G. E. KRIDER.

SHOCK ABSORBING DEVICE FOR ROLL CRUSHERS.

APPLICATION FILED MAY 17, 1920.

1,409,869.

Patented Mar. 14, 1922.

2 SHEETS—SHEET 1.

FIG. 1

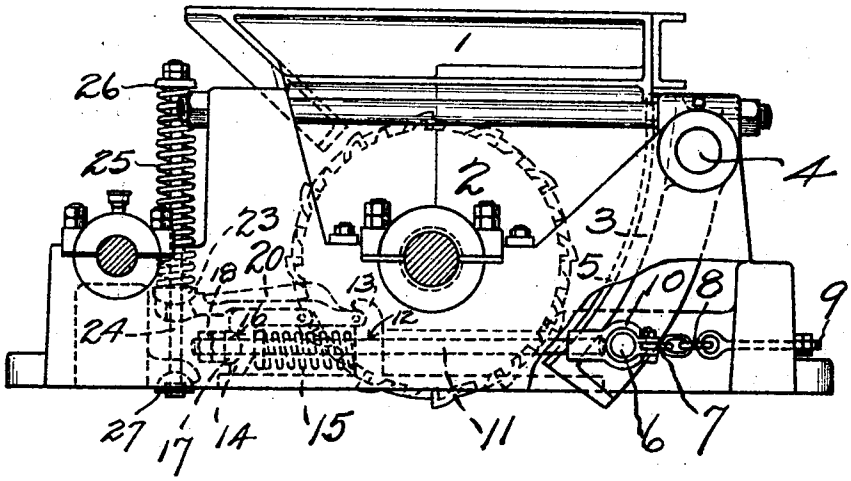


FIG. 3

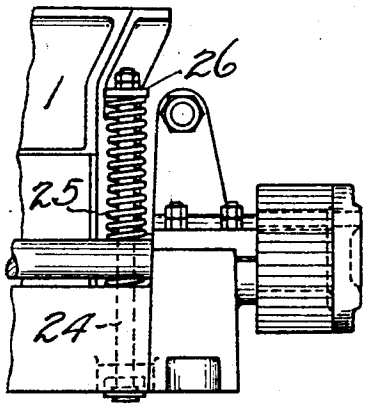
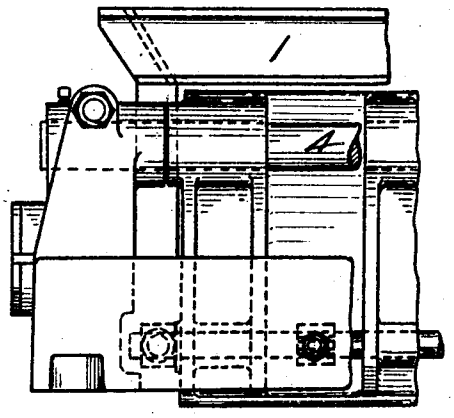


FIG. 2



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2 SHEETS—SHEET 2.

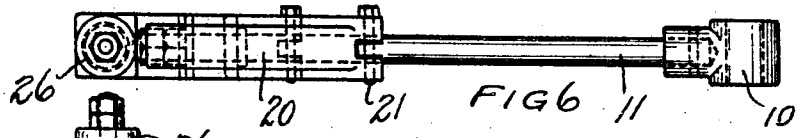


FIG 6

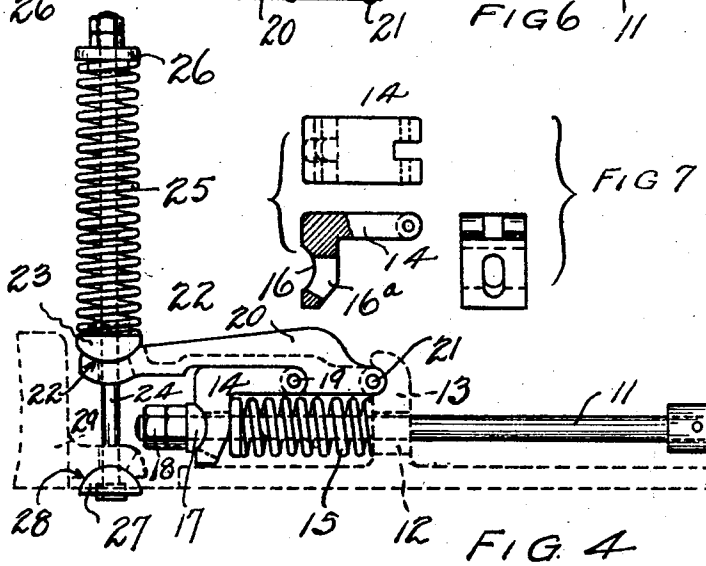


FIG 7

FIG. 4

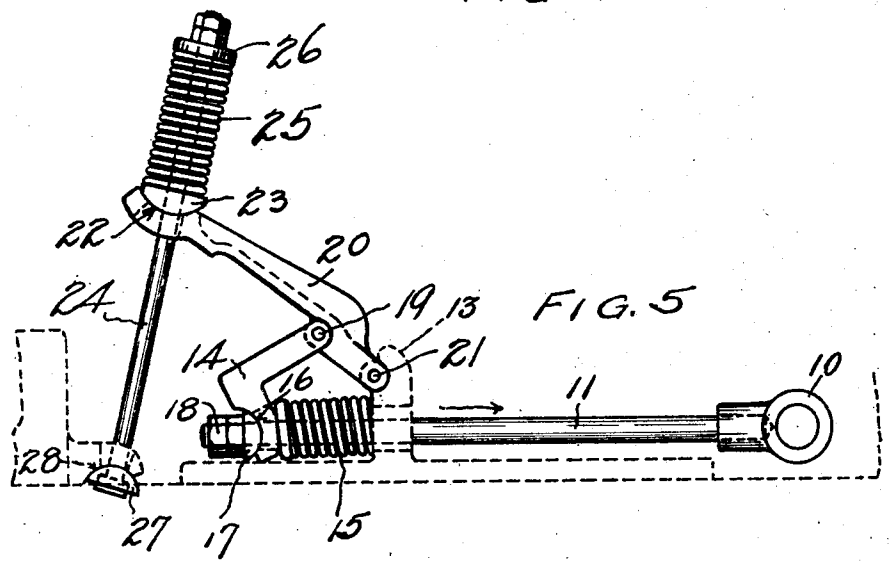


FIG. 5

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SHOCK-ABSORBING DEVICE FOR ROLL CRUSHERS.

1,409,869. Specification of Letters Patent. Patented Mar. 14, 1922.

Application filed May 17, 1920. Serial No. 382,036.

To all whom it may concern:

Be it known that I, GEORGE E. KRIDER, citizen of the United States, residing at Hollidaysburg, in the county of Blair and State of Pennsylvania, have invented certain new and useful Improvement in Shock-Absorbing Devices for Roll Crushers, of which the following is a specification.

This invention relates to an improvement in crushers of the single roll type wherein the material to be crushed is placed in a suitable hopper or receptacle positioned above the roll, and gradually carried down between the face of the roll and a yieldably supported breaker plate.

A primary object of the invention is to provide a crusher of the type set forth wherein the breaker plate is equipped with novel shock absorbing means to permit excessively hard material to pass without damaging the roll or plate and to this end it is proposed to employ a ball jointed toggle device of such a character that the breaker plate will be automatically swung back by abnormal pressures permitting the material to pass through the crusher, after which the joint again assumes its original operative position.

Another object of the invention is to provide adjustable means for holding the ball jointed toggle device in closed position in such a manner that it is unaffected by the usual vibrations of the crusher plate.

With the above and other objects in view which will be more readily apparent as the nature of the invention is better understood, the same consists in the novel construction, combination and arrangement of parts hereinafter fully pointed out, illustrated and claimed.

It will be readily understood by those skilled in the art to which this invention belongs, that the same is susceptible of change and modification without departing from the spirit or scope of the invention, but a preferred and practical embodiment thereof is shown in the accompanying drawings in which:

Figure 1 is a side elevation of a single roll crusher having my invention applied thereto.

Figure 2 is an end elevation of the crusher shown in Figure 1 showing a back view of the crusher plate.

Figure 3 is an end view of the crusher as seen from the end opposite the plate.

Figure 4 is an enlarged view of the toggle joint used to hold the crusher plate in operative position.

Figure 5 is a view of the toggle joint shown in Figure 4 in the position assumed when the crusher plate is thrown back to permit extremely hard substances to pass through the crusher.

Figure 6 is a plan view of the parts shown in Figure 4 of the drawings.

Figure 7 includes plan, side sectional, and end views of one of the links used in connection with the arrangement shown in Figure 4.

Similar reference numerals designate corresponding parts throughout the several figures of the drawings.

In carrying the invention into effect, no change is essential in the crusher roll, the hopper or the crusher plates, the present improvement being directed particularly to a novel device for relieving the roll and the crusher plate of abnormal strains which occur when substances too hard to be crushed pass between the plate and the roll. In other words, the invention is directed chiefly to a novel shock or impact absorbing device wherein the power of resistance is multiplied or increased according to the relative amplitude of movement of the crusher plate.

Accordingly, it is proposed to utilize the conventional hopper 1 having therein a single crusher roll 2 and a crusher plate 3 pivotally suspended as at 4 in one end of the crusher frame. The said plate 2 is preferably of the concave form shown and carries a removable wear surface 5 which may be of the conventional corrugated type to facilitate the crushing action.

The lower end of the crusher plate 3 may be provided with an off-set lug 6 which is adapted to receive the clevis 7 of the tie or anchor connection designated generally as 8 and including the eye bolt 9 adjustably engaging the crusher frame. The said lug 6 may also receive the eye 10 of a main tension rod 11 which extends longitudinally of the frame of the crusher through the eye opening 12 in the upstanding abutment 13 and carries at its end opposite the eye 10 a relatively rockable compresser link 14 which operates against the tension of the spring 15

confined between one side of the link and the abutment 13. By reason of this construction it will be apparent that the tie or anchor connection 8 previously referred to works in opposition to the main tension rod 11 to enable the crusher plate to be properly spaced from the crusher roll by simply adjusting the nut on the bolt 9. It will also be apparent that movement of the crusher plate in a counter-clockwise direction is resisted by the tension of the spring 15.

The main tension rod 11, the link 14, and the spring 15 constitutes a part of the present novel impact absorbing device and in connection with the link 14 it will be observed that the same is provided with a socket 16 for working on the rounded bearing abutment 17 held on the rod 11 by means of the nut 18. As shown in Figure 7 the said link 14 is provided adjacent the socket 16 with a relatively wide clearance opening 16^a, for permitting the link to rock on the rod 11 at right angles to the axis of the rod. It will also be observed from this figure and Figures 4 and 5 that the said link 14 is pivotally connected as at 19 with the intermediate portion of the restraining link 20 which is pivoted as at 21 to the upper part of the abutment 13. The end of the restraining link 20 opposite its point of pivotal support on the abutment is formed with a cupped bearing socket 22 for engaging with the rounded abutment 23 slidable on the vertically disposed oscillatable or relatively pivoted standard 24. This rounded bearing abutment 23 works against the tension of the coil spring 25 positioned on the rod 24 and abutting against the washer 26 on the upper end thereof. The lower end of the said rod 24 also carries a rounded bearing abutment 27 for engaging within the socket 28 of the frame member 29.

The arrangement of the parts described is such that when the crusher plate is in its normal position, the oscillatable or relatively pivoted standard 24 is in its normal vertical position, and also the links 14 and 20 are in their normal horizontal position. However, when the crusher plate 3 is swung in a counter-clockwise direction by the force of a lump of abnormal size being crowded between it and the roll, the main tension rod 11 will move in the direction of the arrow in Figure 5 to cause the parts to assume the positions shown in that figure. It will therefore be obvious that the crusher plate 3 moves against the resistance of both the springs 15 and 25, with the increased resistance due to the leverage between the links 14 and 20 as the former tends to lift the latter.

The particular arrangement of links and springs is especially advantageous since it provides a much greater resistance by using several springs of the same relative size, thereby providing increased resistance to the movement of the crusher plate, where it might otherwise be impossible if it were necessary to provide more springs or heavier springs directly acted on by the movement of the main rod 11. The present device therefore provides for a maximum resistance while at the same time observing the structural limitations of the machine.

Without further description it is thought that the features and advantages of the invention will be readily apparent, and it will of course be understood, that changes in the form, proportion and minor details of construction may be resorted to without departing from the spirit of the invention or scope of the appended claims.

I claim:—

1. A shock absorbing device for crusher plates including a main tension rod connected with the crusher plate, an oscillatable or relatively pivoted standard disposed at right angles to said main rod, a spring thereon, and jointed levers respectively connected with said main tension rod and operating against the spring on the vertical standard.

2. A shock absorbing device for crusher plates including a pair of rods disposed at right angles to each other and one of them being connected with the crusher plate, springs for tensioning said rods, and jointed levers respectively connected with one of said rods and one of said springs.

3. A shock absorbing device for crushers including a main tension rod, an abutment, a spring working against said abutment, an oscillatable or relatively pivoted standard, a spring on said standard, and a lever device connecting said main tension rod and the spring on the oscillatable or relatively pivoted standard, said lever device including a rocking link confined between a portion of the main tension rod and the said abutment, and a restraining link pivotally connected with the said abutment bearing against the spring on the oscillatable rod and also having its intermediate portion connected with said relatively rockable link.

4. A shock absorbing device for crushers including a main tension rod, an abutment, an oscillatable standard disposed at right angles to the rod, a spring on said standard, a spring working against said abutment, and pivotally connected links respectively engaging with said spring on the standard and said spring working against the abutment.

5. A shock absorbing device for crushers including a spring tensioned rectilineally movable rod and a relatively pivotally mounted standard, a spring carried by the standard, and a jointed connection between the rectilineally movable rod and the spring on the standard.

6. A shock absorbing device for crushers including a rectilineally movable tension rod, a relatively pivotally mounted standard

carrying resilient means, a spring for the rod, and a toggle device between the rod and the spring on the standard including a relatively shiftable and rockable link and a second link pivoted in a relatively fixed location and also pivotally connected with said rockable link.

7. A shock absorbing device of the class described including cushioning springs arranged at right angles to each other, means for compressing one of said springs, and a connection between said means and the other of said springs for also compressing the said latter spring.

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

GEORGE E. KRIDER.

Witnesses:
N. E. GEE,
ADAM LEAKE.