O. C. GRUENDER.

OIL WIPER AND SUPPORTING MEANS THEREFOR.

APPLICATION FILED APR. 25, 1919.

**1,334,090.** Patented Mar. 16, 1920.

3 SHEETS—SHEET 1.

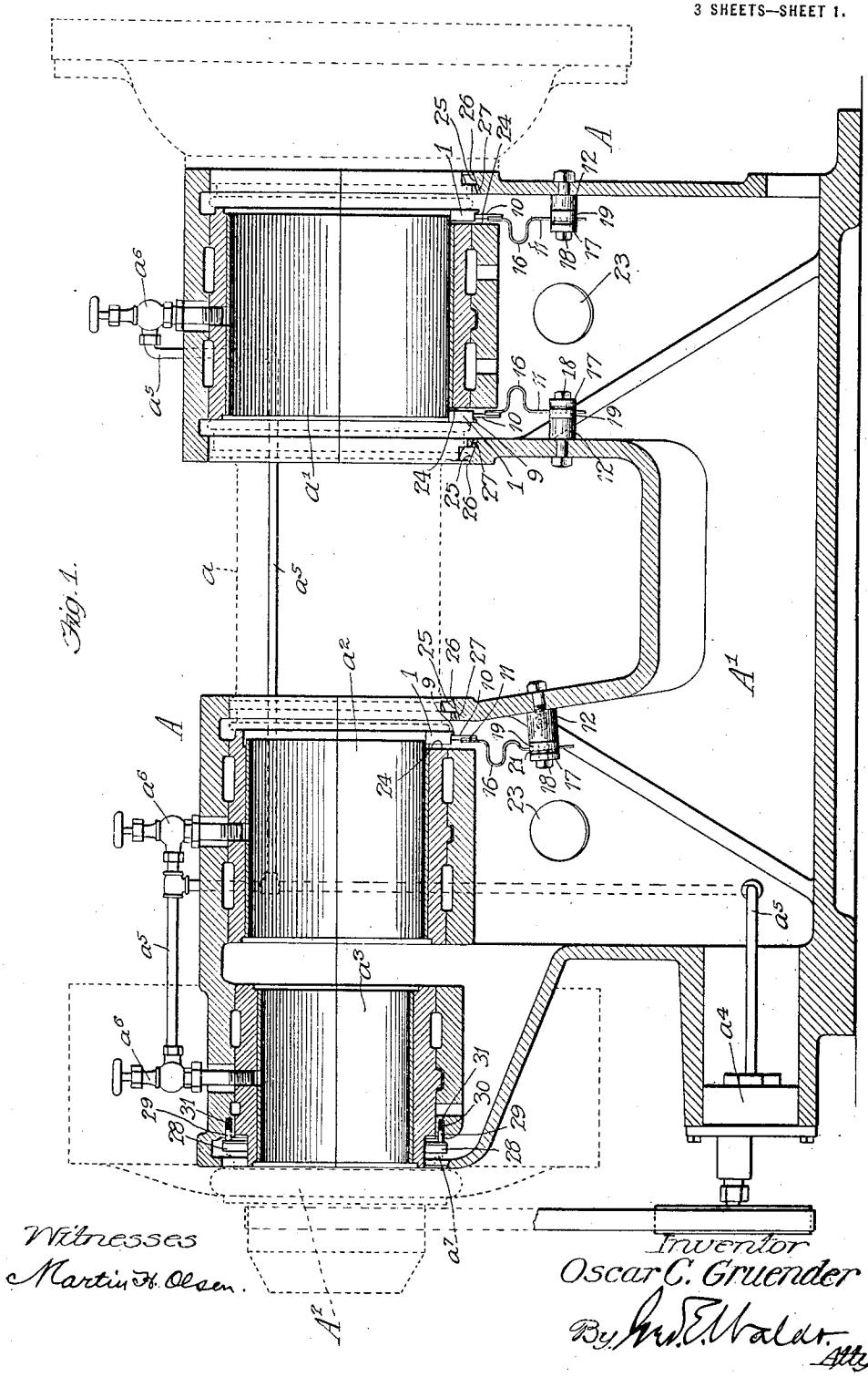


Fig. 1.

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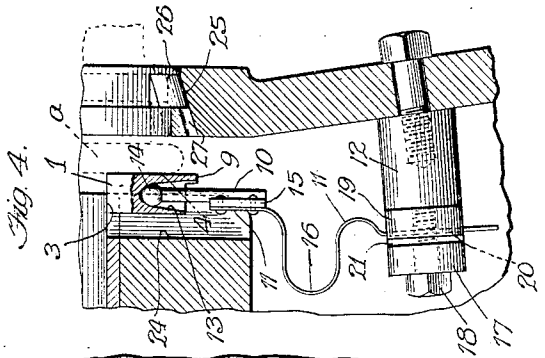


Fig. 4.

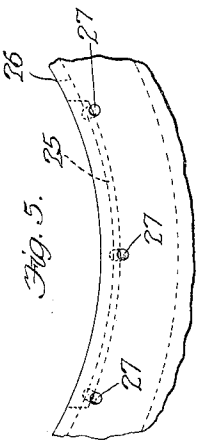


Fig. 5.

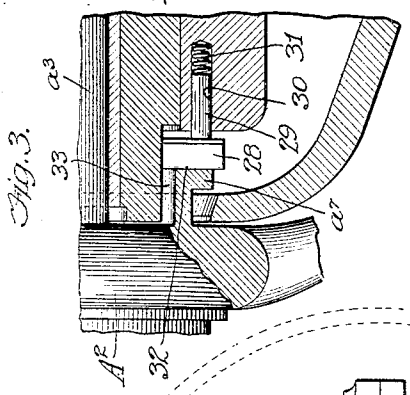


Fig. 3.

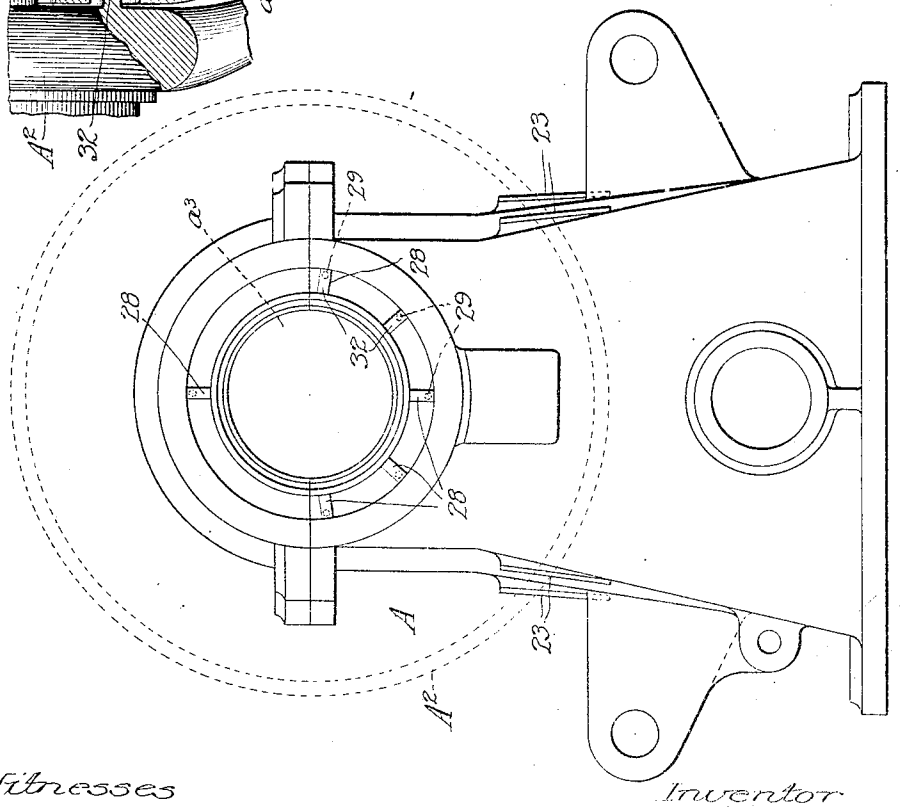


Fig. 2.

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3 SHEETS—SHEET 3.

Fig. 6.

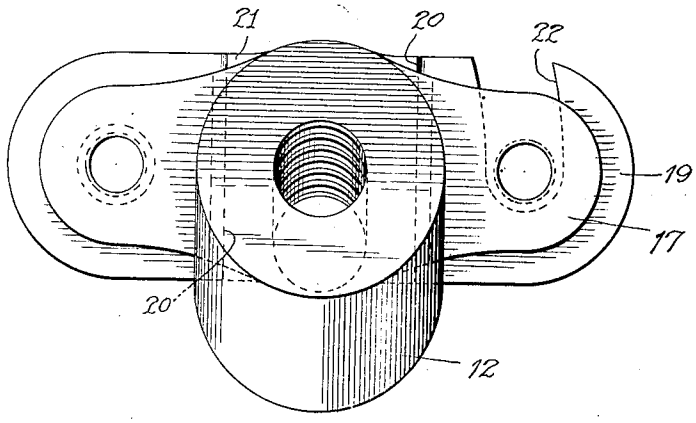



Fig. 7.

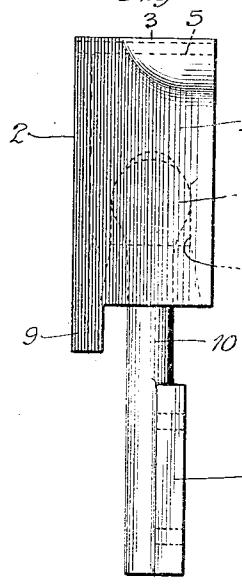



Fig. 8.

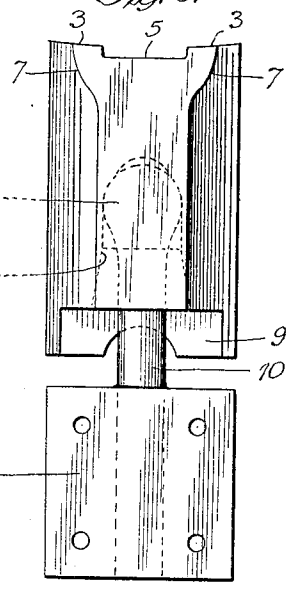



Fig. 9.

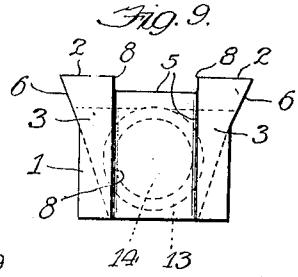
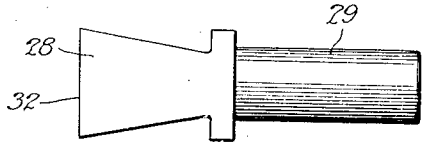



Fig. 10.




Witnesses
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# UNITED STATES PATENT OFFICE.

OSCAR C. GRUENDER, OF CHICAGO HEIGHTS, ILLINOIS, ASSIGNOR TO CHALMERS & WILLIAMS, INC., OF CHICAGO HEIGHTS, ILLINOIS, A CORPORATION OF ILLINOIS.

## OIL-WIPER AND SUPPORTING MEANS THEREFOR.

1,334,090. Specification of Letters Patent. Patented Mar. 16, 1920.

Application filed April 25, 1919. Serial No. 292,648.

*To all whom it may concern:*

Be it known that I, OSCAR C. GRUENDER, a citizen of the United States, and a resident of Chicago Heights, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Oil-Wipers and Supporting Means Therefor, of which the following is a specification.

This invention relates to oil wipers and means for supporting the same.

A practical application of an oil wiper embodying my invention is in connection with the bearings of crushing machines of the type commonly known as Symons disk crushers.

Owing to the heavy duty to which crushers of this type are subjected in use, the practice is to keep all shaft bearings flushed with oil, the base of the machine frame being cored out to form an oil reservoir or well, the circulation of the oil being effected by means of a suitable pump from which the oil is conducted to the different bearings or points of application by means of suitable piping connections, said circulating pipes being preferably valve controlled to provide for regulating the amount of oil delivered to the different bearings.

Theoretically, the crusher frame is so designed that oil escaping from the different bearings will drain back into the oil reservoir or well in the base of the machine frame. It is found in practice, however, that there is a very considerable leakage of oil at the various bearings, which not only causes a large loss and wastage of oil, but the oil which thus leaks out accumulates on the outside of the crusher frame, rendering the same greasy and causing dirt to adhere thereto, and, in some instances, even finding its way into the crushing disks and becoming mixed with the material being crushed. Various expedients have been resorted to in attempts to overcome this leakage of oil with its attendant objectionable features, the device most commonly resorted to consisting of packing rings fitted to circumferential grooves formed in the shafts closely adjacent to the ends of the bearings where the leakage occurs, said packing rings co-acting with cylindrical surfaces formed on the housings on the machine frame in which said bearings are formed. While said bearing rings reduce the leakage of oil, they are far from satisfactory and there is at all times during the operation of the crusher, a very considerable leakage of oil, which is very objectionable.

The object of the present invention is to provide means for preventing the leakage of oil at the exposed ends of different shaft bearings, and to this end, my invention consists in providing oil wipers mounted adjacent to the rotating surfaces of the crusher across or over which oil escaping from a bearing will have to pass. Said wipers are yieldingly supported in contact with such rotating surfaces, the lateral edges of said wipers which contact with said surfaces being sharp so as to produce a scraping action and said wipers being so shaped and positioned that oil scraped from said surfaces thereby will drain therefrom into the oil well or reservoir in the base of the crusher frame.

My invention also comprises the various other features, combinations of features and details of construction hereinafter described and claimed.

In the accompanying drawings, in which my invention is fully illustrated,

Figure 1 is a longitudinal sectional elevation of the frame of a Symons disk crusher, equipped with oil wipers of my invention, certain of the operative parts of said crusher being shown in dotted lines.

Fig. 2 is an end elevation thereof taken from the left hand side of Fig. 1.

Figs. 3, 4 and 5 are enlarged fragmentary detail views.

Fig. 6 is a detached view on an enlarged scale of the stud or lug on which the oil wipers applied to the shaft of the crusher are supported.

Figs. 7 and 8 are detached views on an enlarged scale of one of the wiper blocks applied to the crushed shaft together with the supporting pin therefor.

Fig. 9 is a top plan view of said wiper block; and

Fig. 10 is an enlarged top plan view of the wiper block applied to the eccentric pulley of the crusher.

Referring now to the drawings, A designates, as a whole, the frame of a Symons disk crusher comprising a hollow base portion A′ which forms a well or reservoir for containing lubricating oil, *a* the outer shaft,

$a'$ the head end shaft bearing, $a^2$ the rear end shaft bearing, and $a^3$ the bearing for the eccentric pulley, $A^2$, to all of which oil is supplied from the oil well or reservoir A′ by means of a pump indicated at $a^4$ through circulating pipes indicated at $a^5$, the pipe sections supplying the different bearings being controlled by means of cocks or valves $a^6$, by means of which the quantity of oil supplied to the different bearings may be separately regulated.

As regards the foregoing and other usual features, said crusher may be of any usual or approved construction, and will be readily understood by persons familiar with such crushers without a description thereof in detail.

Heretofore, in spite of efforts made to prevent it, leakage of oil has occurred at both the front and rear ends of the head end shaft bearing, at the front end of the tail end shaft bearing and at the rear end of the eccentric pulley bearing, resulting in a large loss and waste of oil, and rendering the frame and other parts of the crusher greasy and dirty.

In accordance with my invention, I overcome this leakage with its attendant objectionable features, by means of oil wipers applied to the outer shaft $a$ of the crusher at both ends of the head end shaft bearing $a'$ and the front end of the rear end shaft bearing and to the ring or flange $a^7$ on the eccentric pulley, adjacent to the rear end of the eccentric pulley bearing.

In accordance with my invention, the oil wipers for the head and tail end bearings of the outer shaft are all of the same construction and are supported in the same manner, the construction and means for supporting same being as follows:—Said oil wipers each comprises a wiper block 1 of suitable material, preferably brass, comprising a face 2 adapted to bear against a shoulder formed on the outer shaft $a$ of the crusher and an end surface 3 adapted to bear against the journals of said shaft adjacent to the ends of the journal bearing, said surface 3 being preferably ground or otherwise finished to conform to the curvature of the journal against which said wiper is designed to bear. As shown, the lateral faces 2 of the different wiper blocks 1 bear against shoulders 4 formed on the outer shaft $a$ at both ends of the head end journal bearing and at the front end of the rear end journal bearing and the surfaces 3 on the ends of said wiper blocks bear against the journals of said shaft immediately adjacent to said shoulders 4.

To reduce the amount of finishing required on said oil wiper blocks 1, both the lateral bearing faces 2 and the end bearing faces 3 thereof are provided with central grooves or channels 5, and, in order that said wiper blocks may exert a desired scraping action on the surfaces which they contact, respectively, the lateral sides thereof adjacent to the bearing faces 2 and 3, are preferably inclined or beveled to said faces 2 and 3, as shown at 6 and 7, respectively, see Figs. 8 and 9, thus forming sharp scraping or cutting edges which will effectively cut or scrape the oil from the bearing surfaces against which said surfaces 2 and 3 of said wiper blocks bear, respectively. It is obvious that the grooves or journals 5 will also form additional sharp edges 8 on said wiper blocks, which will also exert a scraping or wiping action tending to remove the oil from the surfaces of the shaft with which the bearing surfaces of said wiper block bear, oil thus removed escaping along said grooves or channels 5 to the lower ends of said wiper blocks. Formed on the lower end of each of said wiper blocks 1 so as to form a downward extension or continuation of the surface 2 thereof, is a lug 9 from which oil scraped from the shaft will drop into the oil well or reservoir A′.

The wiper blocks 1 are supported at the upper ends of pins 10 which are in turn secured to the ends of leaf springs 11 adapted to be secured in operative position on lugs or bosses 12 on the machine frame.

In the preferable construction shown, said wiper blocks 1 are supported upon the pins 10 by means of what may be described as ball and socket joints consisting of holes or openings 13 formed in the lower ends of said wiper blocks, and balls 14 formed on the upper ends of said pins 10, said holes 13 being provided at or adjacent to their inner ends with bearings for said balls 14. The size of said holes below said bearings increases downwardly, thus providing for free movement of said wiper blocks 1 on the supporting pins 10. As shown, said pins 10 are formed integral with plates 15 and are secured to the springs 11 by riveting said plates 15 directly to said leaf springs.

The leaf springs 11 are preferably made of relatively light spring steel, a desired thickness being about No. 19 gage, and in order that they may hold both scraping or wiping surfaces 2 and 3 thereon yieldingly in contact with the surfaces of the outer shaft which they engage, respectively, said springs are bent between their ends, as shown at 16.

The lugs or studs 12 on which the springs 11 are supported, preferably form separate parts and are connected to rigid parts of the machine frame within the hollow interior of the base A′ by means of bolts inserted through holes formed in the walls of the machine frame and which are threaded into the ends of said lugs or bosses 12, tight joints being preferably maintained at

the attached ends of said lugs or bosses by means of suitable packing gaskets inserted between the ends of said lugs or bosses and the walls of the crusher frame. The attached ends of said lugs or bosses are preferably so shaped that the outer ends thereof, to which the springs 11 are attached will extend horizontally, though this is not necessary.

The springs 11 are preferably clamped to the ends of the studs or lugs 12 by means of caps 17 and cap screws 18 which extend through holes formed in the ends of said caps and are threaded to lugs 19 formed at the outer ends of said lugs or bosses 12. Said springs 11 are preferably confined in grooves 20 formed in the outer ends of said lugs or studs, which will operate in an obvious manner, to prevent turning of said springs on their seats, the caps 17 being preferably provided with tongues or ribs 21 corresponding to and adapted to enter said grooves 20.

Also, to provide for conveniently disconnecting the springs 11 from the lugs or studs 12 without disconnecting said lugs or studs, when for any reason it is desired to remove the wiper blocks 1, the screw holes for connecting the caps 17 to said lugs or studs comprise slots 22 formed in one end of each of said caps, the sides of said slots being concentric with the axis of the clamping screw at the opposite ends of said plates. Thus, by loosening the bolts which secure said clamping plates in position, the same may be turned pivotally about the other clamping screw so that, to replace said clamping plates it is merely necessary to turn same so as to engage the slots 22 therein beneath the head of the other clamping screw and then tighten both screws.

The wiper blocks 1 and the supporting parts therefor will preferably be assembled before they are inserted into and secured in position within the crusher frame, the walls of which are provided with suitable holes or openings, as hand holes 23 through which said wiper blocks and associated parts may be inserted and held while the securing bolts or screws are inserted. Also, as said blocks wear, said hand holes will afford access to the springs 11 and the supporting means therefor to provide for adjusting the position of said blocks to take up the wear thereof.

To provide for engaging the wiper blocks 1 with the shoulders 4 on the outer shaft *a* and with the journals of said shaft adjacent to said shoulders, the journal bearings for said shaft are cut out, as shown at 24 to form holes or openings to receive said wiper blocks, said holes being slightly—say one-sixteenth of an inch—wider than the surfaces 2 of said wiper blocks, and the distance from the shoulders 4 on said outer shaft to the bottoms of said holes or openings 24 being slightly—say one-eighth of an inch—greater than the corresponding dimensions of said wiper blocks, the relation being such, however, that the rear portions of said blocks will always extend into said holes or openings, the sides of which will thus support said blocks against the side pull on said blocks due to the friction between said blocks and the shaft *a*.

As a further precaution against leakage at the ends of the outer shaft bearings where the wiper blocks 1 are applied, trough-shaped grooves 25 are formed in the lower sides of the openings 26 in the housing of the crusher frame at the ends of the journal bearings for said shaft where said wiper blocks are applied, said grooves being provided adjacent to their bottoms with holes 27 through which any oil which accumulates in said grooves will drain into the oil well or reservoir A.

In like manner, the oil wipers for preventing leakage at the eccentric pulley bearing consist of blocks 28, preferably made of brass, which are supported in operative position by means of stems 29 thereon fitted to holes 30 formed in the end of the eccentric pulley bearing so as to be movable endwise therein and which are held yieldingly in contact with the end face of the ring or flange $a^7$ on the eccentric pulley $A^2$ by means of coiled springs 31 inserted between the bottoms of the holes 30 and the inner ends of the supporting stems 29.

The faces 32 of the wiper blocks 28, which contact with the end face of the ring or flange $a^7$, are straight and the lateral sides of said blocks are inclined thereto at slightly less than right angles, thus forming sharp scraping or wiping edges on said blocks which will effectively wipe or scrape the oil therefrom.

Said wiper blocks 28 are maintained in designed operative positions by engagement of the ends thereof adjacent to the pulley bearing with slots or grooves 33 formed in the bearing boxes of said pulley bearing.

Owing to the severe duty which said eccentric pulley sustains in use, a relatively very large quantity of oil is applied to the eccentric pulley bearing both for the purpose of thoroughly lubricating the same and for the purpose of cooling it. As a result of the large quantity of oil applied to said eccentric pulley bearing, it is found that to effectively wipe the oil from the face of said ring or flange $a^7$, a plurality of wiper blocks 28 is required. In practice, I have obtained very good results by the use of six wiper blocks 28, five of them being mounted in the fixed portion of the eccentric pulley bearing and one in the cap, the wipers mounted in the fixed portion of the bearing being spaced substantially equal distances apart

and the wiper mounted in the bearing cap being mounted substantially at the top side thereof.

It is obvious that the number and arrangement of said wipers may be varied as may be found necessary or may be considered desirable to meet varying conditions.

Also, in order to return any oil which may be thrown from the flange $a^7$ on the eccentric pulley $A^2$ against the sides of the circular opening formed in the rear end of the crusher frame to permit the passage into operative position of said flange $a^7$, the lower side of said opening is preferably inclined or beveled, as shown at 35, so that oil discharged thereon will run or drain into the oil well or reservoir A'.

I claim:—

1. The combination of a rotating part and an oil wiper therefor, said oil wiper comprising a wiper block provided with a face adapted to contact with a zone of the surface of said rotating part across which oil leakage occurs, said wiper block being provided with a sharp edge or edges in its contacting face, and means for supporting said wiper block, said wiper block being connected to its supporting means by a universal joint, substantially as described.

2. The combination of a rotating part and an oil wiper therefor, said oil wiper comprising a wiper block provided with a face adapted to contact with a zone of the surface of said rotating part across which oil leakage occurs, said wiper block being provided with a sharp edge or edges in its contacting face, and means for supporting said wiper block, comprising means for preventing lateral displacement thereof, said wiper block being connected to its supporting means by a universal joint, substantially as described.

3. The combination of a rotating part and an oil wiper therefor, said oil wiper comprising a wiper block provided with a face adapted to contact with a zone of the surface of said rotating part across which oil leakage occurs, said wiper block being provided with a sharp edge or edges in its contacting face, and means for yieldingly supporting said wiper block, comprising means for preventing lateral displacement thereof, said wiper block being connected to its supporting means by a universal joint, substantially as described.

4. The combination of a rotating part and an oil wiper therefor, said oil wiper comprising a wiper block provided with a face adapted to contact with a zone of the surface of said rotating part across which oil leakage occurs, said wiper block being provided with a sharp edge or edges in its contacting face, means for yieldingly supporting said wiper block, said wiper block being connected to its supporting means by a universal joint, comprising a fixed part provided with an opening the sides of which embrace the lateral sides of said wiper block, adapted to support said wiper block against lateral displacement, substantially as described.

5. The combination with a shaft or the like, a shoulder formed thereon, and an oil wiper therefor, said oil wiper comprising a wiper block provided with faces adapted to contact with the shoulder on said shaft and with the surface of said shaft adjacent to said shoulder, said wiper block being provided with sharp edges in its contacting faces, and means for supporting said wiper block, substantially as described.

6. The combination with a shaft or the like, a shoulder formed thereon, and an oil wiper therefor, said oil wiper comprising a wiper block provided with faces adapted to contact with the shoulder on said shaft and with the surface of said shaft adjacent to said shoulder, said wiper block being provided with sharp edges in its contacting faces, and means for supporting said wiper block, the face of said wiper block which contacts with the cylindrical surface of said shaft being shaped to conform to the curvature of the surface of said shaft, substantially as described.

7. The combination with a shaft or the like, a shoulder formed thereon, and an oil wiper therefor, said oil wiper comprising a wiper block provided with faces adapted to contact with the shoulder on said shaft and with the surface of said shaft adjacent to said shoulder, said wiper block being provided with sharp edges in its contacting faces, and means for supporting said wiper block, comprising a spring adapted for holding said wiper block yieldingly in contact with the shoulder on said shaft and with the surface of said shaft adjacent to said shoulder, substantially as described.

8. The combination with a shaft or the like, a shoulder formed thereon, and an oil wiper therefor, said oil wiper comprising a wiper block provided with faces adapted to contact with the shoulder on said shaft and with the surface of said shaft adjacent to said shoulder, said wiper block being provided with sharp edges in its contacting faces, and means for supporting said wiper block, comprising a spring adapted for holding said wiper block yieldingly in contact with the shoulder on said shaft and with the surface of said shaft adjacent to said shoulder, and said supporting means also comprising means for preventing lateral displacement of said wiper block, substantially as described.

9. The combination with a shaft or the like, a shoulder formed thereon, and an oil wiper therefor, said oil wiper comprising a wiper block provided with faces adapted to

contact with the shoulder on said shaft and with the surface of said shaft adjacent to said shoulder, said wiper block being provided with sharp edges in its contacting faces, and means for supporting said wiper block, said supporting means comprising a spring adapted for holding said wiper block yieldingly in contact with the shoulder on said shaft and with the surface of said shaft adjacent to said shoulder, and said supporting means also comprising means for preventing lateral displacement of said wiper block, comprising a fixed part provided with an opening in which said wiper block is positioned the sides of which embrace the sides of said wiper block, substantially as described.

10. The combination with a shaft or the like, a shoulder formed thereon, and an oil wiper therefor, said oil wiper comprising a wiper block provided with faces adapted to contact with the shoulder on said shaft and with the surface of said shaft adjacent to said shoulder, said wiper block being provided with sharp edges in its contacting faces, and means for supporting said wiper block, said means comprising a fixed support, a leaf spring secured thereto, said spring being bowed between its ends, a pin secured to said spring to which said wiper block is connected, substantially as described.

11. The combination with a shaft or the like, a shoulder formed thereon, and an oil wiper therefor, said oil wiper comprising a wiper block provided with faces adapted to contact with the shoulder on said shaft and with the surface of said shaft adjacent to said shoulder, said wiper block being provided with sharp edges in its contacting faces, and means for supporting said wiper block, said means comprising a fixed support, a leaf spring secured thereto, said spring being bowed between its ends, a pin secured to the free end of said spring to which said wiper block is flexibly connected, substantially as described.

12. The combination with a shaft or the like, a shoulder formed thereon, and an oil wiper therefor, said oil wiper comprising a wiper block provided with faces adapted to contact with the shoulder on said shaft and with the surface of said shaft adjacent to said shoulder, said wiper block being provided with sharp edges in its contacting faces, and means for supporting said wiper block, said means comprising a fixed support, a leaf spring secured thereto, said spring being bowed between its ends, a pin secured to said spring to which said wiper block is connected by a ball and socket joint, comprising a ball on said pin and a bearing therefor formed in said wiper block, substantially as described.

13. The combination with a shaft or the like, a shoulder formed thereon, and an oil wiper therefor, said oil wiper comprising a wiper block provided with faces adapted to contact with the shoulder on said shaft and with the surface of said shaft adjacent to said shoulder, said wiper block being provided with sharp edges in its contacting faces, and means for supporting said wiper block, said means comprising a fixed support, a leaf spring secured thereto, said spring being bowed between its ends, a pin secured to said spring to which said wiper block is connected by a ball and socket joint, comprising a ball on said pin and a bearing therefor formed in the lower end of said wiper block, substantially as described.

14. The combination with a shaft or the like, a shoulder formed thereon, and an oil wiper therefor, said oil wiper comprising a wiper block provided with faces adapted to contact with the shoulder on said shaft and with the surface of said shaft adjacent to said shoulder, said wiper block being provided with sharp edges in its contacting faces, and means for supporting said wiper block, said means comprising a fixed support, a leaf spring secured thereto, said spring being bowed between its ends, a pin secured to said spring to which said wiper block is connected by a ball and socket joint, comprising a ball on said pin and a bearing therefor formed at the inner end of a hole in the lower end of said wiper block, said hole flaring downwardly below said bearing, substantially as described.

In testimony that I claim the foregoing as my invention I affix my signature this 14th day of April, 1919.

OSCAR C. GRUENDER.