Sept. 8, 1925. 1,553,293

T. J. STURTEVANT

SLEDGE MILL

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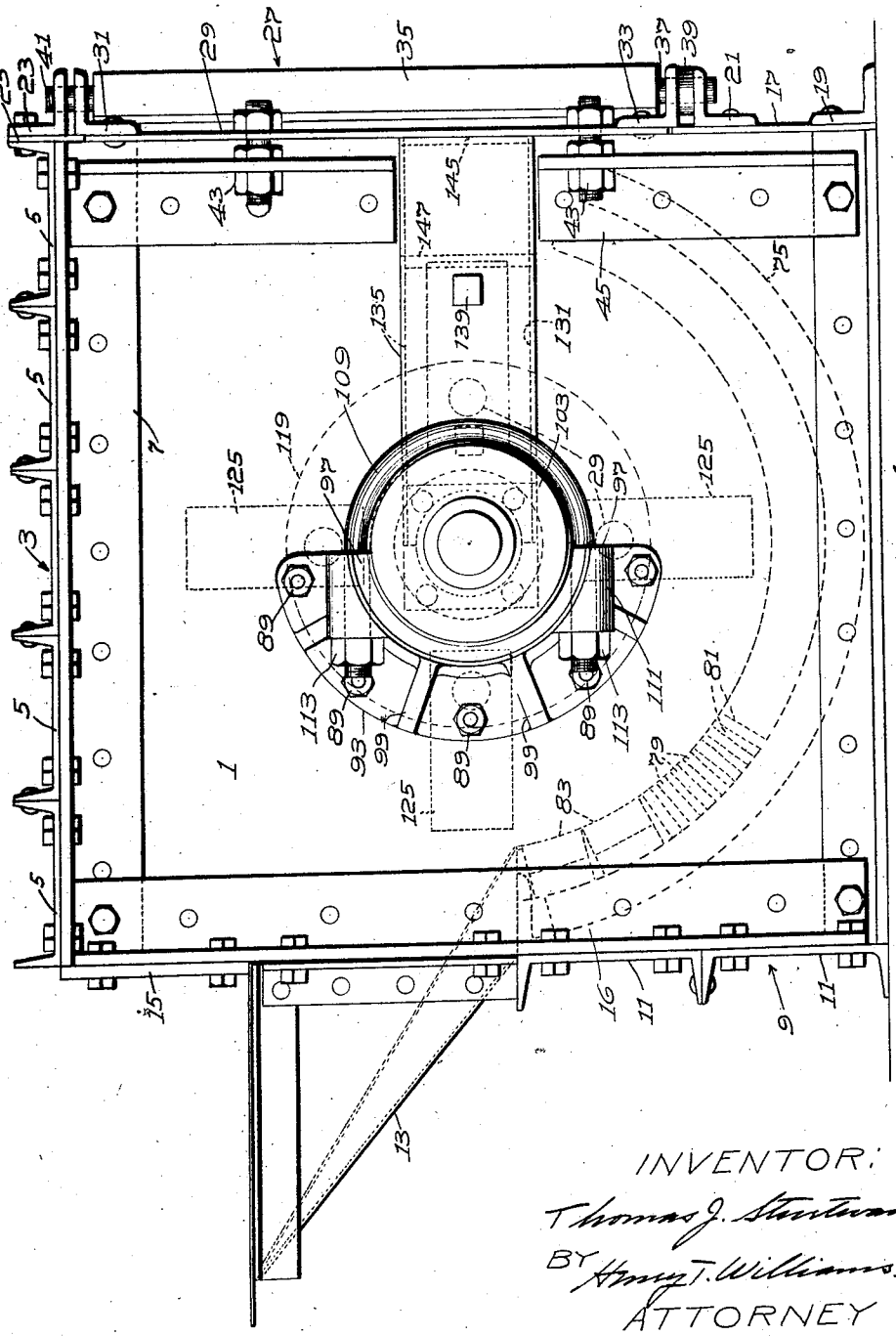


Fig. 1

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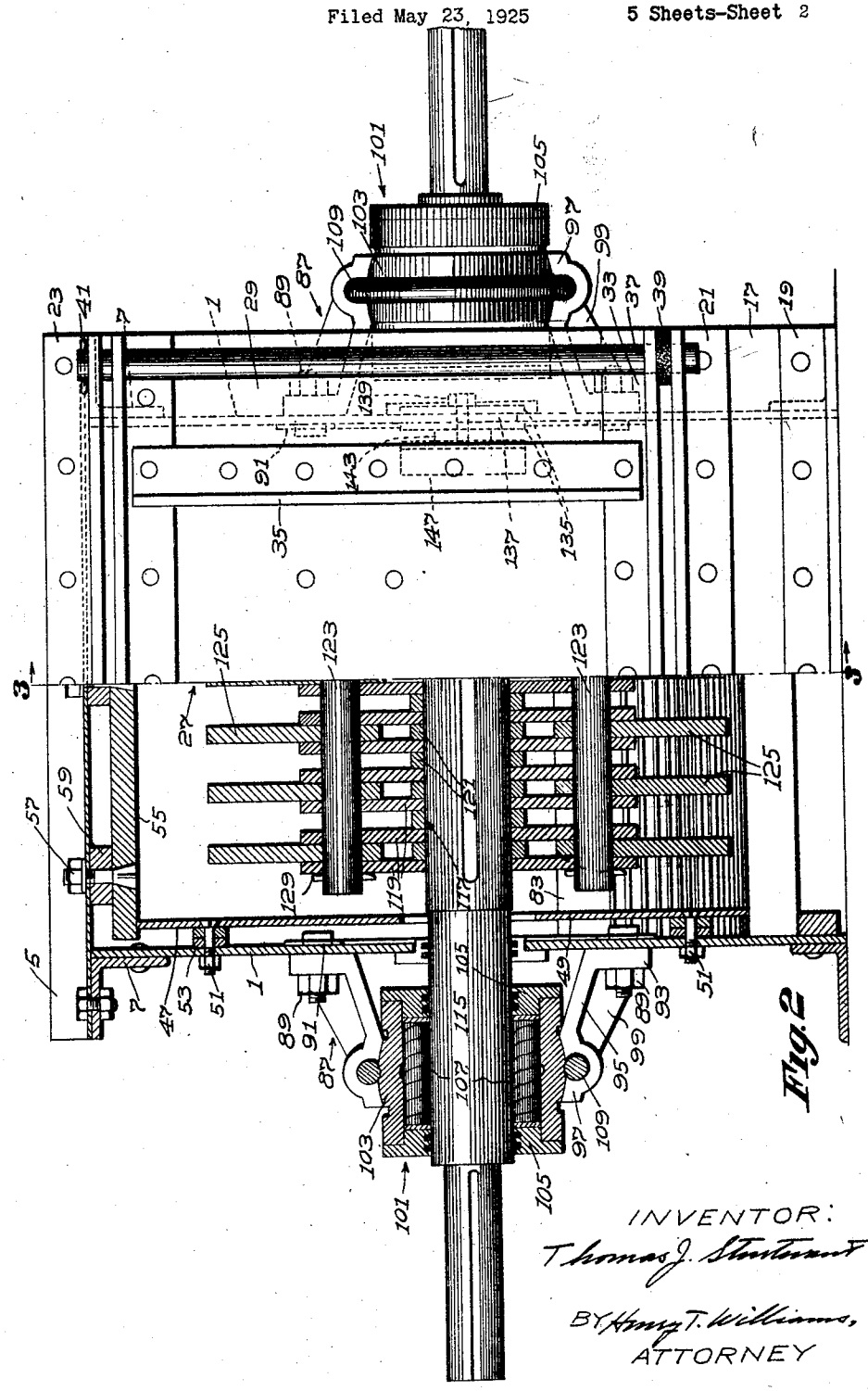


Fig. 2

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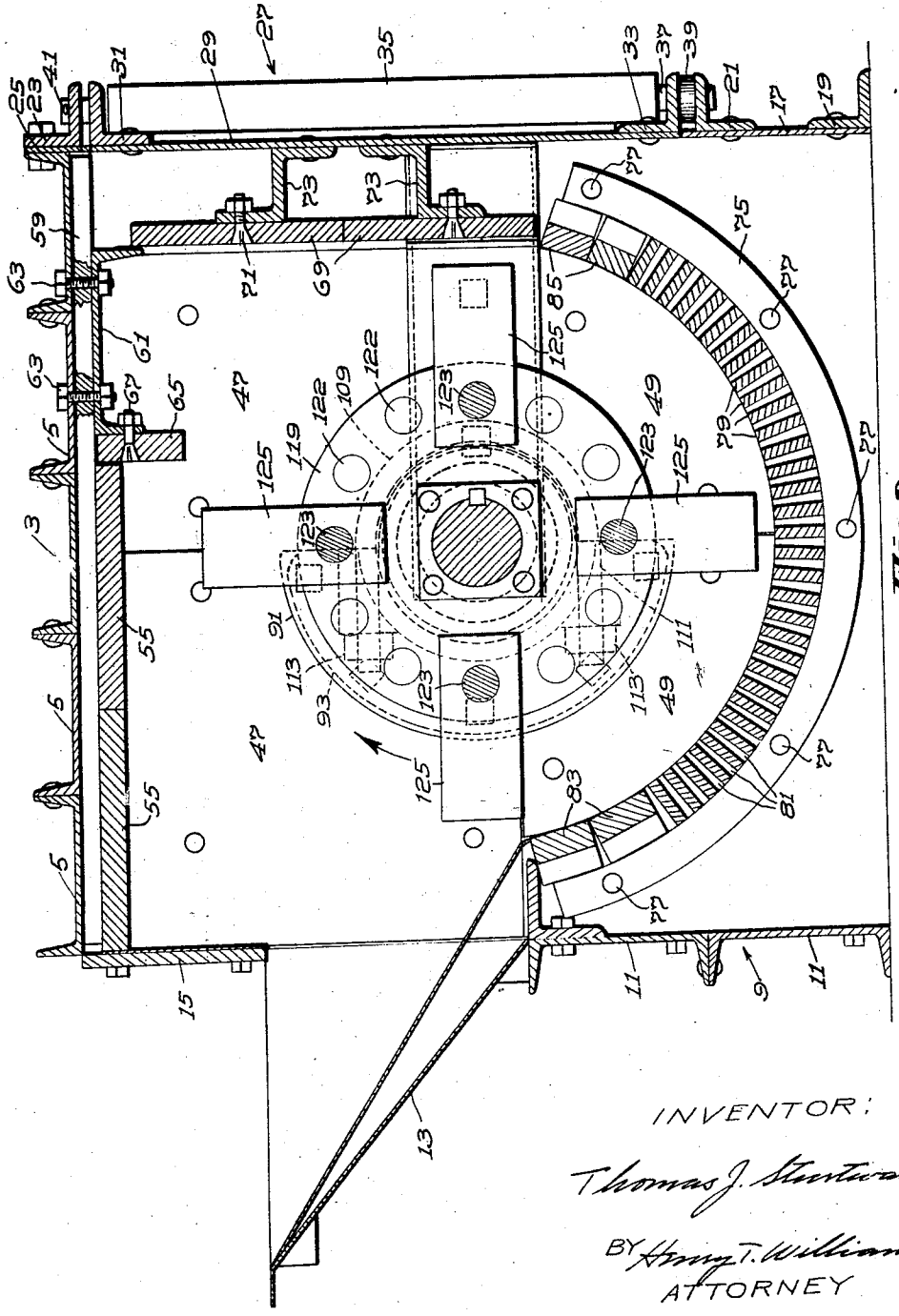


Fig.3

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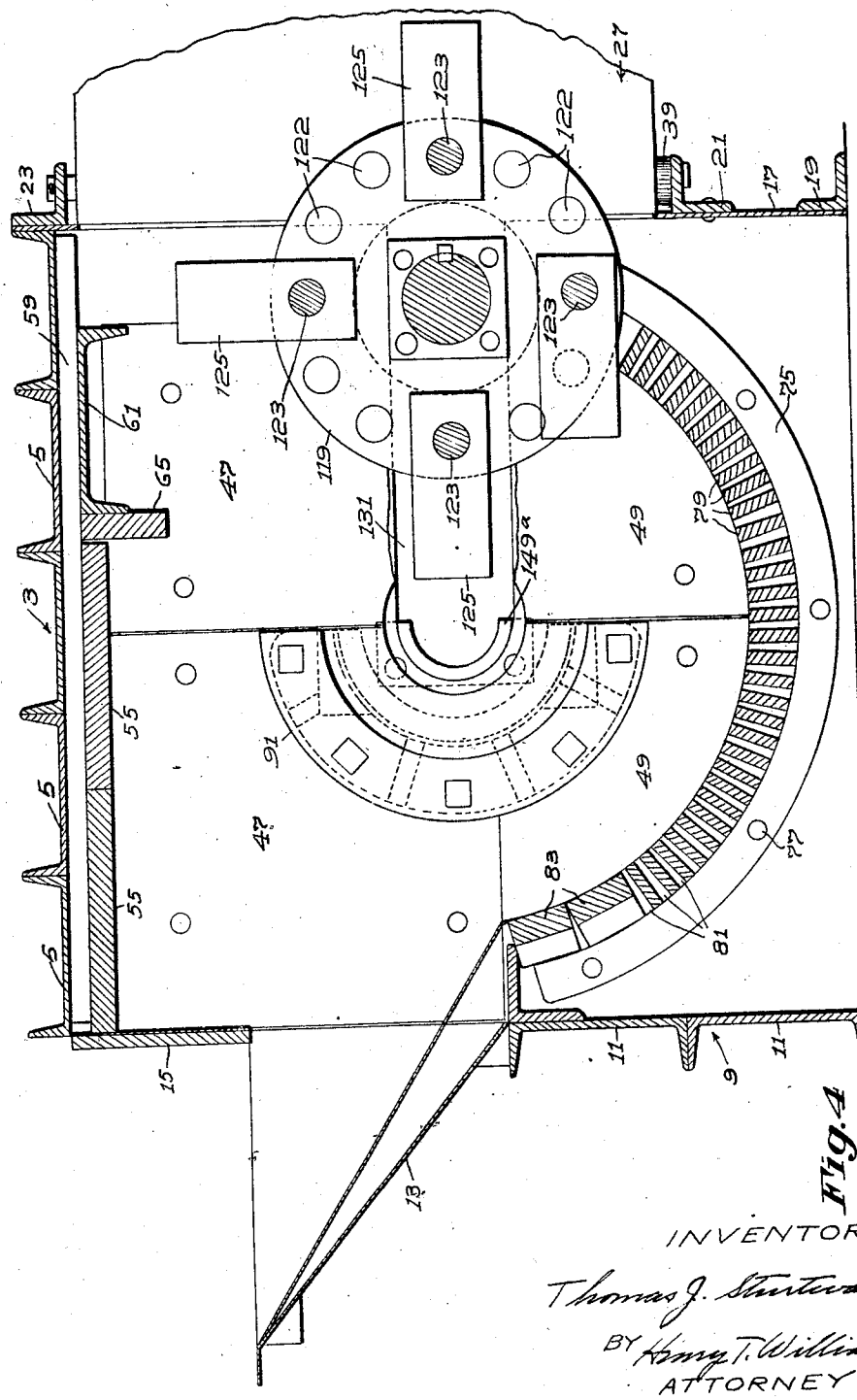


Fig. 4

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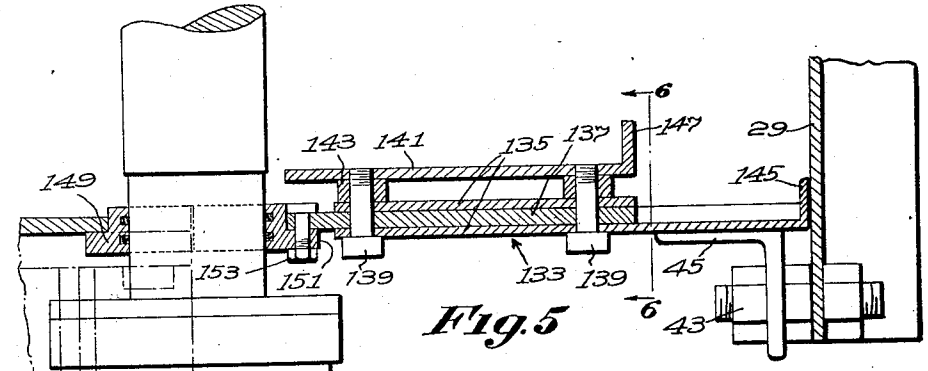
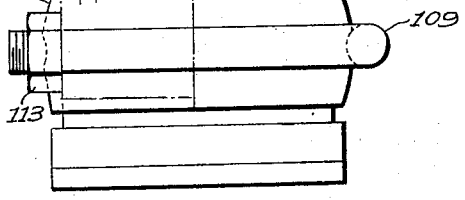


Fig.5



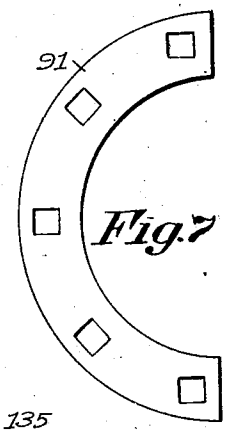


Fig.7

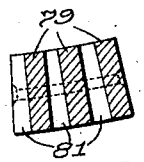


Fig.9

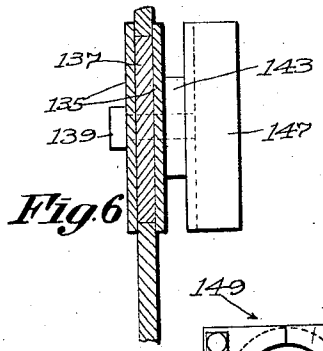


Fig.6

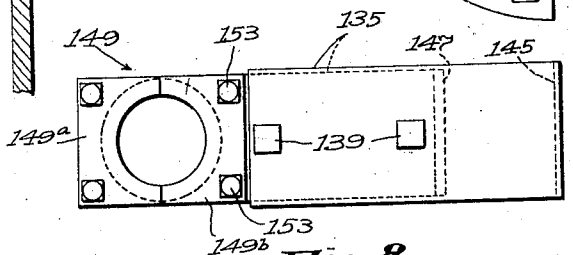


Fig.8

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Patented Sept. 8, 1925. 1,553,293

UNITED STATES PATENT OFFICE.

THOMAS J. STURTEVANT, OF WELLESLEY, MASSACHUSETTS, ASSIGNOR TO STURTEVANT MILL COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

SLEDGE MILL.

Application filed May 23, 1925. Serial No. 32,390.

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 certain new and useful Improvements in Sledge Mills, of which the following is a specification.

The invention to be hereinafter described relates to sledge mills of the type in which rotary sledges or hammers are employed for reducing materials.

One of the purposes of the invention is to provide a mill having a casing formed of sheet steel stiffened to give the mill adequate strength to withstand the hard usage which these mills experience.

Another purpose of the invention is to provide a mill having sheet steel sides and lining plates spaced from said sides and secured thereto, the construction being such that outward bulge or distortion of the lining plates will not be shared by the sides of the casing.

Another purpose of the invention is to provide a mill having provision enabling ready access to the hammers for the purpose of adjusting the same or substituting new hammers for old ones, and having provision permitting the shaft carrying the hammers and the bearings for said shaft to be readily introduced to and removed from the casing.

Another purpose of the invention is to provide a mill having grate bars which may readily be introduced into the casing or removed therefrom.

With the aforesaid and other purposes in view, the character of the invention may be best understood by reference to the following description of one good form thereof shown in the accompanying drawings, wherein:

Fig. 1 is a side elevation of a sledge mill embodying the invention;

Fig. 2 is a view partly in front elevation and partly in vertical section of the mill;

Fig. 3 is a vertical transverse section taken on line 3—3 of Fig. 2;

Fig. 4 is a view similar to Fig. 3 showing the door in open position and the shaft and hammers carried thereby slid outward to furnish ready access to the hammers;

Fig. 5 is a horizontal section through a portion of the casing and one of the slides;

Fig. 6 is a vertical section taken on line 6—6 of Fig. 5;

Fig. 7 is a side view of a keeper receiving the bolts for securing one of the bearing brackets to the casing;

Fig. 8 is a side elevation of the slide and split collar; and

Fig. 9 is an end view of a group of grate bars and spacers.

Referring to the drawings, the sledge mill shown therein as one good form of the invention, comprises a casing having opposed sides 1 formed of sheet steel, and an upper side 3 (Figs. 1, 3 and 4) formed of channels 5 extending side-by-side with their flanges riveted together, said upper side 3 being connected to the sides 1 by angle irons 7 secured by rivets to the sides 1 and by bolts to the upper side.

The rear side 9 (Fig. 3) of the casing comprises a pair of channels 11 having flanges riveted together and above the rear side is a chute 13 formed of sheet metal, and closing the space above the chute is a plate 15. The channels 11, chute 13 and plate 15 are secured by bolts to upright angle bars 16 secured by rivets to the side plates 1.

At the front of the casing is a plate 17 (Figs. 1, 2 and 3) secured by rivets to a base angle bar 19 and to an angle bar 21. Above the angle bar 21 at the top of the casing is an agle bar 23 secured by bolts to a channel of the upper side of the casing, a spacing plate 25 being interposed between said angle bar and channel.

The space between the angle bars 21 and 23 is normally closed by a door 27 comprising a sheet steel plate 29, an upper angle bar 31, and a lower angle bar 33 having flanges secured by rivets to the plate 29. The door is stiffened by upright angle bars 35 secured by rivets to the plate 29. A vertical hinge shaft 37 projects through holes in the door angle bars 31 and 33 and through registering holes in the angle bars 21 and 23. A spacing washer 39 is interposed between opposite flanges of the angle bars 31 and 33, and the shaft is prevented from dropping through the holes by a pin 41 resting upon one of the flanges of the angle bar 23. The

door is held in closed position by bolts 43 (Fig. 5) entered through the door plate 29 and an upright angle bar 45 secured by rivets to one of the sides 1.

Upper lining plates 47 (Fig. 3) and lower arc shaped lining plates 49 are provided for the sides 1, and are secured thereto by bolts 51 having heads flush with the inner face of the lining plates, the latter being spaced from the sides 1 by bars 53 through which the bolts 51 extend.

Lining plates 55 are provided for the upper side 3 of the casing, and are secured thereto by bolts 57 having heads which are flush with the inner surfaces of said plates, said lining plates being spaced from the upper side by bars 59 through which the bolts extend. A channel 61 (Fig. 3) is provided beneath the upper side, and is secured thereto by bolts 63, said channel being spaced from the upper side by the bars 59 referred to. A baffle plate 65 is interposed between the channel 61 and one of the lining plates 55, and is secured to a flange of the channel by bolts 67.

Lining plates 69 are connected by bolts 71 to Z-bar brackets 73 secured by rivets to the inner face of the door plate 29. The heads of the bolts 71 are flush with the inner face of the door lining plates 69.

Since all of the lining plates are detachably supported by bolts, they may be readily removed when they become worn and others substituted therefor. The lining plates are spaced from the sides and from the door, and consequently any distortion which they may experience in the use of the mill will not be imparted to the outer sides or the door of the casing.

A pair of curved grate support bars 75 (Figs. 2 and 3) are secured by bolts 77 to the sides 1 of the casing, and said bars are spaced from the arc shaped lining plates 49 referred to. A series of grate bars 79 are mounted on the support bars 75 and have ends in the space between the arc shaped plates 49 and the support bars 75. Between the bars at the ends thereof are spacers 81. These bars and spacers are arranged in groups (Fig. 9), the bars and spacers of each group being secured together by curved rivets. Between the chute and the end of the grate adjacent thereto are a pair of wide bars 83. Between the door lining plate 69 and the end of the grate adjacent thereto are a pair of wide bars 85. These bars 83 and 85 are for the purpose of filling spaces at the ends of the grate.

Bearing brackets 87 (Fig. 2) are secured by bolts 89 to the sides 1 of the casing, and said bolts pass through square holes 90 in keepers 91 (Fig. 7) placed against the inner faces of the side walls 1. Said keepers prevent the bolts from turning when their nuts are set up. Each of the brackets has a base 93 from which projects a collar 95 carrying a curved seat 97, and strengthening ribs 99 extend from the base to the seat.

Mounted in the curved seats of the brackets are self-alining Hyatt roller bearings 101, each comprising a housing 103 having ends 105 provided with grooves for receiving packing. Rollers 107 are mounted in the housing between the ends 105 thereof.

The bearings are retained in the open seats of the brackets by yokes 109 which have legs entered through bosses 111 on the brackets, the end portions of the legs being threaded to receive nuts 113. The construction is such that the bearings may be laterally presented to the seats of the brackets, and the legs of the yokes may be inserted in the bosses. Then the nuts may be set up tightly against ends of the bosses, thereby to draw the yokes into close embracing engagement with the bearings and hold the latter securely in the brackets. When it is desired to remove the bearings from the brackets, this may be quickly and easily accomplished by releasing the nuts and withdrawing the yokes from the brackets.

Journalled in the bearings 101 is a shaft 115 having a carrier 117 fast thereon comprising a series of collars 119 spaced by washers 121. These collars have holes 122 therein through which pass rods 123. Series of sledges or hammers 125 have holes therein through which the rods 123 pass, said hammers being mounted between the collars 119. The rods have cotter pins 129 at the opposite ends thereof, the construction being such that the rods may be withdrawn from the collars and hammers when it is desired to remove the latter from their carrier.

The holes 122 in the collars are located at different radial distances from the shaft, and thus permit the hammers to be disposed at different radial distances from the shaft. This is of advantage in permitting the hammers to be adjusted outwardly after they have become worn to prolong the service thereof.

An important feature of the invention relates to the construction of the mill which provides for ready access to the hammers and the parts associated therewith. To accomplish this, the sides 1 of the casing are provided with elongated openings 131 (Figs. 1 to 4) which are normally closed by covers, in the present instance in the form of slides 133 (Figs. 1 to 5). Each of these slides comprises a pair of plates 135 which are somewhat wider than the opening 131, and between said plates is a plate 137 of the same width as the opening. The plates 135 and 137 are secured together by screw bolts 139 which also carry a lining plate 141 which is spaced from the inner plate 135 by washers 143 on the bolts 139. The outer plate 135 is somewhat longer than the inner

plate, and extends to the door of the casing where it has an inturned flange 145 which serves as a handle. The lining plate 141 may also have an inturned flange 147 which almost meets the door when closed.

Mounted on the shaft are split collars 149 (Fig. 8) comprising parts 149ª and 149ᵇ and having grooves for receiving packing. The collar parts 149ª are riveted to the sides 1 of the casing. The collar parts 149ᵇ have flanges 151 which overlap the intermediate plates 137 of the slides and are secured thereto by bolts 153.

The construction is such that after the door has been easily swung on its vertical hinge shaft to its open position, the handles 145 of the slides may be grasped, and the slides together with the collar parts 149ᵇ may be pulled outward. This enables ready access to be had to the hammer carrying rods 134 through one or the other of the elongated openings 131 in the sides 1 of the casing. The operator may reach in through one of the openings 131 and remove the cotter pins 129 from one of the rods 123. Then he may pull the rod from the carrier out through the other opening, and thereby remove from the carrier the hammers carried by the rod. The operator may progressively turn the carrier to bring the other rods in line with the openings, so that the hammers on said rods may be removed in a manner similar to that just described.

If it is desired to repair the shaft or the bearings, ropes may be looped about the end portions of the shaft which project beyond opposite sides of the casing, and the loops may be rigged to form a sling for supporting the shaft. Then the yokes 109 may be removed from the brackets, and the shaft, the bearings and the carrier thereon may be swung outward past the door, and in the course of this movement, the shaft will pass through the elongated openings 131. It is necessary to support the shaft in some suitable fashion in removing the same from the casing, since the shaft and the parts carried thereby are of heavy, massive construction. However, the construction is such that the shaft can be quickly and easily removed from the casing and returned thereto. After the shaft has been removed, the bearings may be readily slid along to the ends of and off from the shaft, if desired. Before the shaft is removed from the casing the wide bars 85 and the group of grate bars adjacent thereto are removed from the casing in order that they may not interfere with the passage of the hammer carrier.

The door is so large that when it is open, ready access may be had to the lining plates for the purpose of removing the same and substituting new ones for the worn ones. Since the plates 69 are mounted on the door, they are carried out from the casing when the door is swung to open position, and thus said plates are conveniently accessible for the purpose of removing the plates from the door and substituting new ones for the old ones.

When the door is open, ready access may be had to the grate bars which may be readily slid outward along their supporting bars, and new ones may be easily substituted for old ones.

The casing has a large base which enables the mill to be mounted with stability on its foundation.

The construction of the mill is such that, if desired, it may be shipped in knock-down form to the place where it is to be used. When the parts of the mill reach their destination, they may be quickly and easily assembled. To accomplish this, the sides of the casing are bolted together, the chute is bolted to the rear side, the door is presented to the casing and its hinge shaft is placed in position, the grate bars are introduced in groups through the door opening and slid along their support bars into position, the bearing brackets are bolted to sides of the casing, the shaft with the hammer carrier and bearings thereon are introduced to the casing as described, and the yokes are applied to secure the bearings to their supporting brackets.

In use the materials to be reduced are fed along the chute 13 into the casing. The shaft is rotated in a clockwise direction (Fig. 3), and the hammers smash against the materials and batter them against the linings of the upper side of the casing, against the baffle 65 and against the door lining 69. The materials are reduced by these impacts, and are further reduced as the hammers swipe past the grate. When the materials have been reduced to sufficient fineness, they pass down through the spaces between the grate bars, and are delivered through the open bottom of the casing.

It will be understood that the invention is not limited to the specific embodiment shown, and that various deviations may be made thereform without departing from the spirit and scope of the appended claims.

What is claimed is:

1. A sledge mill comprising, in combination, a casing having a door, bearing brackets mounted at opposed sides of the casing and remote from said door, bearings carried by said brackets, a shaft journalled in said bearings, a carrier on the shaft having holes therein, rods entered through said holes, hammers mounted on said rods, said opposed sides of the casing having openings therein, and covers normally closing said openings and adapted to be opened, thereby to give access to the rods for removing the same through said openings from the carrier.

2. A sledge mill comprising, in combina-

tion, a casing having a hinged door, bearing brackets mounted at opposed sides of the casing and having yokes detachably connected thereto, bearings secured by said yokes to said brackets, a shaft journalled in said bearings, a carrier on the shaft, hammers mounted on the carrier, openings in said opposed sides of the casing extending from the shaft to the door, and covers normally closing said openings and adapted to be opened to permit the bearings, shaft and carrier to be moved out from the casing.

3. A sledge mill comprising, in combination, a casing having a door hinged thereto, and at one side thereof bearing brackets mounted at opposed sides of the casing, bearings, means detachably to secure the bearings in the brackets, a shaft journalled in said bearings, a carrier on the shaft, hammers mounted on the carrier, said carrier and hammers being located within the casing away from the door, said opposed sides of the casing having openings therein extending from the shaft to the door, and covers normally closing said openings.

4. A sledge mill comprising, in combination, a casing having a door, bearings at opposed sides of the casing, a shaft journalled in said bearings, a carrier on said shaft, hammers connected to the carrier, a side of the casing having an opening therein sufficiently large to permit the hammers to be removed therethrough from the casing, and a cover normally closing said opening.

5. A sledge mill comprising, in combination, a casing having a door, bearings at opposed sides of the casing, a shaft journalled in said bearings, a carrier on said shaft, hammers connected to the carrier, said sides of the casing having openings therein, covers normally closing said openings and adapted to be moved, thereby to furnish ready access to the hammers, and lining plates for the interior of the casing including lining plates secured to the covers and movable therewith.

6. A sledge mill comprising, in combination, a casing having a door hinged thereto on a vertical axis, brackets secured to opposed sides of the casing and having lateral openings facing the door, bearings carried by said brackets, means detachably to secure the bearings to the brackets, a shaft journalled in said bearings, hammers carried by the shaft, said opposed sides of the casing having openings extending from the shaft to the door, and plates normally closing the openings and adapted to be opened to permit the shaft to be moved in a direction transverse to the length thereof through said openings out from the casing.

7. A sledge mill comprising, in combination, a casing having a side formed of separate channels secured together, lining plates at the interior of the casing secured to said side and spaced therefrom sufficiently to prevent distortion of said plates from being imparted to said channels, a door for the casing, bearings at opposed sides of the casing, a shaft in said bearings, and hammers carried by said shaft.

8. A sledge mill comprising, in combination, a casing having a side formed of channels, a lining secured to and spaced from said side, a door at one side of the casing, a lining secured to and spaced from the door, bearings at opposed sides of the casing, a shaft journalled in said bearings, and hammers carried by said shaft.

9. A sledge mill comprising, in combination, a casing having an upper side formed of channels, a door for one side of the casing, lining plates secured to and spaced from said upper side and door, bearings at opposed sides of the casing, a shaft journalled in said bearings, and hammers carried by said shaft.

10. A sledge mill comprising, in combination, a casing having a side formed of separate channels secured together, a door for the casing, bearings at opposed sides of the casing, a shaft journalled in said bearings, hammers carried by the shaft, and a grate in said casing beneath said shaft.

11. A sledge mill comprising, in combination, a casing having an upper side formed of channels having their flanges riveted together, a door for the casing hinged thereto on a vertical axis, bearings at opposed sides of the casing, a shaft journalled in said bearings, hammers carried by the shaft, and a chute at a side of the casing opposite the door for conducting materials into the interior of the casing.

12. A sledge mill comprising, in combination, a casing having a side formed of channels, a lining secured to said side, a door for the casing, a lining secured to the door, supports secured to opposed sides of the casing, grate bars mounted on said supports, bearings at said opposed sides of the casing, a shaft journalled in said bearings, and hammers carried by said shaft and movable past said grate bars, said grate bars being movable transversely along said supports out through the door opening.

13. A sledge mill comprising, in combination, a casing having a door, bearing brackets at opposed sides of said casing, bearings mounted in said brackets, a shaft journalled in said bearings, hammers carried by said shaft, openings in opposed sides of the casing extending from the shaft to the door, slides normally covering said openings and movable to uncover the same, and split collars on the shaft, each having a part secured to one of the slides.

14. A sledge mill comprising, in combination, a casing having a door, bearing brackets at opposed sides of said casing,

bearings mounted in said brackets, a shaft journalled in said bearings, hammers carried by said shaft, openings in opposed sides of the casing extending from the shaft to the cover, slides normally covering said openings and movable to uncover the same, and split collars on the shaft, each having a part secured to the casing and a part secured to a slide.

15. A sledge mill comprising, in combination, a casing having a door, brackets mounted on opposed sides of the casing at the exterior thereof, bearings mounted in said brackets, a shaft journalled in said bearings and extending through said opposed sides of the casing, hammers carried by the shaft, and collars on the shaft at opposed sides of the casing and having provision for packings to prevent escape of material from the interior of the casing along the shaft.

16. A sledge mill comprising, in combination, a sheet steel casing having a door, brackets at opposed sides of the casing and at the exterior thereof, bolt keepers opposed to said brackets at the interior of the casing, bolts entered through said opposed sides of the casing, brackets and keepers, bearings mounted in the brackets, a shaft journalled in said bearings, and hammers carried by the shaft.

17. A sledge mill comprising, in combination, a casing, brackets secured to opposed sides of the casing, bearings carried by said brackets, a shaft journalled in said bearings, hammers carried by said shaft, said opposed sides of the casing having openings extending from the shaft to the door, two part collars on the shaft, slides connected to parts of said collars and normally closing said openings, said slides being movable toward the door to enable ready access to the hammers.

18. A sledge mill comprising, in combination, a casing having a door hinged thereto on a vertical axis, bearings at opposed sides of the casing, a shaft journalled in said bearings, and hammers carried by the shaft, said hammers being wholly within said casing, said opposed sides of the casing having openings extending from the shaft to the door, and said shaft being movable through said openings toward the door to enable ready access to the hammers.

19. A sledge mill comprising, in combination, a casing having a door hinged thereto on a vertical axis, and elongated openings in opposed sides of said casing, bearings located exteriorly of the casing, a shaft extending through said openings and journalled in said bearings, means on said shaft for reducing materials, said shaft being laterally movable through said openings toward the door, and means normally closing the portions of said openings not occupied by the shaft.

20. A sledge mill comprising, in combination, a casing having a door at one side thereof, bearings at opposed sides of the casing, a shaft journalled in said bearings, a carrier on the shaft, rods on the carrier extending parallel to the shaft, hammers mounted on the rods, said casing having an opening adjacent the end of the carrier and separate from the door opening through which the rods may be drawn longitudinally to remove the hammers from the carrier, and means normally closing said opening.

21. A sledge mill comprising casing sides, a door, a chute, grate bars, bearing brackets, a shaft, a carrier on the shaft, and hammers on the carrier, said parts being constructed and arranged so that they may be shipped in knock-down form and readily assembled at their destination.

THOMAS J. STURTEVANT.