

(No Model.)

J. POULSON.
GRINDING MILL.

No. 543,967.

Patented Aug. 6, 1895.

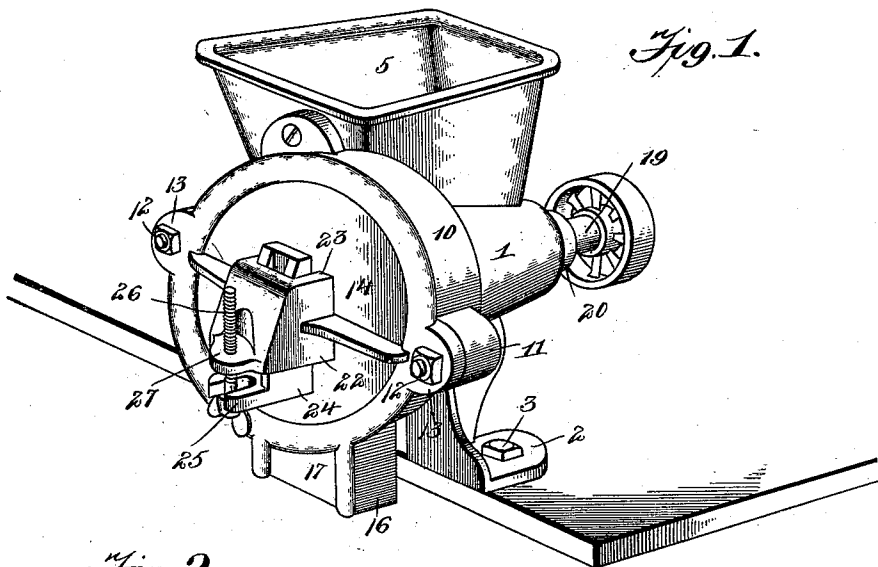


Fig. 1.

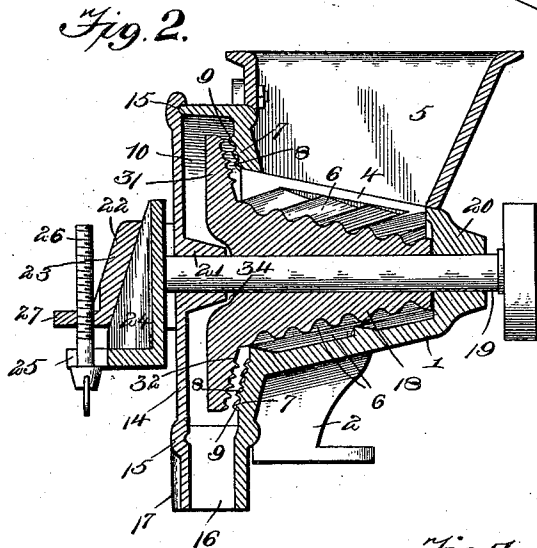


Fig. 2.

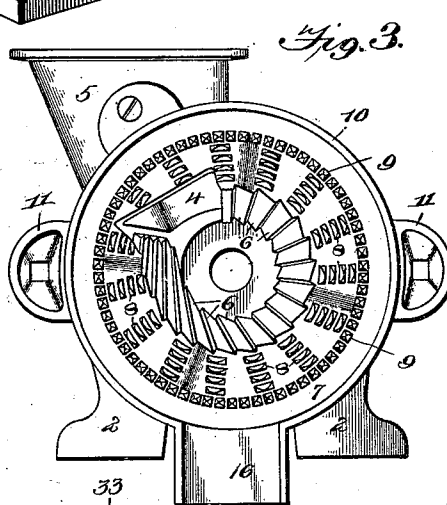


Fig. 3.

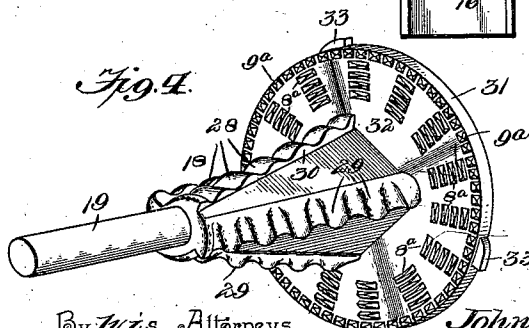


Fig. 4.

Witnesses

John C. Shaw
W. P. H. Haupt

By *W. S. Attorneys*.

Inventor

John Poulson

C. A. Snow & Co.

UNITED STATES PATENT OFFICE.

JOHN POULSON, OF PHILLIPSBURG, NEW JERSEY.

GRINDING-MILL.

SPECIFICATION forming part of Letters Patent No. 543,967, dated August 6, 1895.

Application filed August 6, 1894. Serial No. 519,579. (No model.)

To all whom it may concern:

Be it known that I, JOHN POULSON, a citizen of the United States, residing at Phillipsburg, in the county of Warren and State of New Jersey, have invented a new and useful Grinding-Mill, of which the following is a specification.

This invention relates to grinding-mills, and it has for its object to provide certain improvements in machines of this character with a view to simplifying the construction and rendering more efficient the operation thereof.

To this end the invention contemplates certain improvements in grinding-mills especially adapted for grinding, either coarse or fine, oyster-shells, bones, and the like.

With these and other objects in view, which will readily appear as the nature of the invention is better understood, the same consists in the novel construction, combination, and arrangement of parts hereinafter more fully described, illustrated, and claimed.

In the drawings, Figure 1 is a perspective view of a grinding-mill constructed in accordance with this invention. Fig. 2 is a central vertical longitudinal sectional view thereof. Fig. 3 is a view at one end of the mill-casing with the crusher or cracker removed. Fig. 4 is a detail in perspective of the crusher or cracker removed from the casing.

Referring to the accompanying drawings, the numeral 1 designates a conical mill-casing provided on its lower side with integral perforated angled attaching-feet or flanges 2, that are adapted to receive securing-bolts 3 for fastening the mill on a suitable support, and the said attaching-feet or flanges 2 are disposed at a point intermediate between the opposite ends of the mill-casing, so as to be disposed at one side of the discharging-end of the casing. By reason of thus positioning the attaching-feet or flanges the same are located substantially directly below the point where the greatest strain on the mill occurs during the operation thereof, and therefore the said feet serve to rigidly and firmly brace the mill while in operation.

The casing 1 is provided in the top with a longitudinally-disposed feed-opening 4, over

which is fitted a flared hopper-chute 5, which receives the material to be fed into the mill-casing. The mill-casing is further provided on its inner periphery with a regular series of longitudinal pointed corrugations 6, which are also disposed at an angle or spirally to assist in the crushing operation of the mill and the delivery of the material out toward the flared or wide end of the casing, and at this flared or wide end the casing is provided with a beveled burr-face 7. On the beveled burr-face 7 are formed a series of regularly-spaced and radially-disposed rows of grinding-teeth 8, which are formed in short sections leading out from the inner peripheral edge of the casing and encircled by a circular row of spaced, pointed grinding-teeth 9.

The end-beveled burr-face 7 of the mill-casing is arranged inside of the offstanding circular casing-flange 10, integrally projected from the wide end of the casing, and provided at opposite sides thereof with the bolt-ears 11, which removably receive clamping-bolts 12, that also pass through corresponding bolt-ears 13, formed at opposite sides of a removable circular cap-plate 14. The inner face of the cap-plate 14 is provided with a circular groove 15, which fits over the outer edge of the flange 10 to form a tight joint therewith, and said flange 10 is provided at its lower side with a discharge-neck 16, which is inclosed by the neck-plate 17, forming an integral extension of the cap-plate at the lower edge thereof.

The cap-plate 14 provides ready access to the interior of the casing and holds in position therein the crusher or cracker 18, and the said crusher or cracker is cast on the shaft 19, one end of which shaft projects through and turns in the bearing-collar 20, formed at one end of the casing 1, and the end of the shaft beyond the collar 20 is adapted to have mounted thereon a suitable operating-wheel driven by hand or power. The end of the shaft opposite the collar 20 projects through the bearing-collar 21, cast with the cap-plate 14 on the inner side thereof, and on the outer side of the said cap-plate, directly opposite the collar 21, is cast an open boxing 22, and transversely-disposed brace-ribs at

both sides of the said boxing, which brace-
 ribs strengthen the offset boxing and prevent
 the same from being easily broken off from
 the cap-plate. The offset boxing 22 is pro-
 5 vided with an outer inclined side 23, and is
 open at both its upper and lower ends, so as
 to accommodate therein the wedge-key 24,
 which is of a slightly greater length than the
 boxing 22, so as to be capable of a wide range
 10 of adjustment without increasing the size of
 the boxing 22. The wedge-key 24 is provided
 at its lower end with an integral bifurcated
 flange 25, in which works the lower end of the
 adjusting-screw 26, the threaded shank of
 15 which screw engages the threaded lug 27, pro-
 jected integrally from the outer side and lower
 end of the boxing 22. The end of the shaft
 turning in the collar 21 bears against the flat
 side of the wedge-key 24, so that by adjust-
 20 ing said wedge-key up and down within the
 boxing the shaft 19 will be adjusted longi-
 tudinally to vary the position of the crusher
 or cracker within the mill-casing to provide
 for grinding the material either coarse or fine.
 25 The crusher or cracker 18 is tapered from
 end to end and is made in a pyramidal form,
 so as to be provided with a plurality of tri-
 angular plain faces, which plain faces allow
 the material that is being crushed to freely
 30 work from the small to the large end of the
 mill-casing. The tapering crusher or cracker
 is provided on the meeting angles of said tri-
 angular plain faces with spaced longitudinal
 rows of projecting teeth 28, which teeth have
 35 rounded sides and backs 29 and flat front
 faces 30, forming a scalloped cutting-edge
 along each angle of the pyramid, and the teeth
 28 in one row alternate with those in the ad-
 jacent row, whereby each tooth travels in a
 40 different circular plane. By reason of the
 construction described it will be obvious that
 the disposition of the teeth on the angles of
 the pyramidal crusher or cracker provides for
 a thorough crushing or cracking of the mate-
 45 rial, while at the same time confining the
 crushed or cracked material on the triangular
 plain faces, so that it can freely work out
 toward the discharging end of the casing, and
 the specific shape of the teeth, forming a scal-
 50 loped cutting-edge along each angle of the pyr-
 amid, insures a complete crushing or crack-
 ing of the material, while at the same time
 entirely obviating any clogging thereof with-
 in the mill-casing. Furthermore, the alter-
 55 nate arrangement of the teeth in adjacent
 rows is particularly useful in a machine of this
 character, inasmuch as when oyster-shells
 and the like are being ground the teeth in
 one row will cut a series of notches in the ma-
 60 terial, thereby leaving weak or frail portions
 between the notches, so that the teeth in the
 next succeeding row will engage with such
 weak or frail portions of the material and
 crack the same off, and by this operation
 65 there will be no weak or tender projections
 left standing on the body of the material when
 the last cut has been made. The alternate

arrangement of the teeth 28 is also important,
 for the reason that such arrangement insures
 the drawing in of the material from the hop- 70
 per.

The crusher or cracker 18 has integrally
 cast thereon at one end the circular burr-
 plate or flange 31, which is provided with an
 inner beveled face 32, which works in oppo- 75
 sition to the burr-face 7 of the mill-casing,
 and the said burr-face 32 is also provided
 with short radially-disposed rows of spaced
 grinding-teeth 8^a, which are encircled by a
 circular row of spaced pointed grinding-teeth 80
 9^a, corresponding, respectively, to the teeth 8
 and 9 of the burr-face 7, and the teeth 8^a al-
 ternate with the teeth 8, so that the said teeth
 8 and 8^a pass through the spaces between the
 teeth which they oppose. 85

The burr-plate or flange 31 works within
 the flange 10, and may be provided on its
 periphery with the rounded lugs 33, which
 serve to steady the burr-plate or flange dur- 90
 ing its rotation, and in its outer side and di-
 rectly surrounding the shaft 19 the said plate
 or flange is provided with a collar recess 34
 to receive the inwardly-projecting bearing-
 collar 21 of the cap-plate, whereby a sufficient
 longitudinal play of the shaft is permitted to 95
 provide for the adjustment of the crusher or
 cracker and the burr-plate carried thereby.

Changes in the form, proportion, and the
 minor details of construction may be resorted
 to without departing from the principle or 100
 sacrificing any of the advantages of this in-
 vention.

Having thus described the invention, what
 is claimed, and desired to be secured by Let-
 ters Patent, is— 105

1. In a grinding mill, the combination with
 the conical mill casing, of a tapering crusher
 or cracker, made in a pyramidal form, having
 a plurality of triangular plain faces, and pro-
 vided on the meeting angles of said faces with 110
 spaced longitudinal rows of projecting teeth,
 having rounded sides and backs, and flat
 front faces forming a scalloped cutting edge
 along each angle of the pyramid, the teeth of
 one row alternating with those of the adja- 115
 cent row, substantially as set forth.

2. In a grinding mill, the combination with
 the mill casing; of the removable cap plate
 provided with a bearing opening and having
 cast integrally on the outer side thereof an 120
 offset open boxing and transversely disposed
 brace ribs at both sides of said boxing, said
 offset boxing being open at its upper and
 lower ends and provided with an outer in-
 clined wall and an integral threaded lug pro- 125
 jected outwardly from the lower end of said
 inclined wall, the grinding shaft having one
 end working in said bearing opening and
 projecting inside of the open boxing, an up-
 right wedge key working within the open box- 130
 ing and of a greater length than the same,
 said key having an integral bifurcated flange
 at its lower end disposed parallel with the
 threaded lug of the boxing, and with an in-

ner flat side bearing directly against the flat
end of the shaft within the boxing, and an
adjusting screw loosely engaging in the bifur-
cated flange of the key and working in the
5 threaded lug of the boxing, substantially as
set forth.

In testimony that I claim the foregoing as

my own I have hereto affixed my signature in
the presence of two witnesses.

JOHN POULSON.

Witnesses:

WM. WALTERS,
LEWIS O. BEERS.