

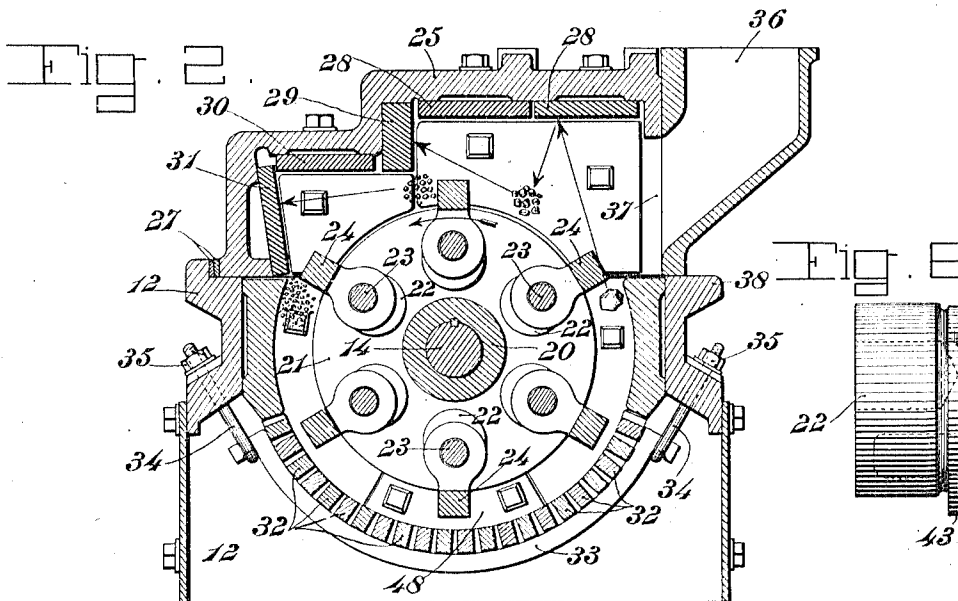
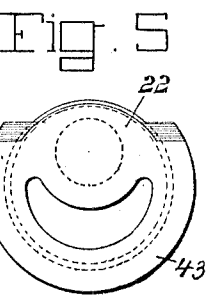
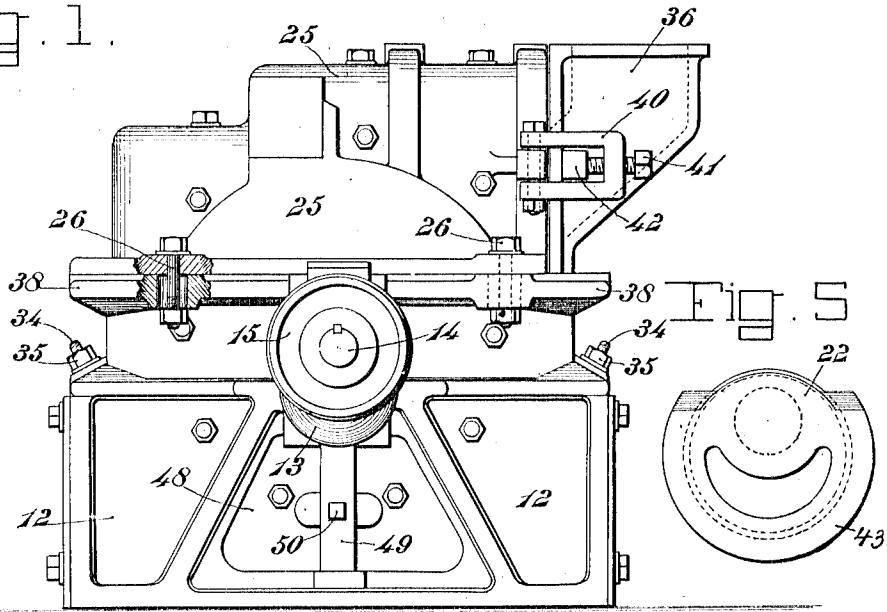
T. J. STURTEVANT.
 CRUSHING OR PULVERIZING MILL.
 APPLICATION FILED MAY 22, 1912.

1,120,250.

Patented Dec. 8, 1914.

2 SHEETS-SHEET 1.

Fig. 1.



Witnesses:
Harry King
C. M. Sweeney

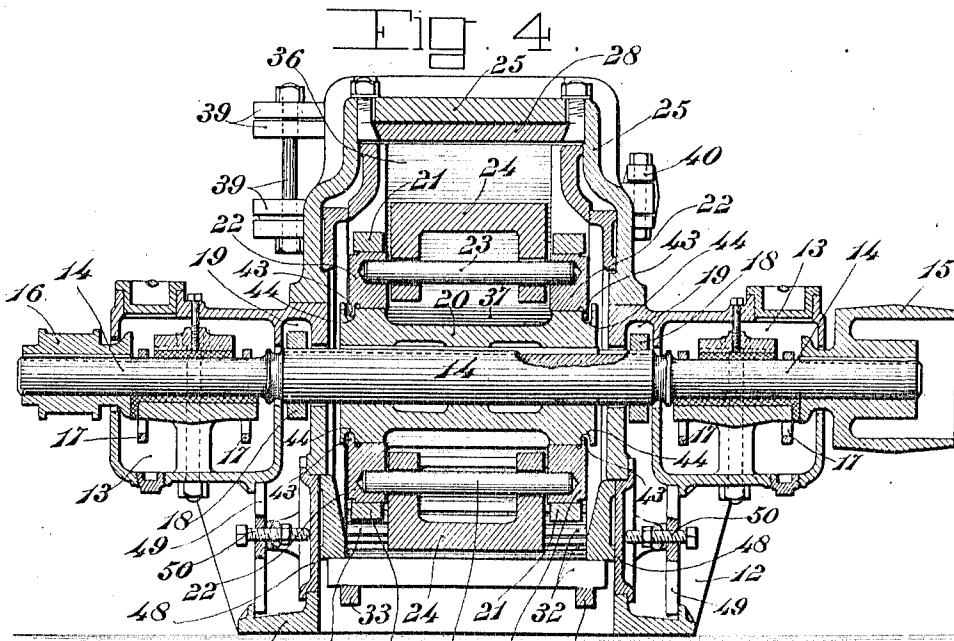
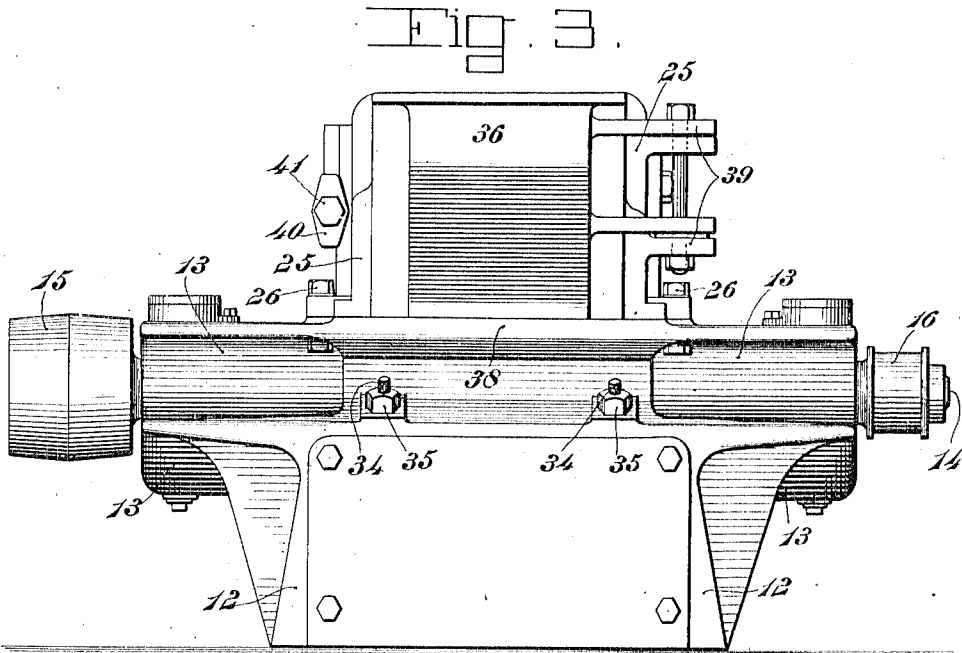
Inventor:
Thomas J. Sturtevant
 by *Calvin Kalor*
 Attorneys.

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2 SHEETS—SHEET 2.



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Harry King
C. M. Sweeney

Inventor:
Thomas J. Sturtevant
 by *Robert Kalow*
 Attorneys.

UNITED STATES PATENT OFFICE.

THOMAS JOSEPH STURTEVANT, OF WELLESLEY, MASSACHUSETTS, ASSIGNOR TO
STURTEVANT MILL COMPANY, A CORPORATION OF MAINE.

CRUSHING OR PULVERIZING MILL.

1,120,250.

Specification of Letters Patent.

Patented Dec. 8, 1914.

Application filed May 22, 1912. Serial No. 699,048.

To all whom it may concern:

Be it known that I, THOMAS J. STURTEVANT, a citizen of the United States, residing at Wellesley, in the county of Norfolk and State of Massachusetts, have invented or discovered certain new and useful Improvements in Crushing or Pulverizing Mills, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to that class of crushing or pulverizing mills employing rotary beaters or hammers in the form of pivotally mounted U-shaped swinging bars or bails, and the invention has for its object to improve the efficiency of mills of this class.

In carrying the invention into effect the rotary beaters of the improved machine are pivotally mounted on pins which are in turn eccentrically supported by bushings loosely mounted in flanges of a rotating head, so that said beaters will be yieldingly mounted, thereby affording a certain flexibility in the operation of said beaters which contributes to their efficiency as also to their durability, in that the strain and wear thereon is lessened. Also in the improved machine the casing thereof is formed in two parts, the lower part supporting a screen formed of grate bars and the rotary shaft which carries the beaters, while the upper part of the casing, which carries the breaking or impact plates, is adjustably mounted relative to the lower part of the casing, so that the positions of the breaking plates may be changed somewhat relative to the rotating beaters. The feed hopper is preferably hinged to the upper portion of the casing, so that it may be opened or swung aside, like a door, to afford convenient access to the interior of the mill, when desired, and the beaters are rotated in such a direction that incoming material will first be hurled against the breaking plates in the upper portion of the casing before it is carried toward the grate bars in the lower portion of the casing.

In the accompanying drawings Figure 1 is an end view of the improved machine; Fig. 2 is a transverse section thereof; Fig. 3 is a side view of the machine, and Fig. 4 is a vertical longitudinal section of the same. Figs. 5 and 6 are detail views of one of the loosely mounted disks or bushings.

Referring to the drawings, the casing of the machine comprises a lower or bed portion 12 provided with dust-proof boxes 13 inclosing the bearings for the driving shaft 13 provided at one end with a driving pulley 15, and at its opposite end with a smaller pulley 16. The hollow bearing boxes afford chambers to contain a lubricant for the driving shaft, and which lubricant is carried to said shaft by oiling rings 17. The shaft 14 is preferably provided with collars 18 which are received in downwardly opening chambers or recesses 19 outside of the end portions of the casing or bed 12, said collars serving as stops for any dust or grit which may work outward from the chamber of the mill, so as to protect the shaft bearings from such dust or grit. Said collars also serve to prevent oil from the bearings in the boxes 13 from working inward to the chamber of the mill, as any oil reaching said collars is discharged therefrom by centrifugal action and escapes from the bottom of the chambers or recesses 19.

Splined to the shaft 14 is a head 20 having flanges 21 in which are loosely mounted disks or bushings 22 socketed for the pivot pins 23 of the cranked or U-shaped beaters 24, these loosely mounted disks or bushings 22 thus affording yielding supports for the said beaters and their pivot-pins.

The upper portion 25 of the casing is adjustably attached to the lower portion thereof by suitable bolts, as 26, which pass through slotted openings in the lower part of the casing, and the position of said upper part of the casing may be varied, relative to said lower part, and to the rotary beaters, when the said bolts are loosened, by means of shims 27, a greater or lesser number of which may be inserted between the two casing parts, as more clearly shown in Fig. 3. The said upper part of the casing is provided with liners or breaking plates 28, 29, 30 and 31. The liners 28, against which the incoming material is first hurled, constitute the first breaker, the liner 29 the second breaker, and the liner 31 the third breaker, these several breakers being arranged at different angles relative to the radii of the circular path of travel of the beaters; so that the material to be crushed will be hurled against them as nearly at right angles as possible, as indicated by the arrows in Fig.

2, and will thus be more effectively crushed than would be the case if it were to strike these breakers with glancing blows.

In the lower portion 12 of the casing is mounted a screen composed of the grate bars 32 which rest on curved supporting bars 33 the ends of which are hooked into eye-bolts 34 provided at their tops, outside of the casing, with nuts 35 which are conveniently accessible for tightening the supporting bars 33 and the grate bars resting thereon, when necessary.

The material to be crushed is fed to the machine through a hopper 36 the lower open portion of which registers with an opening 37 in the upper portion 25 of the casing, the said hopper resting on a ledge or shelf 38 afforded by the lower part of the casing. The said hopper 36 is preferably mounted on hinges 39 so that it may be opened or swung aside horizontally, like a door, to afford access to the chamber of the casing. The hopper is secured in working position by a swinging U-shaped latch 40 pivotally mounted on the casing 35, and provided with a securing screw 41 engaging a lateral projection 42 on the hopper.

Each of the disks or bushings 22 is provided at its outer side with a locking flange 43 to prevent endwise movement of said disk or bushing and which locking flange is interrupted or cut away at one side or part. The flanges 43 are received in annular grooves 44 formed in the heads 20. The said disks or bushings may be inserted in or removed from the flanges 21 of the heads 20 by turning said disks or bushings to such positions as to cause the cut-away parts of their flanges to register with the small lips 47 on the heads 20, outside of the grooves 44, as will be understood. Access to the chamber of the lower part 12 of the casing is afforded by side openings or hand holes each of which is closed by a removable cover 48 held in place by a locking bar 49 and set screw 50. By loosening said set screw and then partially turning said locking bar to release it from engaging projections on the frame, the said cover will be free to be removed.

From the foregoing it will be understood that when the mill is in operation the incoming material will be acted on by the rotary beaters, and will be projected or hurled against the breaking plates or breakers, and will be reduced, not only by impact of the material against the breakers, but by direct crushing blows delivered by the rotary beaters. There is also a shearing breaking action between the lower edges of the breaking plates 29 and 31 and the peripheral edges of the U-shaped swinging beaters 24 and which peripheral edges extend parallel, or approximately so, to the said edges of said plates; and this shearing breaking action

may be varied by adjustment of the upper casing part, in which said plates are mounted, relative to the lower casing part in which the beater-carrying shaft 14 is mounted. The swinging beaters also cooperate with the heavy grate bars 32 in the reduction of the material. In view of the fact that the said beaters are yieldingly supported on the rotating head 20, through the loose disks or bushings 22, it will be obvious that the hammers can yield more or less in delivering their blows, and thus the strain which might otherwise come upon them, if pivotally but otherwise unyieldingly mounted, as heretofore, on the rotating head or part by which they are carried, is greatly lessened. Also by adjusting the upper portion of the casing containing the breakers or breaking plates, relative to the lower portion of the casing, and to the path of travel of the rotating beaters, the second breaker 29 and the third breaker 31 may be brought into such desired relation to the hammers as will be most efficient in the crushing or pulverizing operation, and the positions of the other breakers may also be somewhat changed. This cooperative action of the U-shaped swinging beaters 24 and the adjustable breakers or breaking plates will be readily understood from Figs. 2 and 4 of the drawings. These U-shaped swinging beaters have extended outer peripheral edges which are disposed parallel, or approximately so, transversely of the machine, with the inner corners or edges of the breakers or breaking plates 29 and 31 mounted on the adjustable casing part 25, so that by varying the distance between the parallel, or approximately parallel, transversely extended opposing surfaces of said beaters and cooperating breaking plates the shearing breaking action of these parts may be rendered most efficient for the material being operated on by the proper adjustment according to the character of such material.

The invention is not to be understood as being limited to the details herein shown, as the rotating beaters might be yieldingly supported otherwise than by the particular loosely mounted disks or bushings herein shown and described, without departing from the spirit of the invention.

Having thus described my invention I claim and desire to secure by Letters Patent:

1. In a crushing mill, the combination with a rotary shaft, of a head fixed thereto and provided with flanges, socketed disks or bushings loosely mounted in said flanges so as to be free to turn, pivot pins mounted in said socketed disks or bushings, and swinging beaters carried by said pivot pins.

2. In a crushing mill, the combination with a rotary shaft, of a head fixed thereto and provided with flanges, socketed disks or bushings loosely mounted in said flanges so

as to be free to turn, pivot pins mounted in said socketed disks or bushings, and swinging beaters carried by said pivot pins, the said heads being provided with grooves and the said socketed disks or bushings being provided with locking flanges engaging said grooves.

3. In a crushing mill, the combination with a horizontally divided casing the upper part of which is adjustable horizontally relative to the lower portion, of breakers or breaking plates mounted on said upper adjustable casing part, a rotary shaft mounted

in the lower portion of said casing, U-shaped swinging beaters operated from said shaft and having extended peripheral edges which are parallel, or approximately so, to the faces or edges of said breakers or breaking plates.

In testimony whereof I affix my signature, 20
in presence of two witnesses.

THOMAS JOSEPH STURTEVANT.

Witnesses:

W. F. ELLIS,

L. J. STURTEVANT.