

No. 761,334.

PATENTED MAY 31, 1904.

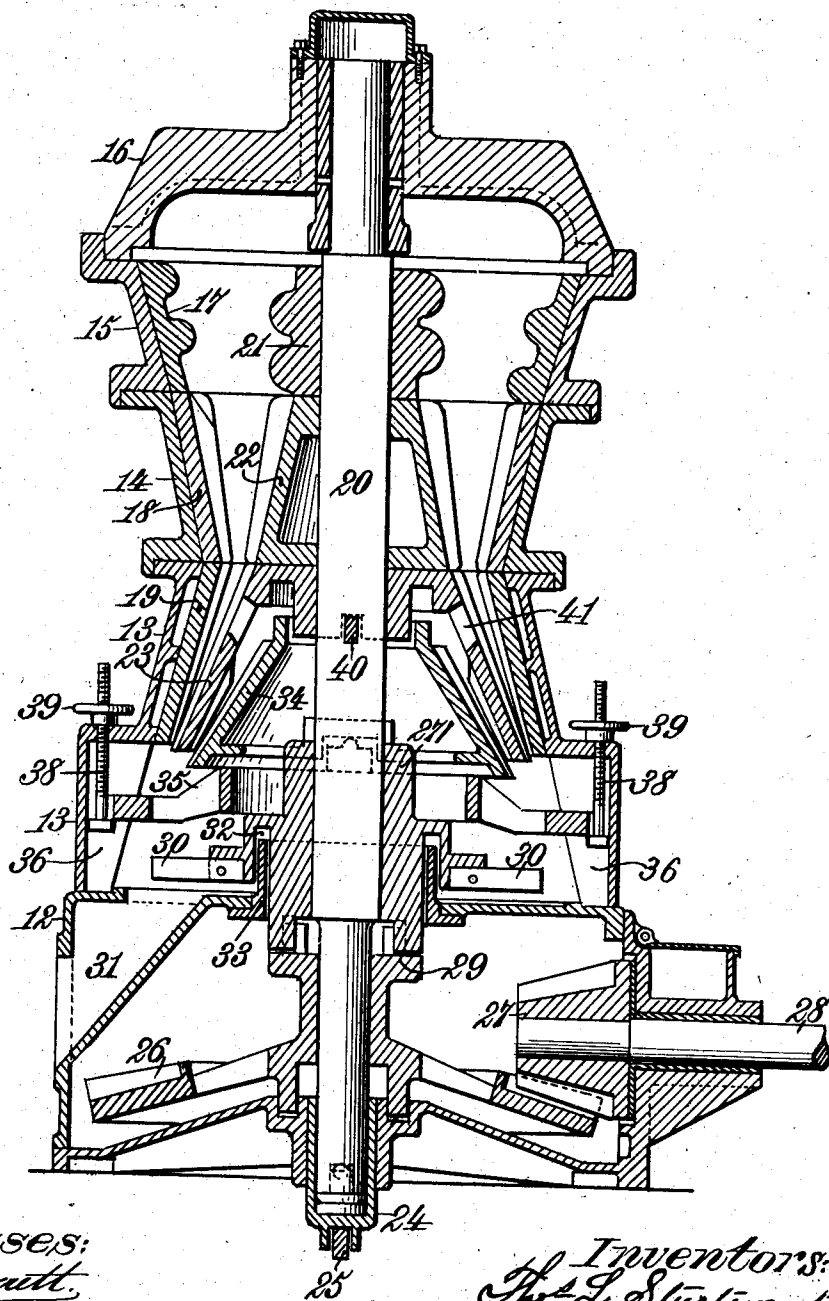
T. L. & T. J. STURTEVANT.
VERTICAL CRUSHING AND GRINDING MILL.

APPLICATION FILED APR. 29, 1903.

NO MODEL.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses:
Robert Smith
J. D. Kluge

Inventors:
T. L. Sturtevant
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by [Signature] Attorney

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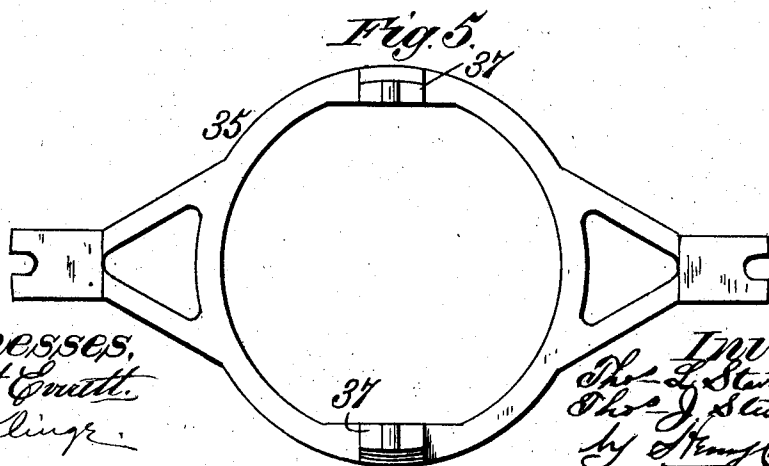
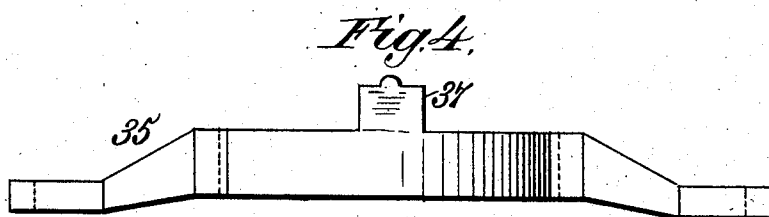
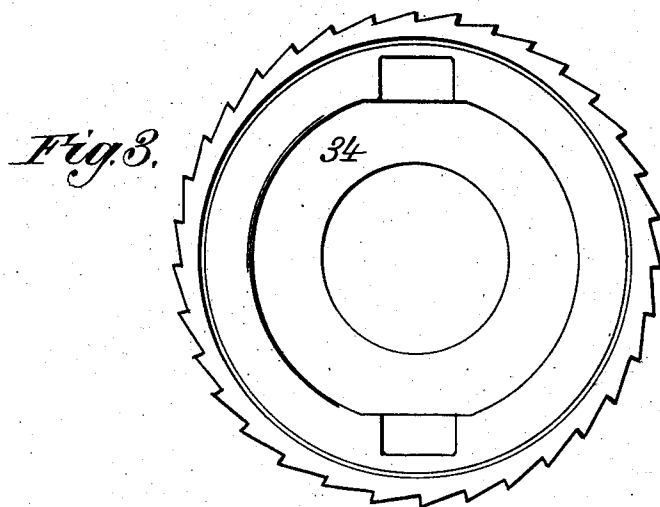
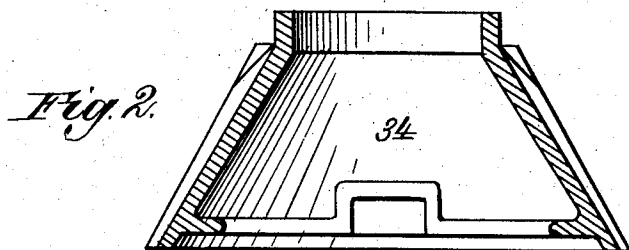
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NO MODEL.

3 SHEETS—SHEET 2.



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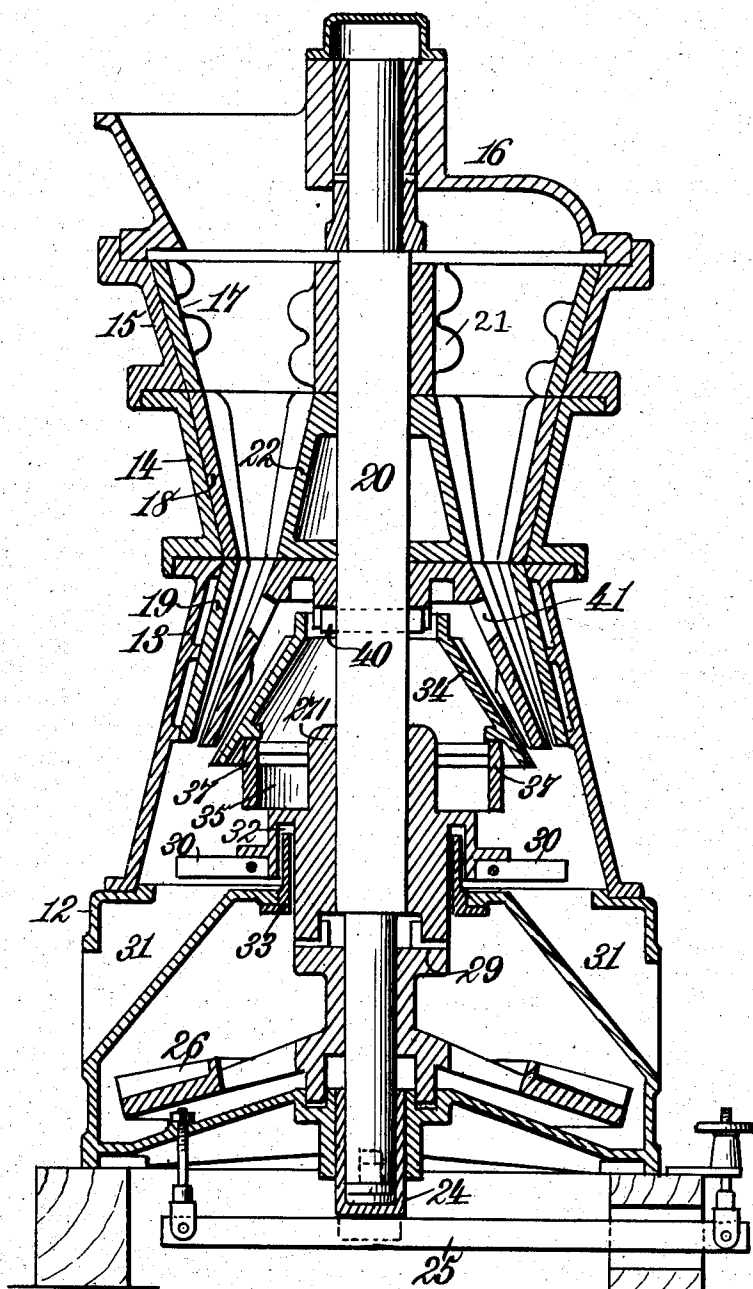
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NO MODEL.

3 SHEETS—SHEET 3.

Fig. 6.



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UNITED STATES PATENT OFFICE.

THOMAS L. STURTEVANT, OF QUINCY, AND THOMAS J. STURTEVANT, OF WELLESLEY, MASSACHUSETTS, ASSIGNORS TO STURTEVANT MILL COMPANY, OF PORTLAND, MAINE, AND BOSTON, MASSACHUSETTS, A CORPORATION OF MAINE.

VERTICAL CRUSHING AND GRINDING MILL.

SPECIFICATION forming part of Letters Patent No. 761,334, dated May 31, 1904.

Application filed April 29, 1903. Serial No. 154,805. (No model.)

To all whom it may concern:

Be it known that we, THOMAS L. STURTEVANT, residing at Quincy, and THOMAS J. STURTEVANT, residing at Wellesley, in the county of Norfolk and State of Massachusetts, both citizens of the United States, have invented certain new and useful Improvements in Vertical Crushing and Grinding Mills, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to vertical crushing and grinding mills for the reduction of rocks, ores, and other materials, and has for its object to provide a crushing and grinding mill of the class referred to of such construction as to be capable of producing a relatively large output of finely-crushed material and in which the degree of fineness of the output may be regulated as may be desired by means of convenient adjustments of the grinding shells or cones by which the final reduction of the material is effected.

In the accompanying drawings, Figures 1 and 6 are vertical sectional views taken at right angles to each other of a crushing and grinding mill constructed in accordance with the present invention. Fig. 2 is a detail sectional view of the lower stationary cone or shell, and Fig. 3 is a bottom view of the same. Fig. 4 is a detail side view of the lighter-bar which supports the lower stationary cone or shell, and Fig. 5 is a plan view of the same.

The frame or casing of the mill may be of any suitable or desired construction; but in the form herein shown said frame or casing comprises the sections 12, 13, 14, and 15, which will be suitably secured together and which may be surmounted by a hood 16, having a suitable opening or openings through which the material to be crushed may be introduced, but which hood will prevent the material from flying out of the upper or hopper portion of the mill.

Suitably fixed to the frame or casing of the mill are the stationary crushing and grinding shells or cones 17, 18, and 19, provided in the

usual manner with internal crushing or reducing teeth.

Suitably journaled in the frame or casing of the mill is the main shaft 20, having a squared portion on which are mounted the rotating crushing and grinding nuts or cones 21, 22, and 23, rotating with said shaft, the latter being preferably stepped in a supporting oil-pot 24, which rests upon a cross-bar 25. The cross-bar 25 is in practice provided with suitable means for adjustment, such as is common in grinding-mills, so that the oil-pot 24 may be raised or lowered in the base of the mill frame or casing to raise and lower the main shaft 20 for the purpose of adjusting the rotary crushing and grinding shells or cones relative to the encircling stationary grinding shells or cones, and thereby regulating the output of the mill.

In the gear-chamber at the base of the mill is mounted the driving gear-wheel 26, engaged by a pinion 27 on a power-shaft 28. The gear-wheel 26 is preferably connected with the vertical shaft 20 through a hub 271, mounted on a squared portion of said shaft, and the lower portion of which hub is connected with the hub of the said gear-wheel through a grab coupling or clutch 29, formed partly on said hub 271 and partly on the hub of the said gear-wheel. Attached to the hub 271, to rotate therewith, are scrapers 30, which move around in the lower part of the material-chamber of the mill and which serve to convey the reduced material to the outlet spout or spouts 31. The hub 271 is preferably provided with an annular recess 32, into which loosely extends a ring or bushing 33, attached to the frame of the machine in such a manner that an annular portion of said hub will widely overlap said ring or bushing, so as to form a dust-lock to prevent the crushed material from working downward into the gear-chamber beneath.

In vertical crushing-mills of the kind to which this invention relates the coarser or first reduction of the material in the upper part of the mill can be accomplished much faster than

the finer reduction of the material in the lower part of the mill, and it is therefore advantageous in order to increase the output of the mill to expedite the finer reduction or grinding action of the mill. To this end our improved mill is provided in the lower reducing-section thereof with three crushing or grinding members—to wit, the outer or stationary shell or cone 19, the intermediate rotating shell or cone 23, and an inner stationary shell or cone 34, between which and the outer stationary shell or cone the intermediate rotating and double-faced shell or cone 23 is interposed, all of these shells or cones having teeth or ribs of suitable shape to enable them to perform their crushing or grinding reducing action. The inner stationary shell or cone 34 is supported on a lighter-bar 35, the ends of which extend into recesses 36 in the section 13 of the machine-frame. The central portion of the said lighter-bar is made in the form of a ring loosely encircling the hub 271, and said ring is provided on its upper side with lugs 37, loosely entering recesses or notches formed in the lower face of the stationary shell or cone 34 in such a manner as to hold the said shell or cone from turning with the rotating vertical shaft, but permitting it to center itself more or less when in operation.

The lighter-bar 35, which supports the inner stationary shell or cone 34, rests on the heads of threaded rods or bolts 38, provided with hand-wheels 39, which may be turned to effect a vertical adjustment of the said lighter-bar and of the stationary cone 34, supported thereby. The intermediate shell or cone 23 is supported by a key 40 passing through the shaft 20, so that a vertical adjustment of the said shaft will effect a vertical adjustment of the said cone or shell 23, thereby providing by the independent vertical adjustments of the said shells or cones 23 and 24 for properly regulating the fineness of the output of the crushed material. The intermediate rotating shell or cone 23 is provided with openings 41, through which a portion of the material coming from above can pass between the said rotating shell or cone and the inner stationary shell or cone 34, and thus in the operation of the machine the final reduction of the material will take place in the two crushing chambers or spaces between the shells or cones 19, 23, and 34.

Having thus described our invention, we claim and desire to secure by Letters Patent—

1. In a vertical crushing-mill, the combination with a central vertical driving-shaft, 20, provided near its lower end with a driving-gear 26, of a vertically-adjustable support in which the lower end of said shaft is stepped, outer and inner stationary shells or cones, as

19 and 34, and an intermediate shell or cone, as 23, hung to said shaft so as to rotate and to be vertically adjustable therewith and provided with openings to admit material into the inner chamber formed by the said three shells or cones.

2. In a vertical crushing-mill, the combination with a central vertical driving-shaft 20, provided near its lower end with a driving-gear 26, of a vertically-adjustable support in which the lower end of said shaft is stepped, outer and inner stationary shells or cones, as 19 and 34, and an intermediate shell or cone, as 23, hung to said shaft so as to rotate and to be vertically adjustable therewith and provided with openings to admit material into the inner chamber formed by the said three shells or cones, one of said stationary shells or cones being vertically adjustable independently of said rotating shell or cone.

3. In a vertical crushing-mill, the combination with a central vertical driving-shaft, 20, provided near its lower end with a driving-gear 26, of a vertically-adjustable support in which the lower end of said shaft is stepped, outer and inner stationary shells or cones, as 19 and 34, an intermediate shell or cone, as 23, hung to said shaft so as to rotate and to be vertically adjustable therewith and provided with openings to admit material into the inner chamber formed by the said three shells or cones, a lighter-bar 35 on which the said inner cone or shell is supported, and means for vertically adjusting said lighter-bar to effect the vertical adjustment of said inner stationary cone or shell independently of the vertical adjustment of the said intermediate rotating cone or shell.

4. In a vertical crushing-mill, the combination with a central vertical driving-shaft, 20, provided near its lower end with a driving-gear 26, of a vertically-adjustable support in which the lower end of said shaft is stepped, outer and inner stationary shells or cones, as 19 and 34, an intermediate shell or cone, as 23, hung to said shaft so as to rotate and to be vertically adjustable therewith and provided with openings to admit material into the inner chamber formed by the said three shells or cones, and a vertically-adjustable lighter-bar with which said inner cone or shell is loosely connected so as to be restrained from rotation, but so as to be self-centering.

In testimony whereof we affix our signatures in presence of two witnesses.

THOMAS L. STURTEVANT.
THOMAS J. STURTEVANT.

Witnesses:

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C. M. SWEENEY.