10 at an intermediate position along the length of the chute. The valves 9 and 10 prevent glass particles being thrown upwardly out of the chute 8.

Extending substantially tangentially outwardly from the rotor chamber 4 is a substantially horizontal outlet spout 11 to which a valve sack (not shown) can be fitted for filling purposes. A valve sack is of a well-known type which is self closing and has a laterally-projecting tubular inlet into which the outlet spout 11 of the machine is inserted and the sack inlet is sealed by a coil spring 12 carried on the outlet spout 11 and which can merely be located around the tubular inlet of the sack to seal it against the spout when it is in position

thereon. An actual opening 13 from the outlet spout 11 is provided on its underside and a deflector spout 14 is provided at the outer extremity of the spout so as to direct the crushed glass downwardly on emergence from the opening 13 thereby preventing the extremely abrasive glass particles from perforating the valve sack wall by direct contact therewith.

The housing 3, chute 8, spout 11 and motor 6 are mounted on a base plate 15 hingedly connected at 16 to a fixed plate 17 carried by a wheeled support pedestal 18. Extending between the free end of the hinged plate 15 and the fixed plate 17 are a pair of coil springs 19 which tend to urge the plates apart from one another. The loading of the springs 19 is variable by means of a preloading bolt 20 whereby the spring-load can be adjusted to within relatively narrow limits. Also located between the fixed and hinged plates is a micro-switch 21 the actuation of which causes operation of an audible signal such as a bell or buzzer 21a and may, if desired, control the drive to the motor 6. The micro-switch 21 has a screw adjustment for finely determining the load required to actuate the switch.

The micro-switch is electrically connected through a sealed, waterproof electrical mechanism to the audible signal device which preferably continues to operate until the load is removed from the spout on removal of the filled sack.

In operation of the machine, a valve sack is suspended from the outlet spout 11. When glass bottles to be crushed are fed into the machine, the rotor blades 7 crush the bottles in conjunction with the interior polygonal surface of the chamber. In addition to the crushing action, the rotor, due to the design of the machine, provides two important additional functions namely:

- a. it acts as a pump to drive the crushed glass particles through the substantially horizontal, tangential outlet spout and into a sack fitted thereto; and
- b. a suction effect is set up in the chute to tend to prevent passage of the fine glass dust or glass particles upwardly along the chute.

When a predetermined weight of crushed glass has been fed into the suspended sack, the loading of the springs 19 between the fixed and hinged plate 17 and 15 respectively is overcome. The hinged plate 15 carrying the housing 3, motor 6, chute 8 and spout 11 turns about its pivot to actuate the micro-switch 21. After removal of the filled sack, the cycle is then recommenced with an empty sack.

What is claimed is:

1. A crushing machine for articles of glass or the like comprising means defining a crushing chamber, and inlet chute through which articles can be fed into the crushing chamber communicating with the crushing chamber, said chute having an inlet end, a drivable rotor mounted within the chamber, a plurality of blades on the rotor, valve means in the chute preventing egress of crushed material from the inlet end of the chute, an outlet spout receiving material crushed in the crushing chamber, the outlet spout communicating with and extending outwardly from the crushing chamber, a spring-loaded support member carrying the crushing chamber, chute and spout, spring means for loading the support member against downward movement, and signal means effecting an audible or visual signal on downward movement of the support member to a predetermined extent.

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2. The crushing machine as claimed in claim 1 in which the valve means includes a pair of spring-loaded metal flaps, said flaps normally extending substantially across the full cross section of the inlet chute.

3. The crushing machine as claimed in claim 2 in which the valve means also includes a strip curtain of resilient material at an intermediate position along the length of the inlet chute.

4. The crushing machine as claimed in claim 3 in which the rotor includes a disc, with the blades being disposed radially on one face of the disc.

5. The crushing machine as claimed in claim 4 in which the internal periphery of the crushing chamber is polygonal thereby providing a series of angular faces against which the articles are crushed by the action of the blades.

6. The crushing machine as claimed in claim 1 in which the outlet from the chamber includes a horizontal receptacle receiving a hollow spout extending tangentially from the chamber, the spout having an open-

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ing in the underside thereof, and a deflector deflecting crushed material from the chamber downwardly through the opening.

7. The crushing machine as claimed in claim 6 in which the receptacle is a valve sack, a tubular inlet on the valve sack for location over the spout, and a resilient coil spring retaining the valve sack inlet around the spout.

8. The crushing machine as claimed in claim 1 including means for cutting off the drive to the rotor on downward movement of the support member to the predetermined extent.

9. The crushing machine as claimed in claim 1 in which the support member includes a fixed plate, a plate hingedly mounted at one end to the fixed plate, at least one spring between the fixed plate and the hinged plate, and a micro-switch between the fixed and hinged plates actuable when the spring loading is overcome.

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