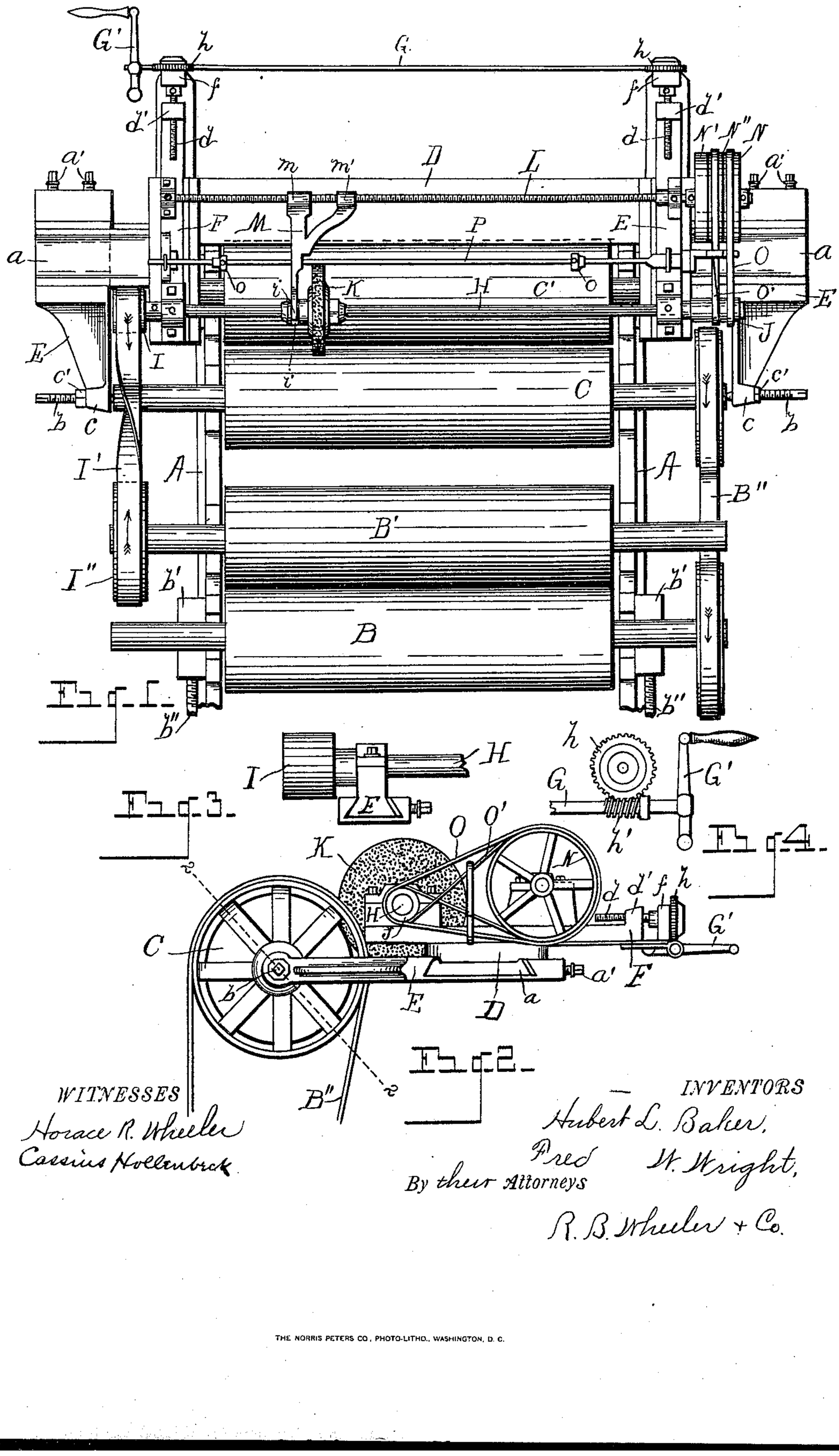
(No Model.)

H. L. BAKER & F. W. WRIGHT,

ROLL GRINDING MACHINE.

No. 587,383. Patented Aug. 3, 1897.



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HUBERT L. BAKER AND FRED W. WRIGHT, OF REED CITY, MICHIGAN.

ROLL-GRINDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 587,383, dated August 3, 1897.

Application filed May 11, 1896. Serial No. 591,016. (No model.)

To all whom it may concern:

Be it known that we, HUBERT L. BAKER and FRED W. WRIGHT, citizens of the United States, residing at Reed City, in the county of Osceola, State of Michigan, have invented certain new and useful Improvements in Roll-Grinding Machines; and we do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to new and useful improvements in roller-grinders especially adapted for grinding the rolls of flour-mill machinery; and it consists in the construction and arrangement of parts hereinafter fully set forth, and pointed out particularly in the claims.

The objects of the invention are to provide simple and effective means for accurately grinding the face of rolls, especially those in flour-mills, so as to effect such grinding directly from the center of the axis of rotation of said rolls, and a further arrangement whereby the grinding mechanism may be driven directly from the roller-mill machinery or the series of rolls upon which the grinder is at work, enabling the rolls to be ground, if desired, without removing them from the machine. These objects are attained by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a plan view showing our improved device in the operation of grinding attached to a roller-mill in which the rolls and their journals are shown in elevation and the major portion of the frame of the machine is broken away. Fig. 2 is a side elevation showing the machine in operation upon a roll. Fig. 3 is an enlarged detail showing one end of the grinder-carrying shaft and one end of the movable carriage in which it is mounted. Fig. 4 is an enlarged detail in elevation of a portion of the feeding mechanism for feeding the grinder to its work.

Referring to the letters of reference, A designates a portion of the frame of an ordinary roller-mill in which are two sets of rolls B and B′ and C and C′, respectively. These sets of rolls are adjustable with respect to each other and are driven through the pulleys mounted upon the outer ends of their respective shafts or journals. The rolls of each set are driven at a differential speed and the grain is crushed and ground between them, as is well understood.

In the operation of a roller-mill the greatest work upon the rolls comes at a point near their longitudinal center and after a time wears them away at this point, leaving them with an uneven or imperfect face, which necessitates their frequent grinding to restore a perfect surface to their periphery, so that the meeting faces of each set of rolls will stand perfectly parallel for their entire length.

In the ordinary manner of grinding rolls they have been journaled in the frame of a machine and while rotated at a high rate of speed are presented to a rotary grinder mounted in independent bearings in said machine, the variation of the bearings and the slight movement of the journals of the roll, as well as that of the grinder, making it quite impossible to grind the surface of the roll absolutely true, while in our improved device we work directly from the journals of the roll itself, insuring the grinding thereof concentric with its axis of rotation. To accomplish this, we employ a suitable frame or base-plate D, which extends transversely of the machine and which carries on opposite ends suitable projecting slides *a*, upon which are mounted the movable head-blocks E, which are held in place by set-screws *a′*. Passing through the projecting ends of said head-blocks are the cone-point set-screws *b*, which screw through the lugs *c* of said heads and are locked by the set-nuts *c′*. These adjustable head-blocks are adapted to embrace the shaft or journal of the roll to be ground, which is journaled between them through the medium of said set-screws, which enter the centers of said journal to retain the roll in place, as clearly shown in Fig. 1. Mounted upon the frame D near each end is a sliding carriage F. These carriages are mounted in suitable ways in said frame and are caused to travel longitudinally in unison through the medium of the screws *d*, which are threaded in a stud *d′* on the outer end of

said carriages and are journaled in corresponding studs *f*, fixed to the rearward projections of said frame, said screws carrying on their outer ends a gear-wheel *h*, which engages a worm *h'* on the opposite ends of the transverse shaft G, which is rotated through the medium of the crank G', whereby the screws *d* are driven and the carriages F are caused to slide longitudinally in their ways. Journaled in the opposite inner ends of said carriages is a shaft H, having upon one end a pulley I, by means of which said shaft is driven through the medium of the belt I', the opposite end of said shaft carrying a drum J. Mounted upon said shaft is the grinding-wheel K, which is splined thereon so as to move longitudinally on said shaft as well as to rotate therewith, said grinder being carried back and forth by means of a screw L, which stands parallel with the shaft H, and the opposite ends of which are journaled in the carriages F. Mounted on this screw L is a bracket M, having a threaded boss *m*, which receives said screw, and a guiding-sleeve *m'*, which travels thereon, the projecting end *i* of said bracket being forked, so as to engage freely in an annular way *i'* in the hub of the grinder K, whereby as the screw L is rotated in either direction the bracket M is actuated thereby, sliding said grinder longitudinally upon the shaft H.

The rotating of the screw L to cause the grinder to travel back and forth upon the shaft H is accomplished through the medium of the fixed pulleys N N' and the interposed loose pulley N'', mounted upon the outer end of said screw, which are alternately driven through the straight belt O and the crossed belt O', leading from the drum J on the end of the shaft H, whereby by shifting said belts O O' so that they will successively drive the pulleys N N' the screw L will be rotated in opposite directions in reciprocal succession, as will be well understood. To effect this shifting of the belts automatically, so as to reverse the motion of the screw L when the grinder shall have traveled the length of the roll in one direction, there is employed a shifting-bar P, which embraces said belts and is adapted to slide longitudinally, being provided with adjustable stops *o*, which are so set as to be engaged by the bracket M, whereby said bar is shifted when said bracket reaches its limit of motion in either direction, by which arrangement the operation of grinding the roll is made automatic, as the grinder, when it shall have reached the limit of its movement in one direction, immediately starts back in the opposite direction and is fed to the work, when it has reached the limit of its movement at each end, through the medium of the worm-shaft G and the screws *d*, which are so constructed as to enable the grinder to be moved toward the roll but the smallest fraction of an inch.

In the application of our improved grinder to the rolls in a machine the top of the frame is removed, so as to expose the rolls which are left journaled in their ordinary boxes, as shown in Fig. 1, in which the grinder is at work upon the roll C. When grinding the high-speed rolls, which are the rolls B C and which are driven through the power-belt B'', the belt on the opposite side of the machine which drives the low-speed rolls B' C' is removed, and the roll B is set up by sliding its movable bearings *b'* through the adjusting-screws *b''*, so as to run in frictional contact with the roll B' that the power to drive the grinder may be obtained through the pulley I'' on the journal of the last-mentioned roll, from which the twisted belt I' leads to the pulley I on the shaft of the grinder, the roll C, upon which the grinder is operating, being driven through its ordinary belt B''. As will be seen, the journals of the roll C are centered upon and engaged by the points of the set-screws *b*, so that the grinder K, mounted upon a frame carried by the head-blocks in which said screws *b* are located, is made to swing concentric with the axis of rotation of said roll, so that in its work thereon the grinder travels parallel with the axis thereof, and when fed thereto moves directly in line with the center of said roll, thereby enabling a perfectly geometrical grinding of the roll, and that without removing it from its bearings in the machine.

Each roll in the machine is ground separately and each in turn by a simple change in the belting and by merely reversing the grinder and belting from the opposite side when grinding the alternate rolls of each pair. The grinding-machine when in operation does not lie horizontally, but stands upward at an angle from the milling-machine, as indicated in Fig. 2, in which 2 2 indicates the horizontal line through the roll. This position enables the grinder to work free from the roll not being operated upon, and this construction also enables the grinder to be swung over, so as to operate from either side of the roll desired, the grinding-machine when in its working position being supported by a suitable brace. (Not shown.)

While we have shown and described our improved roller-grinding machine as applied to and driven from the rolls of a roller-mill, said rolls may be ground when desired by taking them from the mill and centering them between the cone-point set-screws or analogous means to retain them in place, the grinding and feeding mechanism being driven from any suitable source of power.

Having thus fully set forth our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a roll-grinding machine, the combination of the frame having extensions between which the roll is journaled, the rotary shaft mounted on the frame and lying parallel to the axis of rotation of said roll, the rotary

grinder adapted to slide on said shaft and means for moving said shaft parallel to and in the direction of the center of said roll, and means for rotating said roll.

2. In a roll-grinder, the combination with the rotary roll, the frame carrying the grinding mechanism journaled to said roll so as to swing concentric with its axis of rotation, the rotary shaft journaled in said frame parallel with the axis of the roll, the grinding-wheel on said shaft turning therewith and adapted to slide longitudinally thereon, means for moving said shaft in the direction of the axis of the roll to feed the grinding-wheel thereto.

3. In a roll-grinding machine, the combination with the roller-mill machine having a series of rolls therein, said rolls having pulleys on the shafts thereof through which they are driven, the frame carrying the grinder mechanism pivoted to the journal of one of said rolls concentric with its axis of rotation, the rotary shaft journaled in said frame parallel with the axis of said roll, the grinder-wheel turning with said shaft and movable longitudinally thereon, a belt leading from a pulley on one of said rolls to the pulley on the shaft of the grinder, and means for moving the grinder-wheel transversely of the axis of said roll.

4. In a roll-grinder, the combination of the frame, the roll to which said frame is concentrically pivoted, the shaft carrying the grinder-wheel journaled in said frame parallel with said roll, means for rotating said shaft, a grinder-wheel turning with said shaft and movable longitudinally thereon, the screw journaled in the frame parallel with said shaft, pulleys on said screw, and belts leading therefrom to a drum on said shaft, the bracket actuated by said screw and engaging the hub of the grinder-wheel, means for automatically shifting said belts to change the motion of said screw, and means for feeding the grinder-wheel to the roll.

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

HUBERT L. BAKER.
FRED W. WRIGHT.

Witnesses:
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J. W. MORSE.