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F. CASEL

ROLLING MILL

Filed March 8, 1924

Fig. 1.

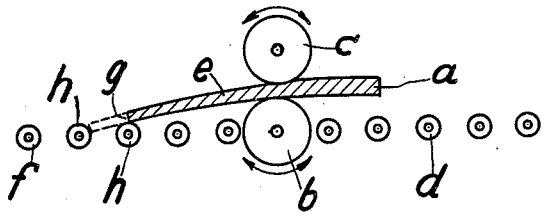
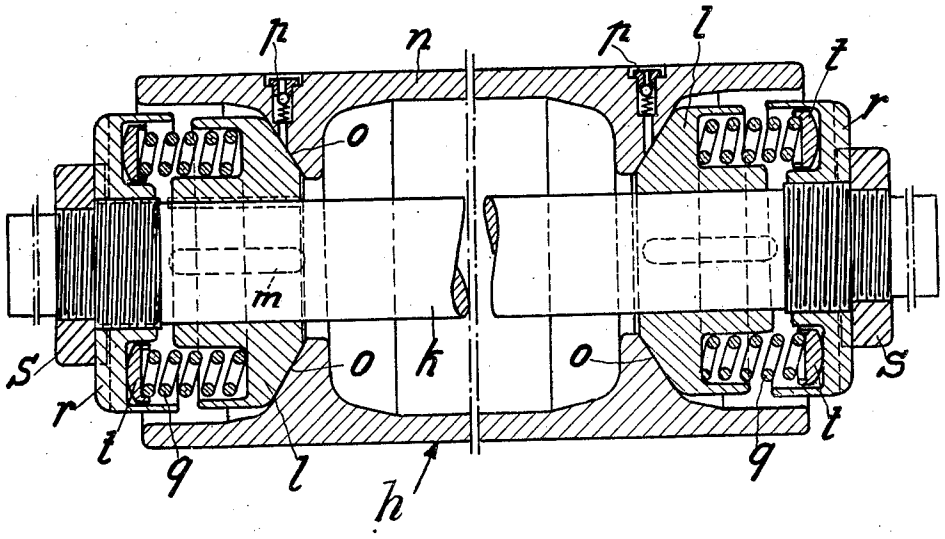


Fig. 2.



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UNITED STATES PATENT OFFICE.

FRANZ CASEL, OF DUISBURG-MEIDERICH, GERMANY, ASSIGNOR TO THE FIRM RHEINISCHE STAHLWERKE, OF DUISBURG-MEIDERICH, GERMANY.

ROLLING MILL.

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To all whom it may concern:

Be it known that I, FRANZ CASEL, a citizen of Germany, a resident of the city of Duisburg-Meiderich, in Germany, have invented certain new and useful Improvements in Rolling Mills, of which the following is a specification.

This invention has reference to a special arrangement of rollers in rolling mills, and it is particularly intended to provide against irregular lateral movement of the billet and to reduce the liability of breakage or of disarrangement of important parts of the machinery and of the rollers. In rolling mills, particularly with two-high, so-called "Duo" rolling mills the billet in consequence of varying conditions of pressure and of temperature, is frequently bent or twisted, as soon as it commences to leave the rollers, so that the head of the billet is inclined with relation to the rolling direction, and is pushed out of its regular path in the direction of the feeding rollers. This drawback always results in the billet striking some of the rolls of the feeding train either radially or tangentially. Inasmuch as the billet leaves the pair of pressing rollers with considerable velocity, strokes, blows and violent jars are produced in succession, by means of which great strain is exerted upon the shafts and the rolls, thereby causing breakage of the shafts or of the rolls or of both of them. Such breakage always causes very annoying interruption of the operations in rolling mills in view of the fact that, inasmuch as all rolls are actuated from a common driving shaft by means of bevel wheels or the like the entire train of rollers has to be stopped for the elimination and exchange of a broken section of the train of rollers. The exchanging of a heavy roll in billet rolling mills, however, consumes several hours' time.

My invention is intended to overcome the difficulties referred to and to either entirely eliminate or, at least, to considerably minimize any danger of breakage. With this end in view the shafts constitute an immovably journaled member, but the rolls themselves are rotatably and resiliently mounted thereon, so as to yield to every impact or stroke, so that the impact is absorbed by the roll and thereby becomes inefficient, the roller yielding in the transverse direction and towards the central line, when the billet is impinging axially upon the roll, while the roll will give way in its longitudinal direction, and laterally of the billet, being at the same time rotated, in case the billet strikes tangentially against it.

The invention will be more fully described by reference to the accompanying drawing, illustrating an embodiment of the principle of my invention in Figure 1 diagrammatically, while Figure 2 is a longitudinal section of the novel construction of roller according to my invention.

In the rolling mill shown diagrammatically in Figure 1 of the drawing a billet of, say, from 3 to 5 tons is forced along between the lower roller *b* and the upper roller *c*, after the billet has been fed to the said pressing rollers *b* and *c* by means of the feeding rolls *d*. The billet leaves the pressure rolls reduced in thickness, and should pass onto the rolls *f*. In case however, that the front end of the billet has become bent or twisted the front end *g* impinges tangentially against the roll *h*. Shortly thereafter the face *g* strikes radially against the roll *h*, as indicated in the drawing. These rolls *h* in accordance with my invention are yieldingly mounted upon their axes, so as to eliminate the objectionable effects of the impacts. Figure 2 shows the construction of the roll by way of example in detail. Upon the stationarily journaled axle or shaft *k* the collar or cap piece *l* is retained by a wedge *m* or otherwise, so as to prevent it from partaking in the rotation of the rollers *n*, while it remains free to be displaced in the longitudinal or axial direction. Upon the cap piece *l* the roll *n* is mounted in such a manner, as to present a conical rotating bearing surface *o* which is lubricated from the grease cup *p*. Each of the spring caps *l* is pressed against the roll *n* by the springs *q*. The said springs *q* bear against the abutment *r* which is screw threadedly mounted upon the shaft *k*, and which is retained in position by the counter nut *s*. In order to insure free movement of the springs, their outer ends are supported by the bearing plate *t*.

The manner of operation of the improved roll is as follows:—The impact of the arriving billet *a* against the roll *n* tends to force the roll away from its normal position, the roll trying to give way either transversely with regard to the axle *k* or in the longi-

tudinal direction thereof. This results in the inclined bearing surface *o* forcing the spring cap *l* outwards, the tensioning springs *q* being thereby compressed. As soon as the impact and the stroke are overcome the springs *q* are relaxed, the caps *l* are again forced inwards, and cause the roll *n* to reassume its normal position.

It should be understood that the invention is susceptible of various modifications and alterations to better adapt the same to varying conditions and without deviating from the spirit of my invention as set forth in the claims hereunto appended.

I claim:—

1. In a device of the kind described a relatively stationary axle shaft, a roll mounted on said shaft and adapted to yield to impacts in the axial direction and transversely with relation to the shaft.

2. In a device of the kind described, a relatively stationary axle shaft, a roll rotatably mounted on said shaft, spring acting means intermediate the roll and the shaft, and adapted to cause the roll to yield in the axial and transverse directions.

3. In a device of the kind described a relatively stationary axle shaft, a cylindrical roller casing mounted thereon, rotatable terminal caps between the shaft and the casing at both ends thereof, and relatively stationary abutments on said shaft spacedly confronting the rotatable caps, and springs intermediate the stationary and rotatable caps.

4. In a device of the kind described, a relatively stationary axle shaft, an endwise extended hollow cylindrical roller casing concentrically mounted on the shaft, conical bearings at the inside of said casing and spaced from its outer ends, rotatable conical caps on said shaft engageable with the bearings, terminal abutments mounted at the ends of the shaft and spacedly confronting the rotatable caps, and springs intermediate the rotatable caps and terminal abutments.

5. In a device of the kind described, a relatively stationary axle shaft, an endwise extended hollow cylindrical roller casing concentrically mounted on said shaft, conical bearings at the inside of said casing and spaced from the outer ends thereof, rotatable conical caps at the inside of said casing in engagement with the bearings, terminal abutments of lesser diameter than the casing and stationarily mounted at the ends of the shaft, and spaced from the rotatable caps, and springs inserted between the rotatable caps and terminal abutments.

In testimony whereof I affix my signature in presence of two witnesses.

FRANZ CASEL.

Witnesses:
FERD KÜTTYER,
HANS GRAF.