

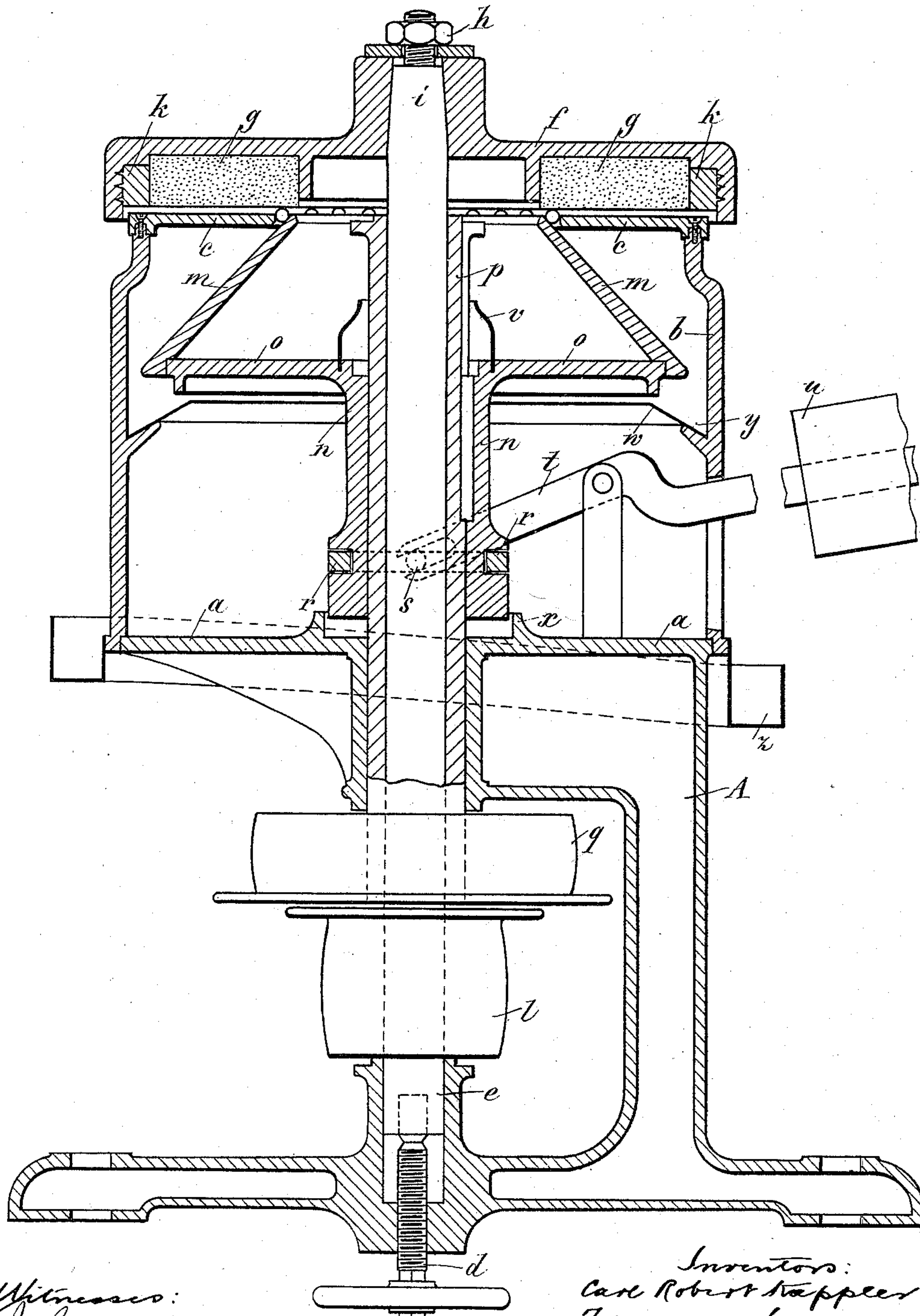
No. 610,059.

Patented Aug. 30, 1898.

C. R. KAPPLER & F. SCHUNK.
MACHINE FOR GRINDING CAST STEEL BALLS.

(Application filed Nov. 19, 1897.)

(No Model.)



Witnesses:
J. Green.
J. L. Leverett

Inventors:
Carl Robert Kappler
Friedrich Schunk
By Harry E. Knicker
Atty.

UNITED STATES PATENT OFFICE.

CARL ROBERT KAPPLER, OF GOCHSHEIM, AND FRIEDRICH SCHUNK, OF SCHWEINFURT, GERMANY.

MACHINE FOR GRINDING CAST-STEEL BALLS.

SPECIFICATION forming part of Letters Patent No. 610,059, dated August 30, 1898.

Application filed November 19, 1897, Serial No. 659,076. (No model.)

To all whom it may concern:

Be it known that we, CARL ROBERT KAPPLER, master builder, of Gochsheim, near Schweinfurt, and FRIEDRICH SCHUNK, engineer, of 9½ an den Schanzen, Schweinfurt-on-the-Main, both residing in the Kingdom of Bavaria and in the Empire of Germany, have invented a new and Improved Machine for Grinding Cast-Steel Balls, of which the following is a specification.

This invention relates to a machine for grinding cast-steel balls, by means of which cast-steel balls of all sizes can be produced with complete utilization of the grinding devices. The grinding devices are so arranged and constructed as to render sharpening of the same unnecessary.

The accompanying drawing illustrates in a longitudinal section and by way of example this new cast-steel-ball-grinding machine.

A is the bed of the machine, provided with bearings for supporting the revolving shafts. Upon the plate *a* of the machine-bed A is arranged a perforated casing *b*, which carries the stationary grinding-disk *c*. The vertical shaft *e*, which can be accurately adjusted in position as regards its height by means of a screw *d*, is supported in the bed A of the machine and carries the removable cover *f*, in which is fixed the emery-disk *g*. This cover *f* is fixed in a removable manner by means of the nut *h* upon the conical part *i* of the shaft *e*. The emery-disk *g* is fixed in the cover by means of a composition *k*, which does not attack the iron parts. A belt-pulley *l* imparts a rapid rotary motion to the cover and to the emery-disk. The third grinding device is constituted by the cone *m*, which is fixed upon a sleeve *n*, that is provided with a supporting-disk *o*. This sleeve *n* is capable of rotating with the hollow shaft *p*, which is itself capable of rotating about the shaft *e*, but the sleeve *n* is also arranged to be capable of movement in the longitudinal direction. Upon the hollow shaft *p* there is mounted the belt-pulley *q*, which imparts to the hollow shaft *p*, and consequently also to the cone *m*, a velocity which is four times less than that of the cover *f* and emery-disk *g*. Further, the cone *m* rotates in the reverse direction to

that of the emery-disk *g*. A ring *r*, capable of rotating about the sleeve *n*, is provided with pins *s*, with which engages the slotted end of a lever *t*, which is provided with a movable weight *u* and presses the cone *m* upward. The guard-plates *v* and *w*, and also the annular shoulder *x*, prevent ground particles, emery-dust, and the like from getting in between the rotating parts. The gutter *y* collects the ground balls and conveys them to the collecting-channel *z*, whence they pass to a sorting-machine.

The machine operates as follows: After removal of the cover *f* a number of balls are placed in the intermediate space between the stationary grinding-disk *c* and the upper end of the cone *m*, and the cover *f*, together with the emery disk *g*, is fastened again on the shaft *e*. The distance of the emery-disk *g* from the stationary grinding-disk *c* is regulated by means of the set-screw *d*. By means of the adjustable weight *u* the sleeve *n*, with the cone *m*, is adjusted according to the amount of wear of the stationary grinding-disk *c* and of the cone *m*, and also serves at the same time for regulating the size of the cast-steel balls to be made. When the balls are completely ground, then by raising the weight *u* the sleeve *n*, with the cone *m*, is lowered and the balls run along the cone down into the channel *v*, whence they are led to the collecting-channel *z*. The belt-pulley may be driven, if desired, by crossed belts or in any other manner; but the emery-disk *g* and the cone *m* must rotate in opposite directions. As the cone *m* and the grinding-disk *c* become worn the weight *u* will sink and will always produce the same grinding-space for the balls. In this manner a complete utilization of all the grinding parts is insured without it being necessary to resharpen the same afterward. It is also to be understood that the cone might also be made in another way—namely, so that the wide side would be at top and in the narrow side at the bottom. Then the emery-disk would have to be arranged accordingly.

The essential feature of the invention consists in that the grinding process takes place between three grinding parts, of which one is a

revolving cone and the other two are respectively a stationary grinding-disk and a rotating grinding-disk arranged in such a manner that by the wear of the same the cone adjusts itself automatically so that always the same grinding-space is present.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is—

1. In a machine for grinding steel balls, the combination of a horizontally-revolving grinding member, presenting a horizontal grinding-face, a fixed member, presenting a vertical grinding-face, a member rotating horizontally at a different speed to the first-named member and presenting a conical grinding-face, the said three grinding-faces leaving between them an annular channel of triangular form, wherein the balls are received and ground by contact with said members only, the conical member being vertically movable, and means, such as a weight

connected to the conical member to maintain the said channel of constant size.

2. In a grinding-machine for steel balls, the combination of a horizontally-revolving grinding member, presenting on its lower side a horizontal grinding-face, a fixed member presenting a vertical grinding-face, and a rotating member presenting a conical grinding-face inclosing with the aforesaid grinding-faces, an annular triangular channel for receiving the balls, means for moving the conical grinding member vertically, and a channel arranged around and below said conical grinding member to receive and collect the balls when released from the grinding-channel by depression of such member.

In witness whereof we have hereunto set our hands in presence of two witnesses.

CARL ROBERT KAPPLER.

FRIEDRICH SCHUNK.

Witnesses:

ERNST KNAFER,

CARL VALKNING.