No. 728,802. PATENTED MAY 19, 1903

C. KUHLEWIND.

AUTOMATIC CONTROLLER FOR ROLLING MILLS, SHAFTS, &c.

APPLICATION FILED SEPT. 16, 1901.

NO MODEL.

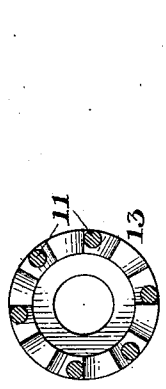

Fig. 2

Fig. 1.

WITNESSES

Warren W. Swartz

H. M. Corwin

INVENTOR

Cornelius Kuhlewind

No. 728,802. Patented May 19, 1903.

UNITED STATES PATENT OFFICE.

CORNELIUS KUHLEWIND, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO HYDRAULIC VALVE AND REGULATOR COMPANY, LIMITED, OF PITTSBURG, PENNSYLVANIA, A LIMITED PARTNERSHIP ASSOCIATION OF PENNSYLVANIA.

AUTOMATIC CONTROLLER FOR ROLLING-MILLS, SHAFTS, &c.

SPECIFICATION forming part of Letters Patent No. 728,802, dated May 19, 1903.

Application filed September 16, 1901. Serial No. 75,453. (No model.)

To all whom it may concern:

Be it known that I, CORNELIUS KUHLEWIND, of Pittsburg, Allegheny county, Pennsylvania, have invented a new and useful Automatic Controller for Rolling-Mills, Shafts, &c., of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a front elevation, partly broken away, showing my improved device applied to a hoop-rolling mill; and Fig. 2 is a detailed face view of one of the ratchets, showing the grouping of the pins.

My invention relates to the controlling of driven shafts, such as rolling-mill shafts, and is designed to provide means for driving a shaft frictionally or by slip connections and at the same time provide positive clutch mechanism which is at once brought into action in case the speed of the shaft is decreased below a determined limit.

The device is an improvement upon and is for the same general purpose as that set forth in my copending application, Serial No. 44,975, filed January 28, 1901, and it is designed to simplify such apparatus and do away with the necessity for a friction-clutch.

My present invention is applicable in many connections, and I have shown it as applied to the finishing-mill of a hoop-rolling train. In such finishing-mills the top roll of the pair has heretofore been driven by friction with the lower roll or the metal passing between them. In such mills the burning of the rolls often occurs from sticking of the piece, and it is consequently necessary to frequently take out one of the rolls and turn it down. The use of positive gearing for driving both rolls has been found impracticable because of marks made upon the rolled surface of the metal. In applying my invention to such mills the upper roll is normally driven frictionally from the lower roll or the metal, as before, but a clutch device is provided which automatically acts upon the shaft of the upper roll in case of any lag or slowing up of the speed of this upper roll and positively connected to a driven shaft.

In the drawings, 2 and 3 represent the upper and lower rolls of the hoop-finishing mill, these being mounted in suitable housings 4 and 5. The lower roll is positively driven by wabbler connections 6 with positively-driven pinions 7. The frictionally-driven upper roll 2 has a wabbler connection 8 with a shaft 9, having loose thereon a pinion 10, which engages with the lower driving-pinion 7 and is preferably similar thereto as to size and number of teeth. The body of the pinion 10 is, however, provided with a series of guiding-holes, in which are mounted oppositely-projecting spring-pressed clutch-pins 11. These may be arranged in any desirable manner and may project from one side only of the pinion, if desired, though I prefer to use two sets, as shown, because of the quicker action of the clutch. The springs 12 may be placed between each pair of pins, as shown, and the pins are preferably arranged in groups, three being shown in each group. The shaft upon which pinion 10 is mounted is provided with two ratchet-disks 13 and 14, secured thereto and whose teeth are engaged by the clutch-pins, the ends of which are suitably beveled for easy action. The teeth of one disk are preferably staggered relatively to those of the other, the pins being so arranged that in any position of the parts a part of the pins will be resting at the bottom of the ratchet-teeth, while others are intermediate of the teeth and still others at the top of the teeth in such position.

In driving the mill power passes through the lower pinion-shaft direct to the lower roll. The upper roll being smaller than the lower roll, its shaft revolves faster than that of the lower roll, which latter is revolved in a counter-clockwise direction. As the upper shaft revolves in the opposite direction and at a higher rate of speed than the lower shaft, the ratchet-disks will revolve at a higher rate

of speed than the upper pinion, and consequently the teeth will be constantly moving over the pins, which ride up the teeth and drop into the next teeth one after the other. If there is any sticking of the piece being rolled, the upper roll tends to slow down; but any such tendency will be at once resisted by those pins which at this moment are at the bottom of the ratchet-teeth, and these pins then give a positive clutch connection and an impulse is given the upper shaft, which restores the proper speed. The positive clutch connection then becomes inactive until the upper roll again tends to slow down, when the action is repeated.

The advantages of my invention will be apparent. The upper roll is driven in the ordinary manner, while at the same time by a simple single clutch I prevent any slowing down of the upper shaft resulting in burning of the rolls.

The device may be applied to many different locations, a single set of pins may be used with a single ratchet-wheel, or another form of positive clutch may be used, and many other changes may be made in the form and arrangement of the parts without departing from my invention.

I claim—

1. The combination with a driving-shaft, of a driven shaft having frictional or slip driving connections therewith, said driven shaft having a single positive connection with the driving-shaft, said connection comprising a positive clutch inactive while the driven shaft rotates above a determined rate of speed; substantially as described.

2. A driving-shaft, a driven shaft normally rotating at a higher speed than the driving-shaft, a pinion loosely mounted on the driven shaft, a wheel secured to said driven shaft, said pinion and wheel having coacting yielding projections and ratchet-teeth, and a driving-pinion engaging the pinion on the driven shaft; substantially as described.

In testimony whereof I have hereunto set my hand.

CORNELIUS KUHLEWIND.

Witnesses:
GEO. B. BLEMING,
H. M. CORWIN.