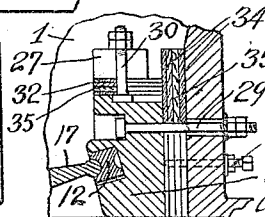
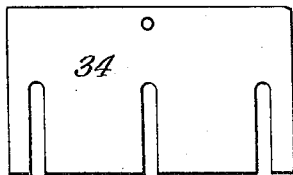
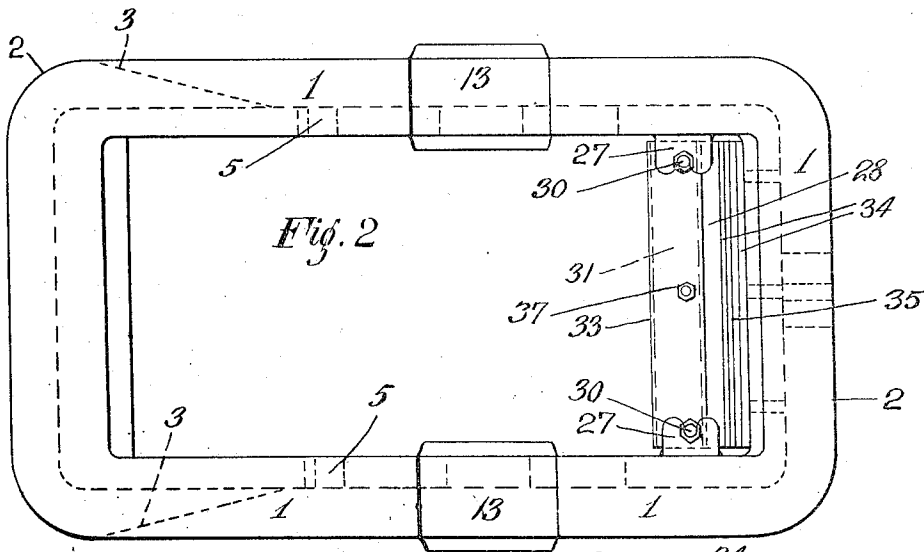
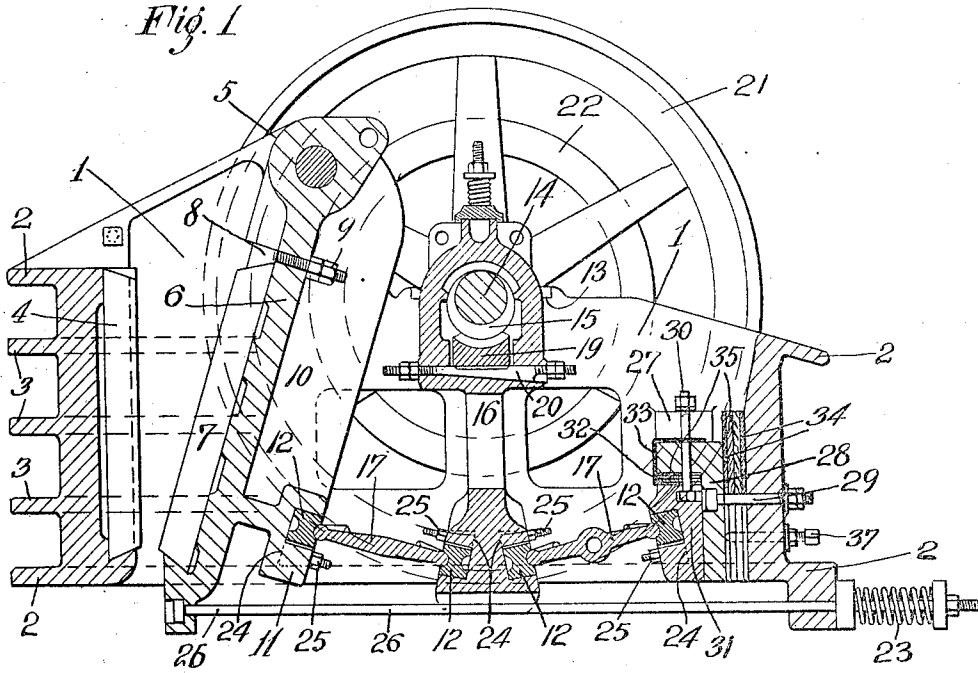


APPLICATION FILED OCT. 30, 1907. RENEWED SEPT. 28, 1910.

Patented June 18, 1912.




 38 Inventor
 Charles G. Buchanan
 By my Attorneys
 Edwards, Sager & Wooster.

UNITED STATES PATENT OFFICE.

CHARLES G. BUCHANAN, OF BROOKLYN, NEW YORK.

CRUSHING-MACHINE.

1,029,910.

Specification of Letters Patent.

Patented June 18, 1912.

Application filed October 30, 1907, Serial No. 399,882. Renewed September 28, 1910. Serial No. 584,309.

To all whom it may concern:

Be it known that I, CHARLES G. BUCHANAN, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Crushing-Machines, of which the following is a full, clear, and exact specification.

This invention relates to crushing machines and has particular reference to an improved frame construction as well as improvements in the adjustments for taking up wear and varying the distance between the jaws, whereby the position of the movable jaw can be varied by moving an abutment block mounted on the frame in such manner that the crushing strain is transmitted to the frame independently of the attachments for holding the block in the frame.

A further object of the invention is to provide a one piece frame, preferably of cast iron or steel, and in conjunction therewith to provide a novel form of cushioning means whereby the shock will not tend to crystallize the material of the frame and eventually cause its fracture.

It has heretofore been proposed to construct crusher frames of a single casting, but many failures of such frames have occurred in practical use either by reason of inherent defects in their design or by crystallization of the metal due to rapid shocks to which the frames are subjected, or else the strain causes the toggle block abutments and fastenings to be broken.

The invention will be more fully understood in connection with the accompanying drawings, wherein—

Figure 1 is a longitudinal cross section of a crushing machine made according to my invention; Fig. 2 is a plan view showing the frame; Fig. 3 is a detail view showing one of the shims or liners for adjusting the jaws; and Fig. 4 is a detail showing a modified abutment for the toggle.

1 represents a frame somewhat in the general form of a rectangular ring having flanges 2 at top and bottom and at the crushing end, intermediate flanges 3 extending across the end and part way along the sides to the other end beyond the movable jaw. The forward end of the frame is provided with seats in which a vertical reversible fixed jaw 4 is mounted, and at the top, in-

intermediate the ends in raised standards, are bearings 5 carrying a transverse shaft on which the movable jaw frame 6 is mounted. This enables the lower crushing portion of the jaw to have a larger movement without having an excessive arc. The jaw frame 6 swings from the upper end and carries a jaw plate 7 which is also reversible and is retained in the jaw frame by a wedge 8 and nuts 9. The wear comes principally at the lower side of the jaw plate and it is therefore advisable to mount it so that it can be reversed in order to equalize the wear. The swinging jaw frame 6 is provided with vertical stiffening ribs 10 and at its lower end has a transversely extending bearing box 11 carrying a toggle block 12. The frame 1 is provided with bearing seats 13 in which the main shaft 14 is mounted, and held down by caps of the usual construction. The shaft 14 is provided with an eccentric 15 which operates a pitman 16. The lower end of the pitman 16 also carries bearing blocks 12 on its opposite sides which are connected by toggle plates 17 with the movable jaw and the rear end of the frame. The wear at the eccentric may be taken up by means of an adjustable bearing block 19 and a wedge 20. 21 is a flywheel, 22 a driving pulley. Connecting the lower end of the movable jaw 6 and a lug at the rear end of the machine is a rod 26 having a spring 23 normally tending to hold the movable jaw against the toggles and the frame. The toggle blocks 12 are each mounted in slots respectively in the fixed jaw, the pitman and the end of the frame, which slots are wider at the bottom than at the top and contain wedge blocks 24 which are pushed outward by screws 25 in order to lock the wedge blocks in their seats.

Another feature of the invention resides in the construction of the fixed abutment for the actuating toggle at the rear end of the frame, and the means for adjusting the abutment so as to vary the distance between the jaws in order to crush different sizes of material. The frame 1 adjacent the rear end is provided with lugs 27 projecting toward each other and having horizontal underfaces, and supported beneath these lugs between the sides of the frame is an L-shaped rectangular block 28 which is held against the rear vertical face of the frame by one or more bolts 29. Carried by bolts

30 and the lugs 27 is a vertically adjustable rectangular block 31 which is provided with T-shaped slots receiving the heads of the bolts 30. In order to avoid having the strain come on bolts or other adjustable fastenings the distance between the block 31 and the overhanging portion of the block 28 is varied by means of shims or liners 32 which are slotted so as to permit withdrawal without removing the bolts 30. To hold the shims against separation an angle plate 33 held by bolts 30 is provided. By removing one or more of the shims or adding others, the block 31 can be moved up or down and thereby the distance between the jaws varied and also the angle of the toggle itself. In some instances, it is desirable to vary the distance between the jaws without affecting the angle of the toggle and this may be by means of vertical shims or liners 34 which are interposed between the block 28 and the rear side of the frame. By reason of the vertical and horizontal faces of the abutment block, and the interposed liners, the strains come directly on the lugs 27 or on the rear end of the frame, and the bolts merely position the blocks, without being themselves subjected to any crushing strains. In a machine of this character, the frame is subjected to continual vibration, by reason of the impact of the reciprocating jaw on the material being crushed, and this vibration tends to crystallize the material of the frame and eventually cause it to fracture. In order to prevent this, and at the same time to provide a firm and practically unyieldable abutment, I interpose between the toggles and the rear end of the frame a cushion or shock absorbing liner 35. As herein shown, this liner is made of one or more layers of wood having the grain crossed to increase the durability and interposed between the two liners 34. It is not essential that this particular arrangement be followed, but it has been found satisfactory in practice. The wood or non-metallic liner prevents the transmission of destructive vibrations to the frame, and thereby prevents crystallization without being resilient and thereby reducing the crushing effect. It will be seen that all of the crushing strain is transmitted through this non-metallic liner. It will also be seen that by this arrangement of parts, no strain is applied to the bolts themselves, which simply hold the blocks in position, all of the strain being transmitted by the shims which have a large amount of superficial area. In order to permit the insertion or removal of the liners, a set screw 37 is provided which passes through the block 28. By turning this screw the block 28 can be pushed away from the liners against the tension of spring 23 thus relieving the compression and permitting the liners to be pulled out or others inserted.

The same arrangement may be applied to the block 28 so as to lower the sliding block 31.

Fig. 4 shows a modified construction wherein the blocks 28 and 31 are made in a single rectangular block 38 with slots adjacent the ends for receiving the heads of bolts 30 and also the bolts 29. In this form, the liners 32, 34 and 35 are disposed as before, except that the former come between the lugs 27 and the edge of block 38. All the strain however, is transmitted directly to the frame, as before.

It is thought that the operation of the machine will be clear from the foregoing description, power being applied to the shaft 14 and material being fed in at the top between the movable and fixed jaw.

It will be seen that all of the parts subjected to wear are readily renewable, and also that the shock will be taken up by the frame without injurious vibration. By reason of the sets of vertical and horizontal liners and block surfaces, the distance of the jaws can be quickly and readily adjusted, without requiring parts which will be subjected to deterioration in the operation of the machine.

The invention is not to be restricted to the particular construction herein described, since various modifications and changes may be made without departing from the scope of the invention.

Having thus described my invention, I declare that what I claim as new and desire to secure by Letters Patent, is,—

1. In combination with a frame of a crushing machine, an abutment block, means for adjustably supporting said block relative to said frame including one or more shims disposed in a substantially vertical plane, one or more shims disposed in a plane transverse to the vertical, and an angle plate for retaining the latter shim or shims, crushing means, and means for operating said crushing means and bearing against said abutment block.

2. In a crushing machine, the combination with a frame having sides and front and rear ends about an interior opening, lugs extending from opposite sides of said frame into the interior thereof, a movable crushing jaw mounted on said frame, means for moving said jaw to perform the crushing operation, an abutment block against which said means bears, said block being beneath said lugs and thrusting against said lugs and the rear end of said frame, said block having a vertical rear bearing-surface so that it may slide vertically on the surface against which it contacts, and one or more shims interposed between said block and said lugs, substantially as described.

3. In a crushing machine, the combination with a rectangular open frame having interior abutment projections adjacent the

rear end, and a vertical face on the rear
end adjacent and below said projections, of
a relatively stationary jaw mounted at the
front end of said frame, an intermediately
5 mounted swinging jaw, toggle means for
actuating said swinging jaw disposed be-
tween said swinging jaw and the rear end
of the frame, an adjustable abutment block
engaged by the rear end of the toggle and
10 located adjacent said vertical face of the
rear end of the frame and below said abut-
ment projections, and shims interposed be-
tween the upper surface of the block and
the interior abutment projections and the
15 rear surface of the block and the vertical
face of the rear end of the frame for inde-
pendently adjusting the block and toggle
vertically and horizontally.

4. The combination with a frame of a
20 crushing machine, of an abutment block, an
L shaped block interposed between said abut-
ment block and said frame, and means for
adjustably supporting said abutment block
by said frame comprising shims interposed

between one leg of said L shaped block and 25
said frame and shims interposed between
said abutment block and the other leg of
said L shaped block.

5. The combination with a frame of a
crushing machine, of an abutment block, an 30
L shaped block interposed between said abut-
ment block and said frame, said L shaped
block having one leg vertical and the other
leg horizontal, lugs extending from the sides
of said frame, bolts extending through the 35
end of said frame and into the vertical leg
of said L shaped block, bolts extending
through said lugs and into said abutment
block, shims between the horizontal leg of
said L shaped block and said abutment block 40
and shims between the vertical leg of said
L shaped block and said frame.

In testimony whereof I affix my signa-
ture, in presence of two witnesses.

CHARLES G. BUCHANAN.

Witnesses:

JULIAN S. WOOSTER,
GEO. A. HOFFMAN.