E. B. SYMONS.

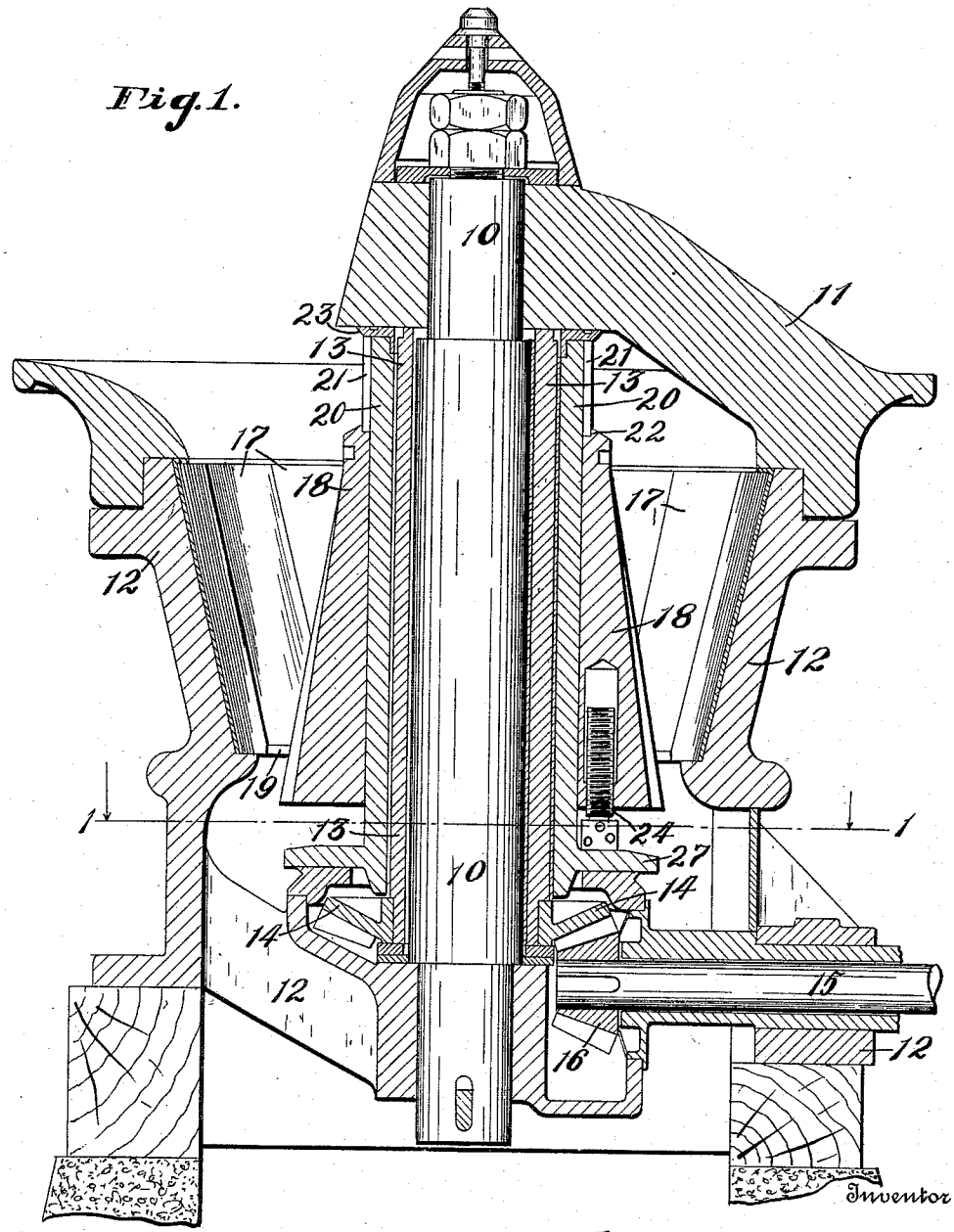
HEAD ADJUSTING DEVICE FOR GYRATORY STONE CRUSHERS.

APPLICATION FILED DEC. 27, 1909.

995,044. **Patented June 13, 1911.**

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses
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3 SHEETS—SHEET 2.

Fig. 2.

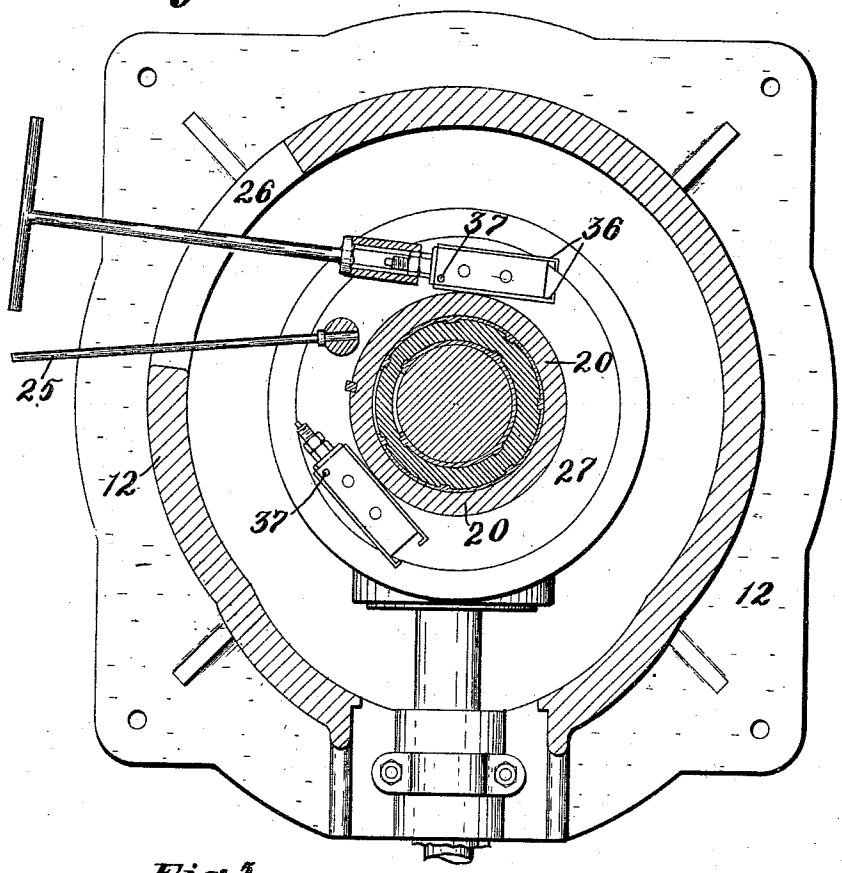

Fig. 3.

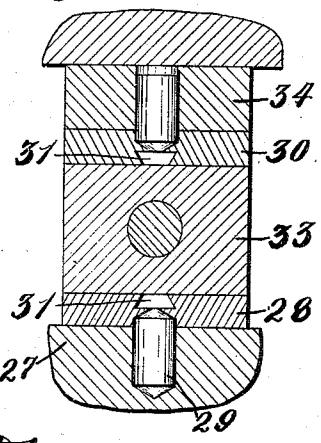

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Fig. 3.

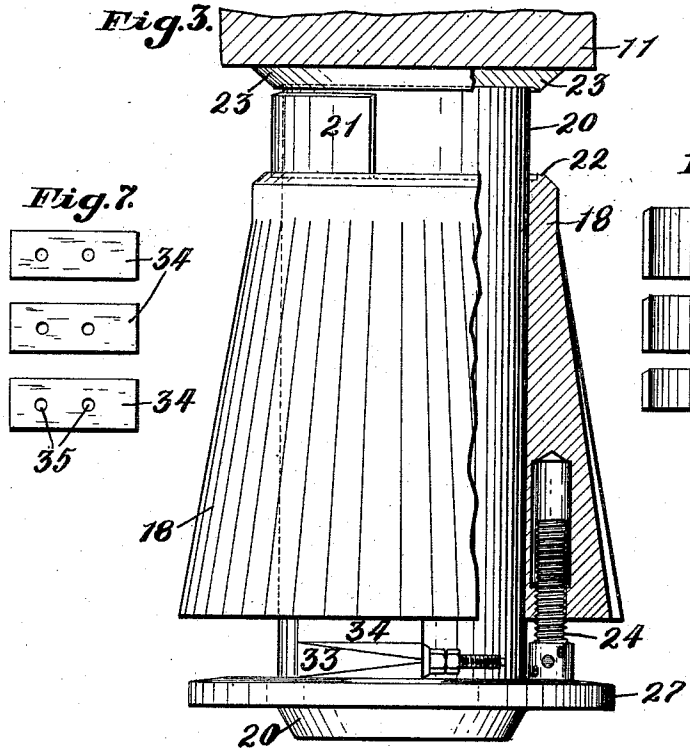


Fig. 7.

Fig. 6.

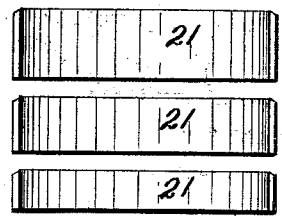
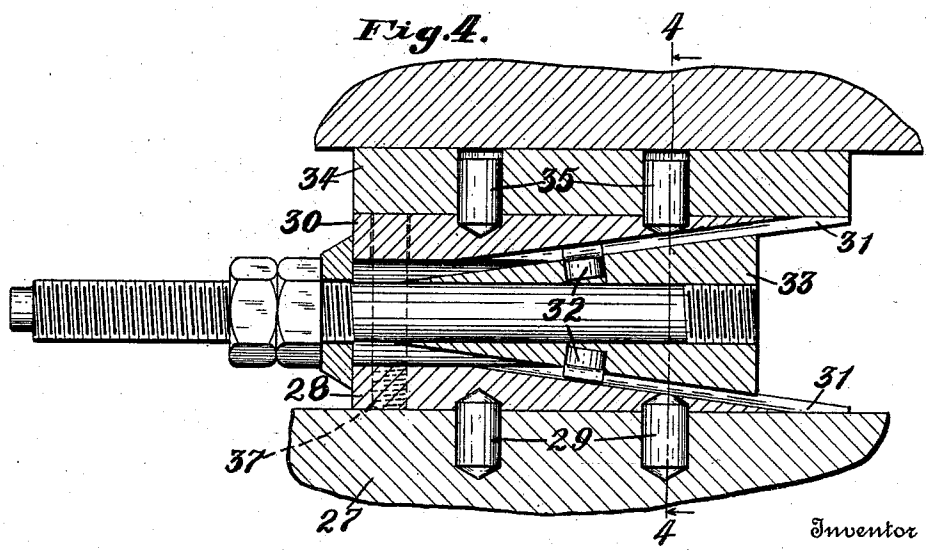


Fig. 4.



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UNITED STATES PATENT OFFICE.

EDGAR B. SYMONS, OF MILWAUKEE, WISCONSIN, ASSIGNOR TO SMITH & POST CO., OF MILWAUKEE, WISCONSIN, A CORPORATION OF WISCONSIN.

HEAD-ADJUSTING DEVICE FOR GYRATORY STONE-CRUSHERS.

995,044. Specification of Letters Patent. Patented June 13, 1911.

Application filed December 27, 1909. Serial No. 535,227.

To all whom it may concern:

Be it known that I, EDGAR B. SYMONS, a citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented a new and useful Head-Adjusting Device for Gyratory Stone-Crushers, of which the following is a description, reference being had to the accompanying drawings, which form a part of this specification.

The object of my invention is to provide a handy adjusting device for the head of a gyratory crusher, by means of which the adjustment may be quickly effected and the head will be securely retained in position, while the device itself will not be excessive in cost, and is durable. I attain these objects by the mechanism illustrated in the accompanying drawings in which—

Figure 1, is a vertical central section. Fig. 2, is a horizontal section taken on the line 1. 1. of Fig. 1, showing a plan view of the base of the crusher. Fig. 3, is a side elevation of the head lining with the crusher head thereon a part of which is broken away to show a section through the adjusting screw. Fig. 4, shows a central vertical section taken through the length of the adjusting wedges and through a fragment of the head liner flange and head. Fig. 5, shows a cross section through the wedges taken on the line 4. 4. of Fig. 4. Fig. 6, shows three different widths of semi-circular distance collars. Fig. 7, shows three shims for building up on the wedges.

The crusher in which my head adjusting device is particularly designed for use, is shown in Fig. 1, and is of that type in which the central shaft 10, connecting the crown 11 with the bottom of the frame 12, is stationary, and forms the bearing for the eccentric sleeve 13. This eccentric 13 is driven through its attached bevel gear 14 by the shaft 15 and its attached pinion 16. The interior of the frame 12 is surfaced by sections of exceptionally hard metal 17, 17, termed concaves, and the rock to be crushed is placed between these concaves 17, and the crusher head 18.

The size of the product is determined by the annular opening 19, at the lower ends of the concaves, as it is through this opening only that the material must pass to get out of the crusher. This opening is varied in size for the purpose of varying the size of the product to a limited extent, by raising and lowering the crusher head 18, and it is also necessary to raise the head 18 to maintain a uniform size of product as the concaves and head wear appreciably in crushing hard and sharp rock. The head 18 is therefore made adjustable vertically on the head liner 20, and provision must be made for maintaining it solidly in its adjusted position.

To determine the position of the head, I provide distance or spacing collars 21, of various widths, as shown in Fig. 6. These collars are made in halves so they may be placed around the top of the head liner above the crusher head, as shown in Fig. 1, one half collar being shown in place in Fig. 3. These collars are held from creeping out of place during the operation of the crusher by an annular shoulder 22 on the top of the head 18. These collars not only position the head but also protect the head liner from deformation, as material entering the crusher is fed thereto by a chute. As the head 18 is raised into position the collars 21, are guided into close contact with the head liner 20 by the beveled upper edges of the collars riding in the correspondingly beveled groove in the washer 23. After the requisite pair of collar halves 21 have been placed on the crusher head, the head and collars are raised to their adjusted position by means of the adjusting screw 24. This screw 24 is operated by means of a bar 25 which is manipulated through an opening in the lower part of the frame 12. The head of the screw 24 rests on the flange 27 of the head liner 20, and the threads of the screw engage threads tapped in the head 18. The screw is intended to be used merely to move the head up or down as may be required, and I provide a system of wedges and shims to support the head during crushing operations independently of the screw 24. I provide two sets of wedges spaced on opposite sides of the head liner but so that they may both be manipulated through the one opening 26. Each lower wedge 28, see Fig. 4, is positioned on the head liner flange 27 by two dowel pins 29, in the latter engaging recesses in the wedge. The upper wedges 30 have corresponding recesses so it is immaterial which wedges are placed uppermost. Both upper and lower wedges have dovetailed grooves 31 to accommodate dove-

tailed guide pins 32 which are carried by the center wedge 33. As the movement toward or from each other of the outside wedges is necessarily limited, I provide shims 34 a requisite number of which may be placed on each set of wedges according to the width of distance collar 21, which is in use. The shims 34 carry dowel pins 35, the same size and spaced the same as pins 29. As shown in Fig. 2, the sets of wedges may be somewhat protected from the rock dust and kept in alinement sidewise by plates 36, secured to each side of each lower wedge 28. To prevent the upper wedges sliding with the central wedge, as the latter is moved over the lower wedge, I provide a stud 37 tapped into each lower wedge and projecting through a short slot in the center wedge into an unthreaded hole in the upper wedge. After the crusher head has been placed in position by the screw 24, the sets of wedges are collapsed as far as possible and placed in position on the dowel pins 29 of the flange 27 of the crusher head liner. One or more shims 34 are then placed on the wedges with their dowels 35 fitting the recesses in the upper wedges. The central wedges are then drawn forward until there is no vertical play of the head liner and its washer 23 in the crusher frame and no vertical play of the head 18 and distance collars 21 on the head liner. At the same time this adjustment must cause the washer 23 to make a neat sliding fit against the crown 11. After the wedges are adjusted the strain on the screw 24 may be relieved.

What I claim as my invention is.

1. In a rock crusher, a crusher shaft, shoulders projecting from said shaft, a crusher head slidable along said shaft, removable distance collars in halves spacing said head from one shoulder and a screw tapped into the head and reacting against the other shoulder for holding said head and collars up to said shoulder.

2. In a rock crusher, a crusher shaft, a crusher head slidable along said shaft, shoulders in the crusher stationary relatively to said shaft, removable half collars positioning said head relatively to one shoulder and adjustable means positioning the head relatively to the other shoulder.

3. In a rock crusher, a crusher shaft connecting the lower part of the frame and the crown, a head liner surrounding said shaft having a flange at its lower end, a crusher head slidable on said liner, fill in collars at the top of said head, and relatively slidable inclined planes between the head and the liner flange.

4. In a rock crusher a sleeve surrounding the crusher shaft, a crusher head slidable on said sleeve, an adjusting screw tapped into the head and abutting a flange on the sleeve, removable split collars of the requisite width surrounding the sleeve at one end, and sets of inclined planes relatively adjustable and adapted to support the crusher head from said sleeve flange.

5. In a rock crusher a head liner having a flange, a crusher head adjustable on said liner and a system of wedges comprising two inclined planes which together have a V shaped opening between them, a central wedge fitting said V shaped opening, means for adjusting the central wedge relatively to the two inclined planes and means holding the wedges in alinement.

6. In a rock crusher, an annular frame and crusher member, a spider at the bottom of the frame and crown piece removably attached to the top of the frame, bearing surfaces on the lower side of the crown piece and upper side of the spider, a shaft secured in the crown and spider, an eccentric sleeve on the shaft, a crusher head outside the eccentric, bearing collars provided above and below the head adapted to engage the bearing surfaces on the crown and spider, a screw tapped into the head and engaging the lower bearing collar, and distance collars in halves above the head.

In testimony I have hereinto set my hand in the presence of two witnesses.

EDGAR B. SYMONS.

Witnesses:
E. O. Maulteclow,
H. H. Berlach.