May 9, 1933. C. A. JAMISON 1,908,021

CRUSHING MACHINERY

Filed Feb. 9, 1931

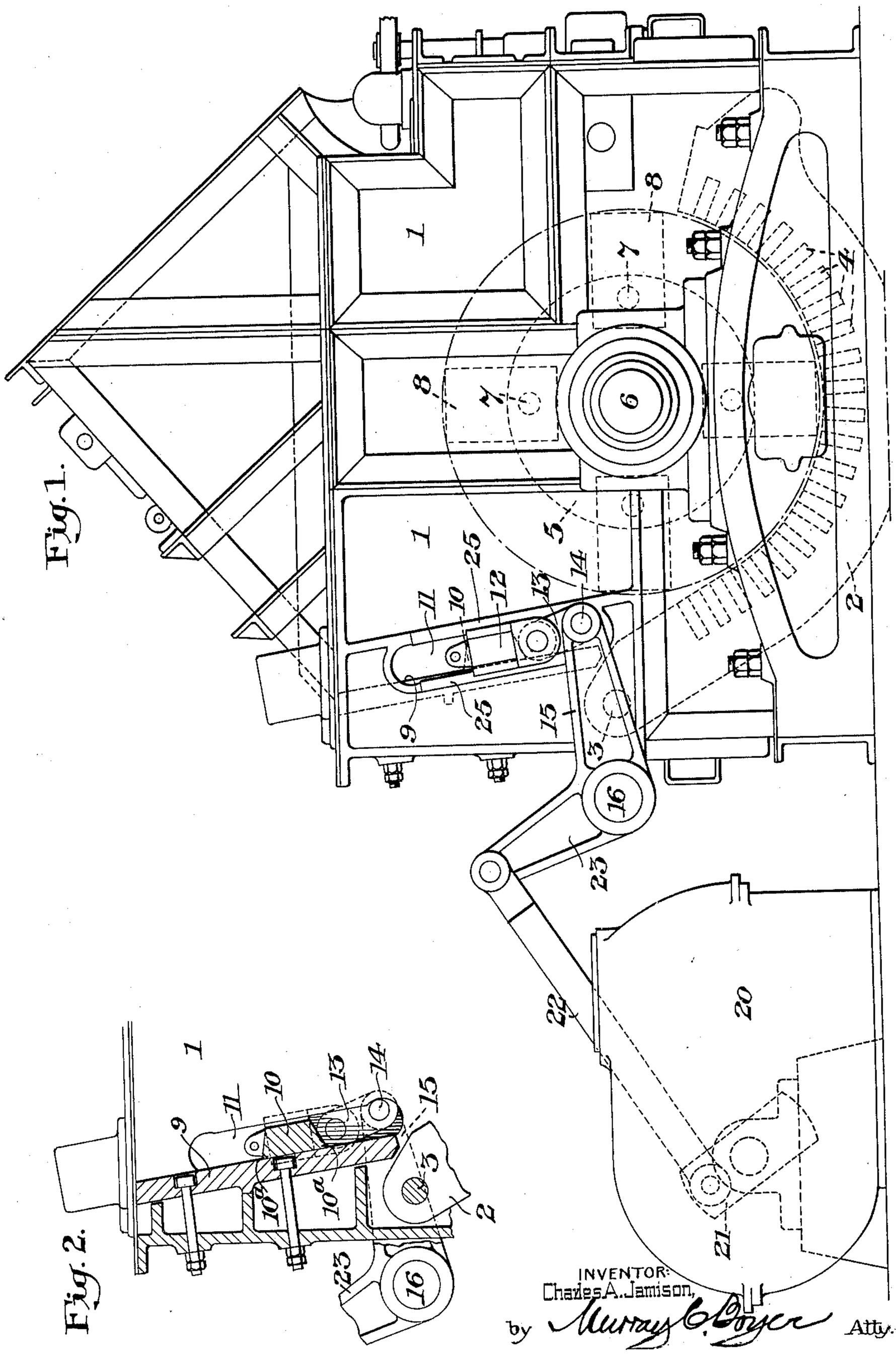

Fig. 1.

Fig. 2.

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Patented May 9, 1933

1,908,021

UNITED STATES PATENT OFFICE

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CRUSHING MACHINERY

Application filed February 9, 1931. Serial No. 514,577.

This invention relates to crushing machinery of the type employing rotor structures carrying hammers which engage material delivered into their path and effect breakage or rupture thereof by hurling the same against a breaking surface (or surfaces) forming one wall or part of one wall of the crushing chamber.

In the crushing of raw material of various kinds, it is common to find material containing a high moisture content, and various materials which are to be crushed, are frequently stored under such weather conditions as to absorb additional moisture.

In the crushing of material in a wet or moist condition, a mass of highly viscid mud builds up on the breaking surface (or surfaces) and seriously impairs the capacity of the machine. The main object of this invention therefore is to provide means that will prevent this building up of a body of sticky or slimy material, mud, and/or the like, upon such breaking surface (or surfaces).

Another object of the invention is to provide a sliding member or scraping blade arranged to be reciprocated over the breaking surface against which the material is hurled by the rotating hammers.

And a still further object of my invention is to provide means for imparting proper reciprocative movement to the scraping blade.

These and other features of my invention are more fully described hereinafter; reference being had to the accompanying drawing, in which:

Figure 1 is a side elevation of a crushing structure with which may be employed the improved scraping mechanism within the scope of this invention, and

Fig. 2 is a sectional elevation of a portion of the breaking surface; showing the scraping blade in operative position with respect to the breaking surface.

In the present instance the improved scraping means and operating mechanism therefor have been applied to a crushing structure of usual type, employing a hammer-carrying rotor of usual character, arranged within a crushing chamber whose lower portion is defined by a cage or screen pivotally mounted within the frame and carrying the usual bars or members with which the hammers of the rotor cooperate.

The frame of the crushing structure is indicated generally at 1, having a cage or screen comprising side frames 2, pivotally mounted at 3, and carrying the usual cross-bars 4. The rotor structure may be of usual type comprising a series of disks 5, mounted on a shaft 6; said disks supporting rods 7 from which hammers 8 are hung.

Carried by an end wall of the frame is a breaker plate 9 which may be of any usual type; in the present instance shown as inclined slightly from the vertical and disposed above the cage or screen. The material to be crushed is fed through the usual chute or hopper opening at the upper portion of the frame and is hurled against this breaker plate and partly broken by impact thereon; further breaking or reduction being effected by the hammers 8 cooperating with the cross-bars 4 of the cage or screen.

When material carrying a large moisture content is being reduced, considerable difficulty is had in keeping the breaking surface clean. In practice, a wall of mud builds up on such breaking surface, and such wall being so much less hard than the normal breaking surface, there is practically no breaking by impact, and unless removed, the breaker plate will become so clogged with this mud as to destroy the efficiency of the machine and in some instances completely stop its operation by clogging the hopper.

To overcome the difficulty occasioned by the wet or damp portion of the material building up on the breaking surface, I propose to employ a reciprocating scraping bar or blade 10, clearly illustrated in Figs. 1 and 2; which blade is reciprocated over the breaking surface. The ends of the blade or supports therefor extend through openings 11 formed in the side walls of the crusher frame. This blade may be provided with end brackets or supports 12, pivotally attached to links 13, which links are connected at 14 to bell-crank levers 15, pinned or otherwise con-

nected to a shaft 16 externally disposed and extending across the end of the machine. Upon rocking shaft 16, the scraper blade 10 will be reciprocated across the breaking surface. Preferably this blade is provided with cutting edges 10a, so that as it is moved back and forth it will actually cut away and remove the mud tending to build up on such breaking surface. It will be understood, of course, that the reciprocative movement of the scraper blade is continuous while the machine is in operation.

For the purpose of driving the rock shaft 16, which is operatively connected to the scraping blade 10 and serves to effect movement of the latter, I provide a motor 20, whose shaft carries a crank arm 21, connected by link 22 to an arm 23, carried by rock shaft 16, and such arm 23 may be an extension of one of the bell-crank levers. The connection between the several parts is such that proper adjustment may be made so as to vary the speed and/or the extent of the stroke of the scraper blade.

In the present arrangement, with the side walls of the frame making up the hammer structure slotted at 11 for the passage of the scraper blade, slide ways 25 may be provided for guiding the brackets 12.

While I have illustrated a crushing structure having an inclined breaking surface, it will be understood that the angle of such breaking surface may be changed as may be desired and that crushing structures having breaking surfaces with other degrees of angularity may be equipped with the scraping blade operated by means disposed externally of the frame or casing of the machine. In like manner such blade may be operated in connection with a breaking surface vertically disposed.

I claim:

1. The combination, in crushing machinery of the rotary beater type, of a casing or frame having a breaking surface, a scraping blade disposed within said casing and having end connecting portions; the walls of said casing being slotted adjacent to the breaking surface for the passage of said end connections, arms pivotally connected at one end to the casing and at the opposite end to said scraping blade, and means for moving said arms whereby said scraping blade may be reciprocated across the breaking surface.

2. The combination, in crushing machinery of the rotary beater type, of a casing or frame having slotted side walls, a rotor structure having hammers disposed within said casing, a breaking surface against which material undergoing crushing may be thrown by the action of the said hammers, a movable scraping blade disposed within said casing and movable therein across said breaking surface; said blade having end portions extending through the slotted sides of said casing, and means disposed externally of the machine and operatively connected to said end portions for effecting movement of said scraper blade.

In witness whereof I have signed this specification.

CHARLES A. JAMISON.