Oct. 4, 1938. O. C. GRUENDER 2,131,801

DOUBLE ACTING JAW CRUSHER

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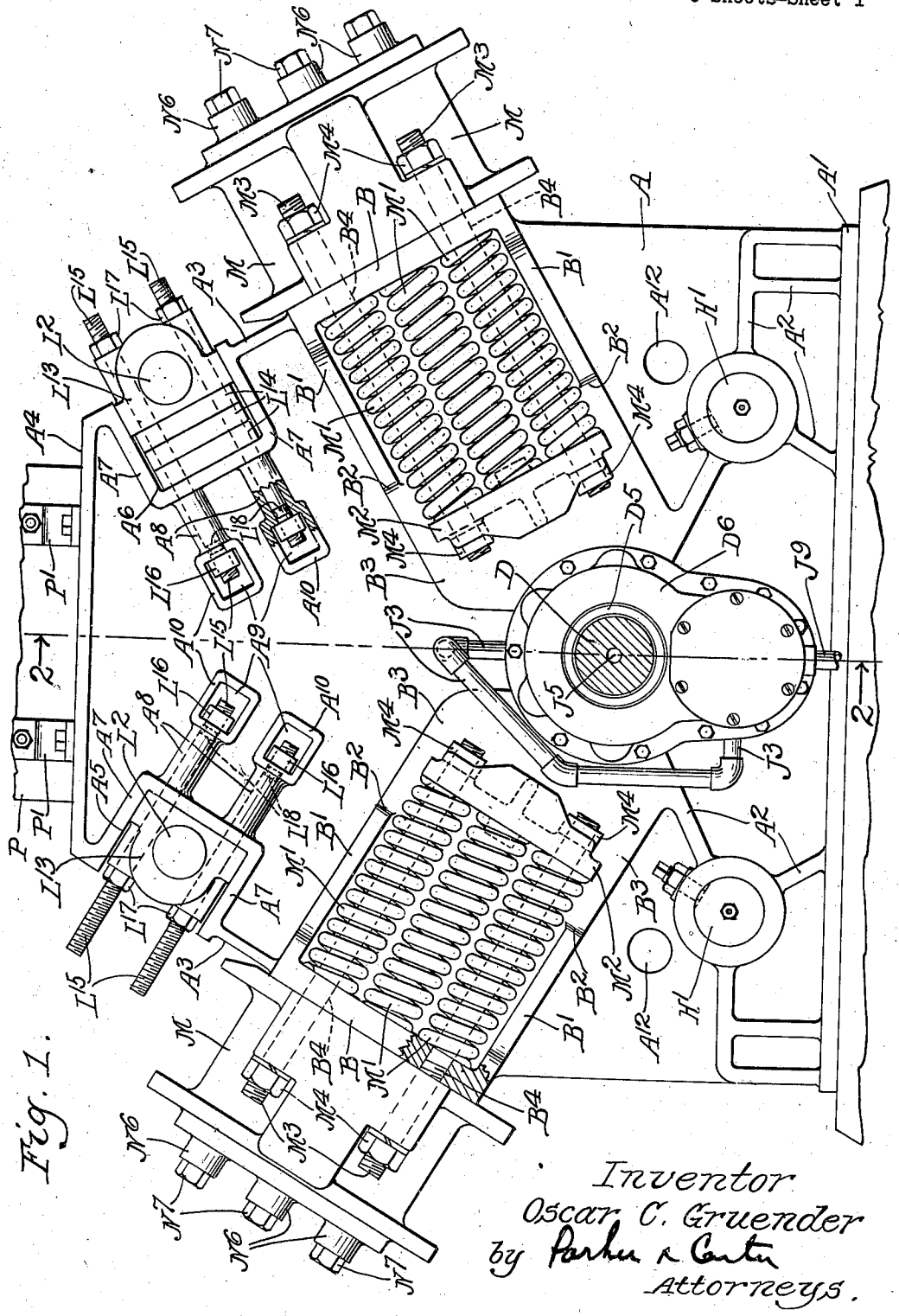


Fig. 1.

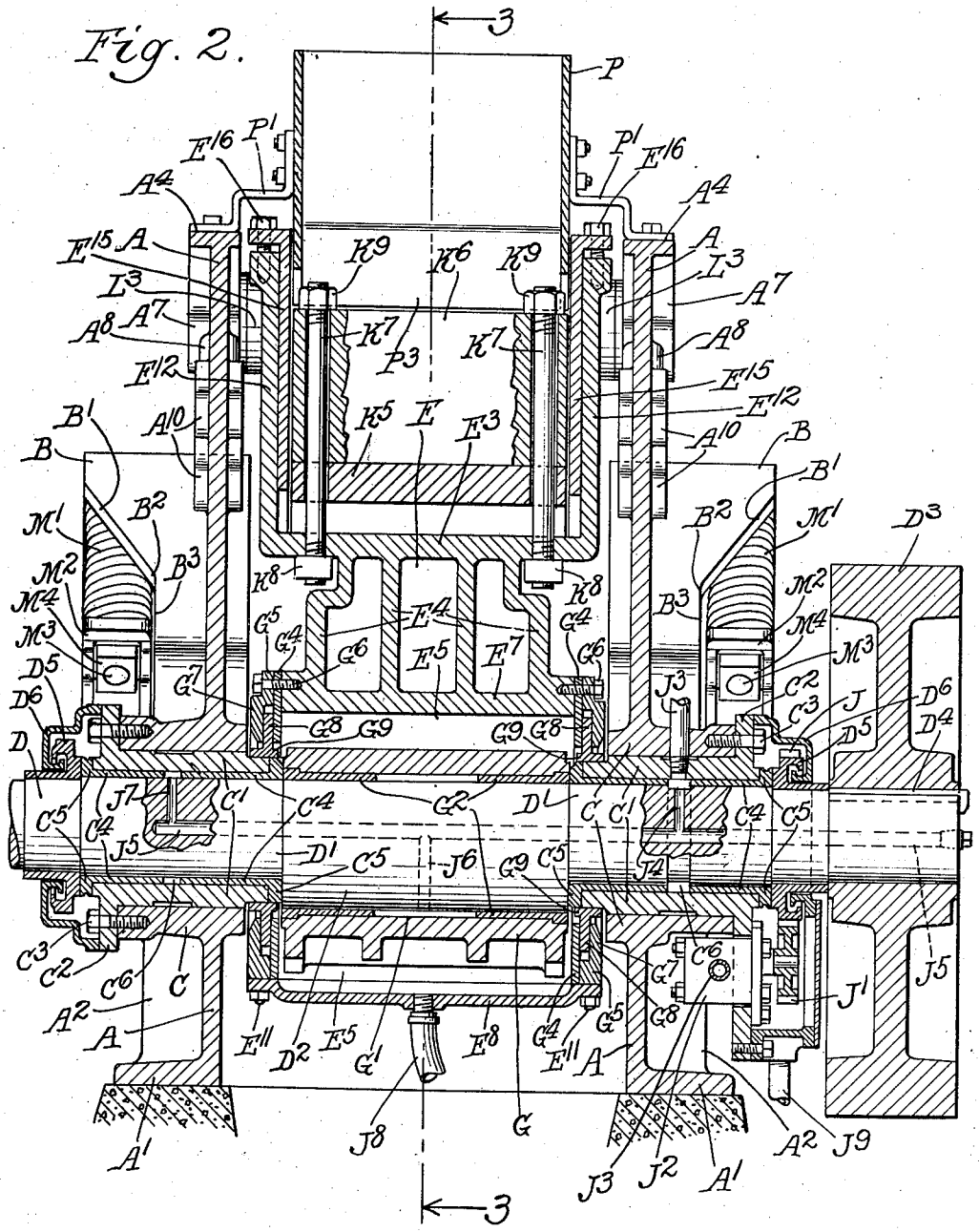
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Fig. 2.



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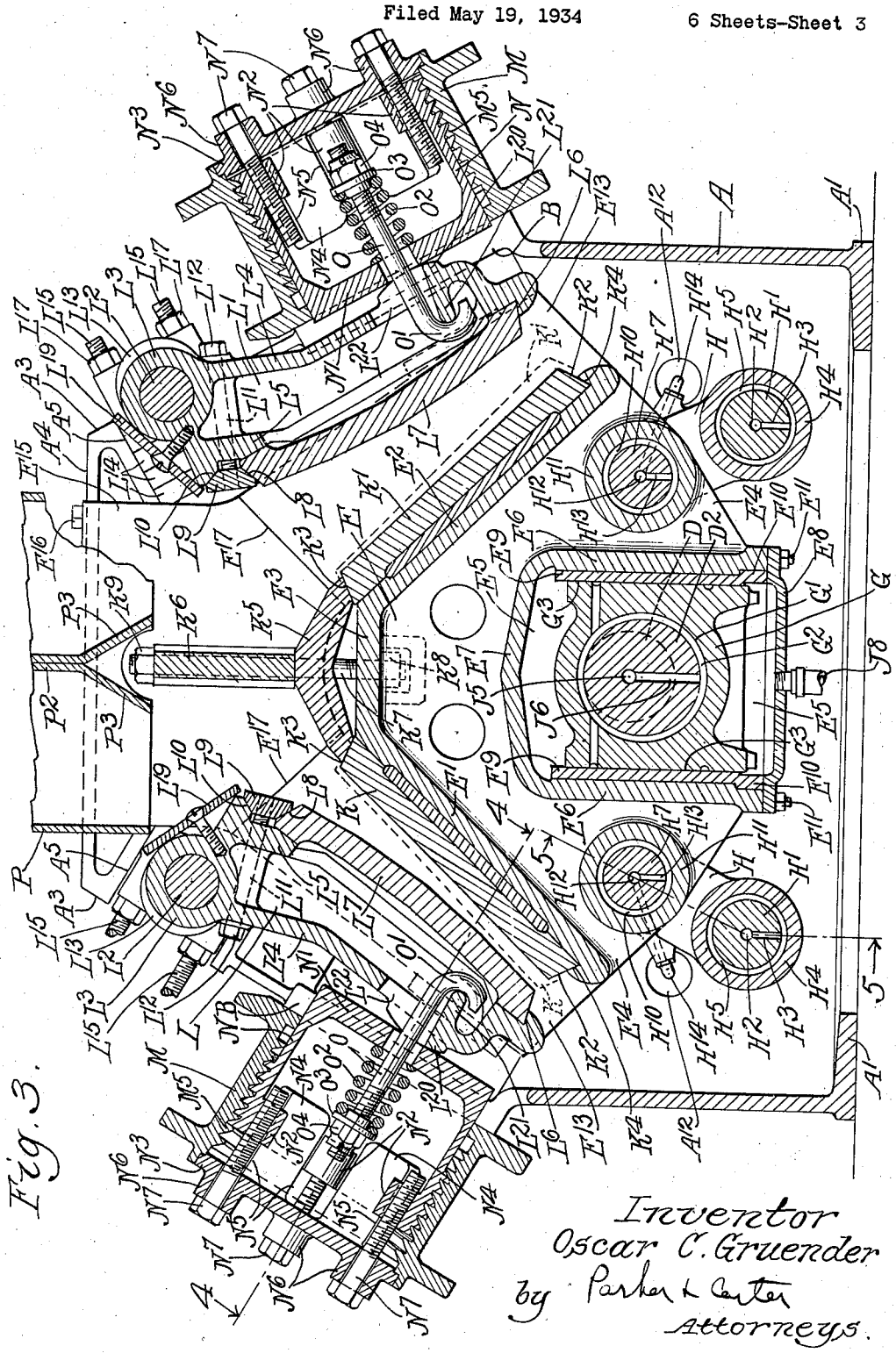


Fig. 3.

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Fig. 4.

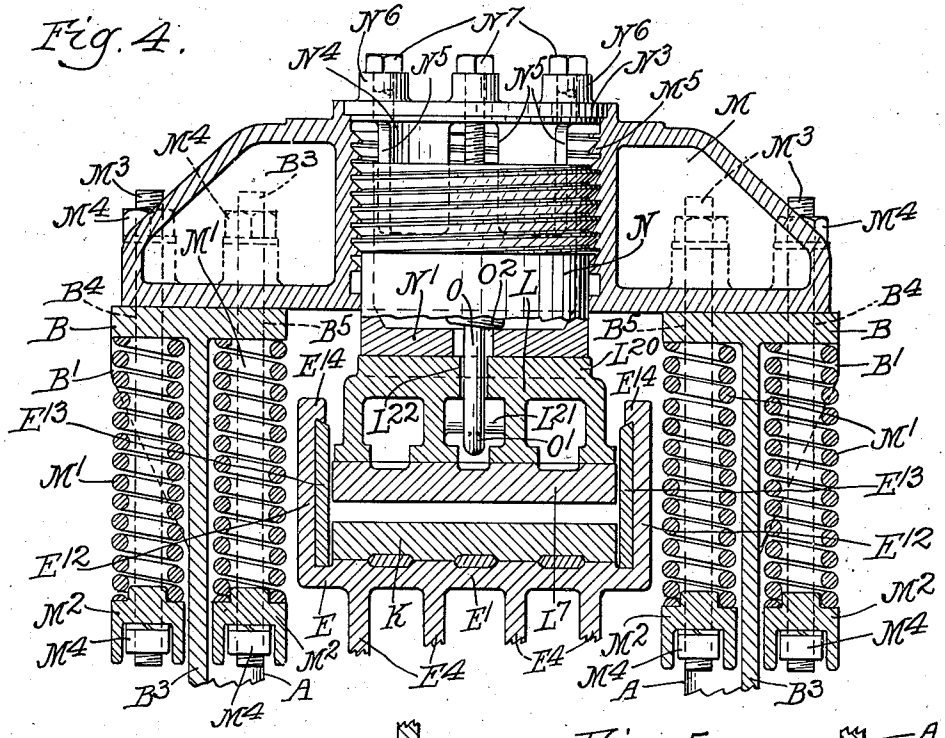


Fig. 6.

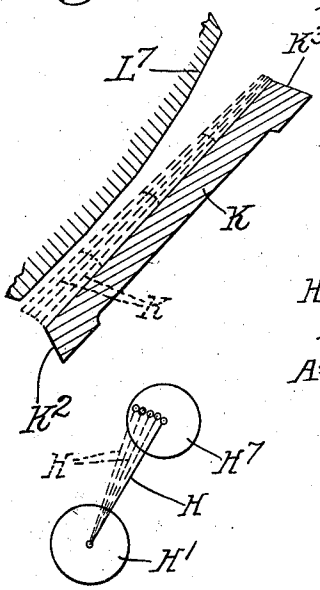


Fig. 5.

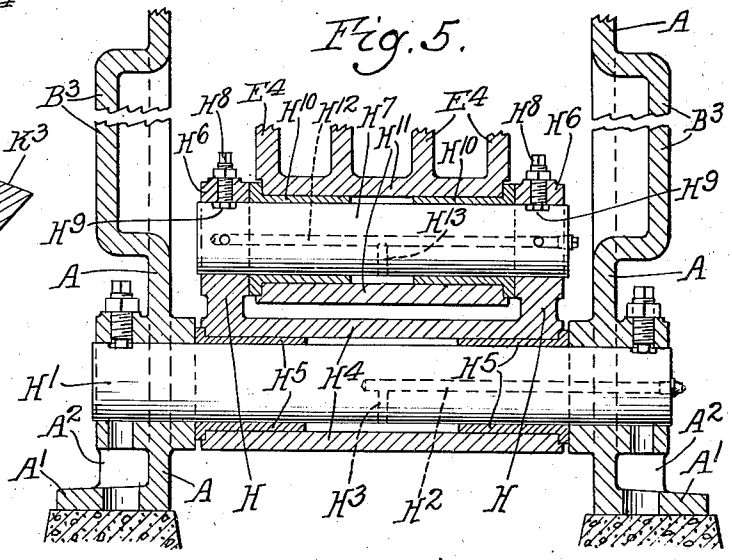


Fig. 10.

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Fig. 8.

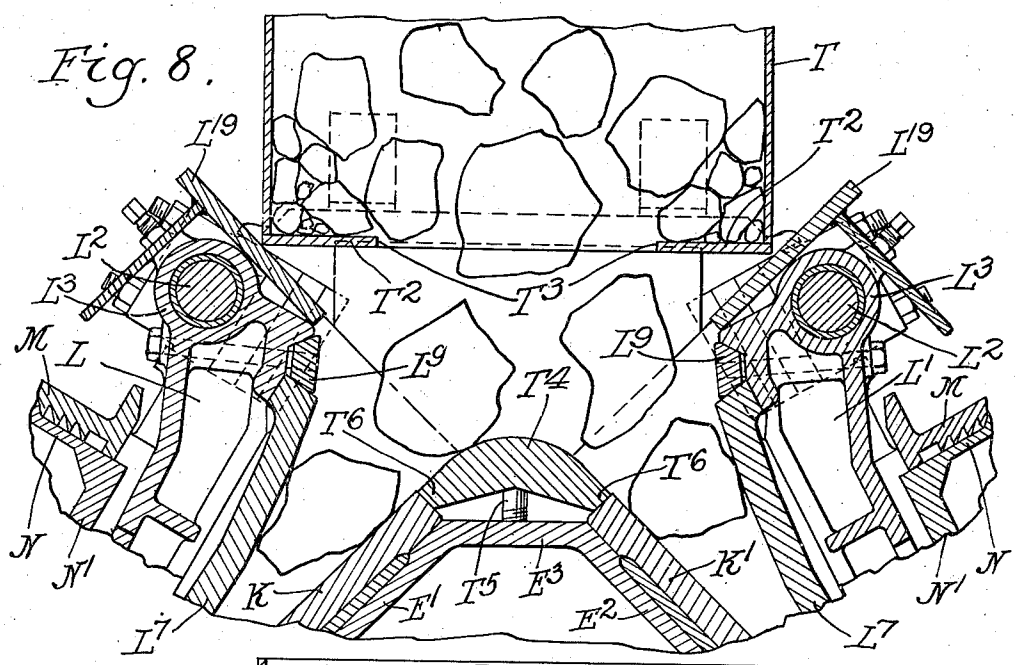
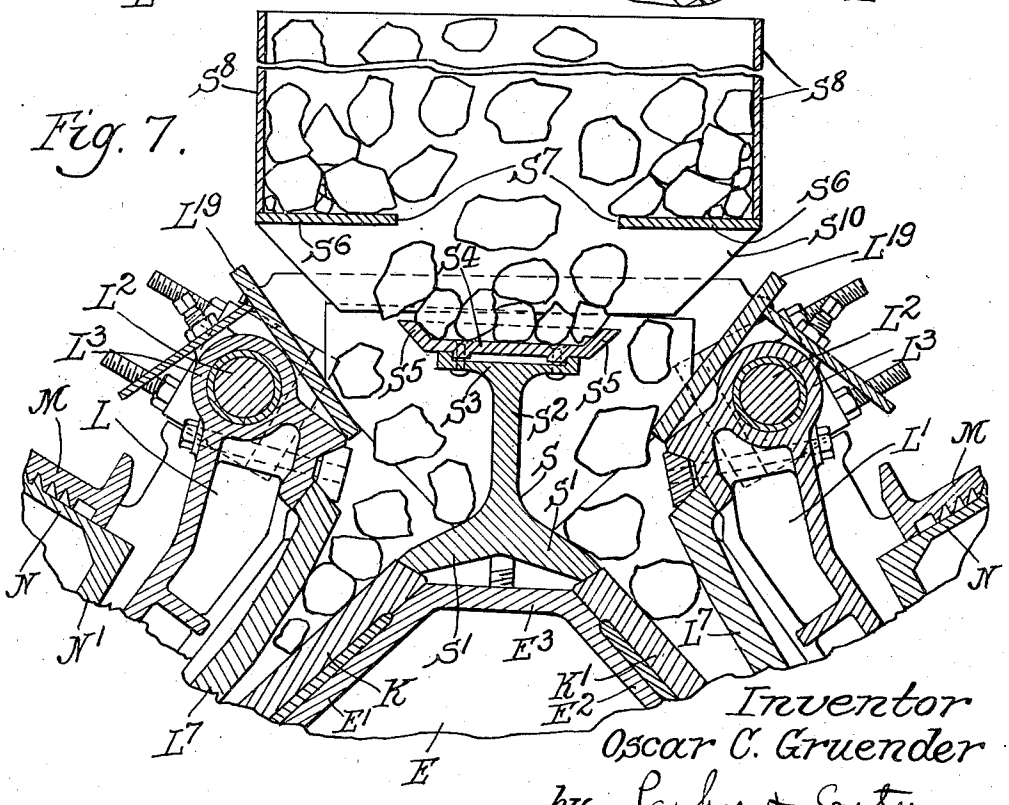


Fig. 7.



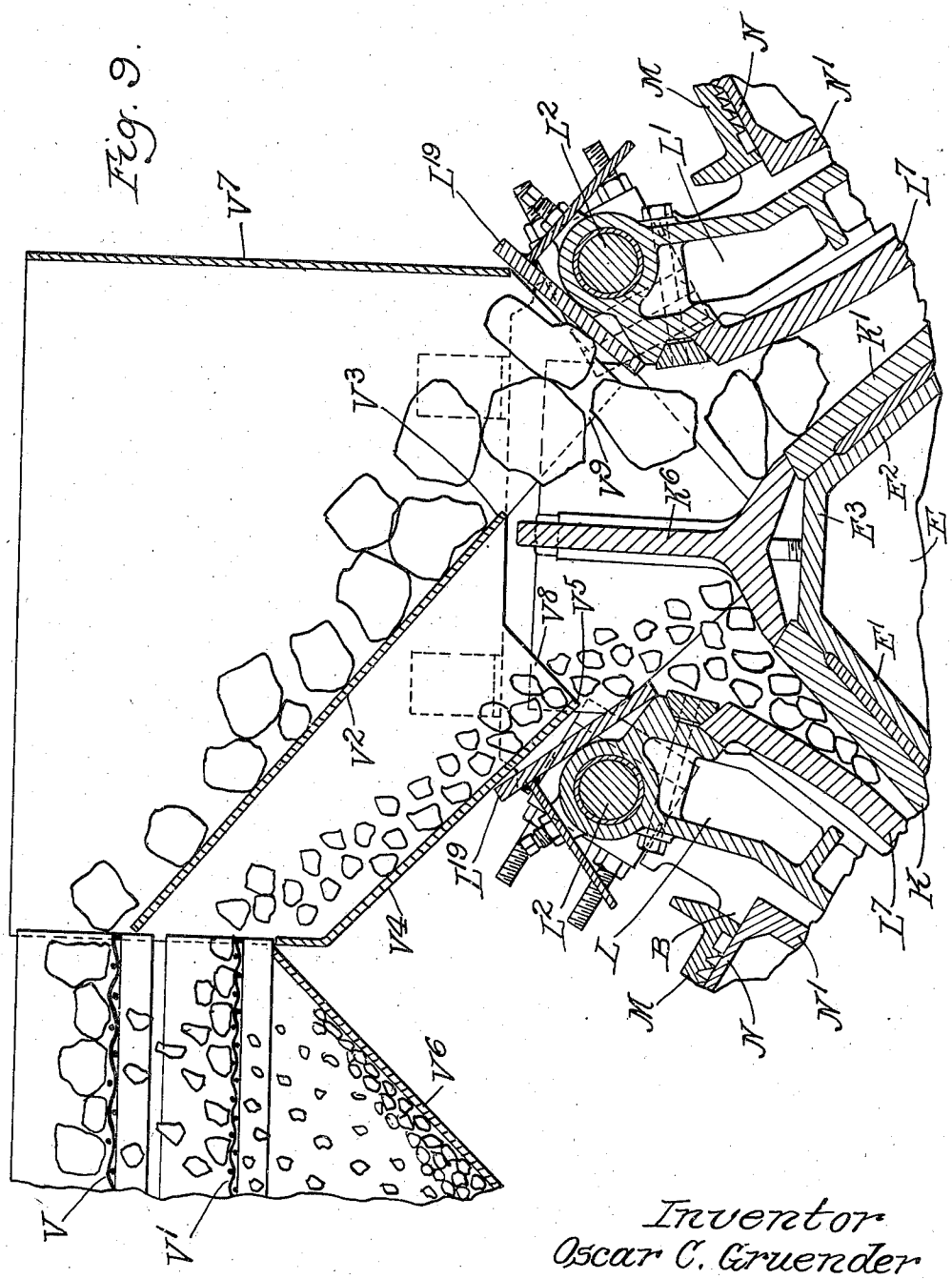
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Fig. 9.



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UNITED STATES PATENT OFFICE

2,131,801

DOUBLE ACTING JAW CRUSHER

Oscar C. Gruender, Milwaukee, Wis., assignor to Nordberg Manufacturing Co., Milwaukee, Wis., a corporation of Wisconsin

Application May 19, 1934, Serial No. 726,491

15 Claims. (Cl. 83—53)

My invention relates to an improvement in jaw crushers, and particularly to a double jaw crusher in which two normally fixed jaws are acted upon by a single moving jaw structure, the moving jaw structure having a crushing face opposed to each of the normally fixed jaws. One purpose is the provision of improved means for simultaneously crushing particles of different size in a single crusher. Another object is the provision of means for delivering simultaneously two different sizes of produce from a single crusher. Another object is the provision of improved jaw actuating means for a jaw crusher. Another object is the provision of improved feeding means for a jaw crusher. Another object is the provision of improved lubricating means for a jaw crusher. Another object is the provision of improved yielding release means for permitting a jaw or crushing member to release when it is opposed by a predetermined excess crushing stress. Another object is the provision of improved means for adjusting the position of the fixed jaw or jaws. Another object is to provide for adjustment of the feed apertures or crushing cavities.

Other objects will appear from time to time in the course of the specification and claims.

I illustrate my invention more or less diagrammatically in the accompanying drawings, wherein—

Figure 1 is a side elevation;

Figure 2 is a section on the line 2—2 of Figure 1;

Figure 3 is a section on the line 3—3 of Figure 2;

Figure 4 is a section on the line 4—4 of Figure 3;

Figure 5 is a section on the line 5—5 of Figure 3;

Figure 6 is a motion diagram of one of the jaws; and

Figures 7, 8 and 9 are partial sections, similar to Figure 3, through variant forms of feeding or feed limiting means.

Fig. 10 is a diagrammatic view illustrating the link connection between the shafts H' and H⁷.

Like elements are indicated by like symbols throughout the specification and drawings.

Referring to the drawings, A generally indicates the side wall of a frame structure which includes lower base or reinforcing flanges A^1, and strengthening webs A^2. The frame includes two sides having upwardly and inwardly inclined edge portions A^3 and a generally horizontal upper edge A^4. A^5 A^6 indicate recesses in the inclined edge portions A^3. These recesses are bounded by flanges or enlarged portions A^7. A^8 indicates enlarged portions which are provided with apertures in communication with other recesses or transverse apertures A^9, reinforced by flanges A^{10} the purpose for which will later appear.

Projecting outwardly from each side of the frame is a spring enclosure which includes a wide member B lying in the general plane of the inclined edge A^3 of the frame. It is connected to inclined portions B^1 which extend inwardly and terminate as at B^2 where they are lost in the general level of an outward projection or offset B^3 of the side frame A which offset is shown, for example, in Figure 5. The member B is apertured, exteriorly of the side of the frame, as at B^4 B^4. As will be clear from Figure 4 the member B extends on both sides of the side frame member and it is inwardly apertured as at B^5 to permit the passage of bolts therethrough.

C indicates cylindrical sleeves formed in the side frame members in which are positioned bearing sleeves C^1 which may be flanged as at C^2 and held in position as by the bolts C^3. C^4 are bushings or sleeves which may, for example, be of bronze or any other suitable anti-frictional material. It will be observed that two of these sleeves C^4 are employed for each bearing, each one being flanged at its end as at C^5 and extending in opposite directions into the sleeve C^1 but separated if desired, leaving a channel C^6 the purpose of which will later appear.

D generally indicates a drive shaft which includes portions D^1 D^1, conforming to the inner faces of the sleeves C^4 and provided with a central eccentric portion D^2. D^3 is any suitable drive pulley which may be keyed or otherwise secured upon and held against rotation in relation to the shaft D as by the key D^4. D^3 may, if desired, be of sufficient weight to serve as a fly wheel. Secured to each end of the shaft D exteriorly of the bearings above described are maze members D^5 which are surrounded by and interpenetrate with opposed fixed maze members D^6. The purpose of said maze is to prevent the escape of oil or lubricant and prevent the penetration of dust, grit or the like.

E generally indicates a moving jaw or head structure. It includes upwardly and inwardly inclined jaw supporting members E^1 E^2 which are herein shown as joined by a transverse upper portion E^3 as shown in Figure 3. They are inwardly strengthened and supported by ribs E^4 which are in connection with an inner box-like enclosure E^5 having side walls E^6, a top wall E^7 and a removable bottom plate E^8. Positioned within this box structure are wear taking side plates or liners E^9 the upward position of which is limited by shoulders E^{10}. They are locked in position, when the closure plate E^8 is in position, by the bolts E^{11} which penetrate the said plate. These members may be of bronze or any other suitable anti-frictional and wear taking material. The moving jaw E has the upwardly extending end

walls E^{12} E^{12}, to retain the crushing material. The lower portion of the end walls having the lining plates E^{13} E^{13}, held in place by the lugs E^{14} E^{14}, and also by the upper liner plates E^{15} E^{15}, which are held in place by the cap screws E^{16}. E^{17} indicates the dividing line between the two lining plates.

Slidable between the opposed liner plates E^9 is a sleeve G which has an inner cylindrical surface G^1 provided with any suitable bushings or sleeves G^2 which surrounds and conforms to the exterior of the eccentric D^2 of the shaft D. The exterior of the member G is provided with plane surfaces G^3 which slide upon the liner plates E^9. Secured to the ends of the walls E^6 and E^7 are closure members G^4 G^5, which may be bolted, for example, by the bolts G^6. The member G^5 includes flange portions G^7 spaced out to receive penetrating flanges G^8 of rings G^9 which surround the inner ends of the bearing sleeves C^1. It will be seen that a slip fit between the members G^4 and G^7 is thus provided which prevents escape of oil and excludes dust or grit.

The above described head structure is supported on the frame in the following manner. A plurality of movable links or groups of links or struts are employed, generally indicated as H. These links are pivoted at their lower ends, as shown in Figures 3 and 5, to the fixed shafts H^1, which may be provided with any suitable axial oil passages H^2 and radial oil passages H^3. H^4 indicates a bearing sleeve rotatable about the fixed shaft H^1 and having the wearing bushings H^5. The links H, H, may be either integral with or secured to the sleeve H^4. The links H^5 terminate in eyes H^6, herein shown as integral, in which are positioned a shaft H^7, such shaft being held against rotation in relation to the eyes H^6, as by set screws or locking members H^8, penetrating notches or apertures H^9. H^{10} are wearing bushings within the sleeve H^{11} of the swinging crushing jaw member E, in which the shaft H^7 rocks. H^{12} is any suitable axial oil aperture for the shaft H^7 and H^{13} is a radial oil aperture. Any suitable fitting H^{14} may be employed whereby oil or any other suitable lubricant may be admitted. Apertures A^{12} are provided in the side walls of the frame A to allow the use of a grease gun for the fittings H^{14}. It will be observed, as from Figure 3, that two pairs of links are employed, one underlying each crushing face of the member E, the links being inclined upwardly and inwardly toward each other. They so support the swinging crushing member E that none of its weight is supported by the eccentric.

Whereas any suitable oil fittings may be employed for lubricating the bearings for the links or struts H, I provide a separate and independent lubricating system for the bearings of the shaft D. I illustrate, for example, the member D^5 in Figure 2 as formed with gear teeth J which are in mesh with a driven pinion J^1 which actuates any suitable pump structure, the details of which form no part of the present invention but which may be housed in the housing J^2. As the gear J rotates with the shaft D this pump is constantly actuated during the operation of the crusher, thereby forcing oil through the pipe line J^3 to one of the bearing sleeves C^1. The oil then passes around the channel C^6 into the radial aperture J^4 in the shaft D; it then passes through the axial aperture J^5 and lubricates the eccentric through the aperture J^6 and the opposite bearing sleeve C^1 through the aperture J^7. The oil which collects in the bottom of the swing jaw enclosure E^5 flows by gravity through a flexible pipe J^8 back to a supply oil tank not shown. J^9 is a supply pipe from the tank to the pump.

The swing jaw or head structure E is provided with a plurality of removable replaceable crushing plates K, K^1, each with a lower bevelled face K^2 and an upper bevelled face K^3. The lower bevelled faces K^2 penetrate overhanging notch members K^4 formed at the lower edges of the walls E^1 and E^2. The two plates are then unitarily locked in position by the transverse member K^5 with its feed separating upward projection or plate K^6 through which pass threaded rods or bolts K^7 which have nuts K^8 at the lower ends recessed in the transverse top portion E^3 of the head E. Nuts K^9 at the upper ends serve to lock the assembly in place and the transverse member K^5 is thereby thrust downwardly against the upper edges of K and K^1, locking them firmly in position.

I provide two separate individual normally fixed crushing jaws opposed to the moving head E. I illustrate these jaw structures generally as L, L^1, each such jaw structure being rotatable about a normally fixed axis or shaft L^2. Each jaw includes a sleeve L^3, and a rearward projection L^4 therefrom and a forward and considerably shorter projection L^5. The projection L^4 has a lower notch L^6 to receive the lower edge of the crusher plate L^7, the upper edge of which, bevelled as at L^8 is engaged by a correspondingly bevelled locking member L^9 which also engages the bevel L^{10} of the projection L^5. L^{11} are screw bolts with heads L^{12}, whereby the bevelled member L^9 is moved into locking position, thrusting and holding the plate L^7 into the position in which it is shown in Figure 3. The location of the shaft L^2 is shown as adjustable. Referring, for example, to Figures 1 and 3, the shaft L^2 may be secured to the bearing supports L^{13}, slidably mounted in the recesses A^5 A^6 of the frame. A plurality of shims L^{14} may be employed to space the member L^{13} out at any desired position of adjustment, as shown in the recess A^6. No shims are shown in the recess A^6 so that the upper hinged end of the fixed jaw L is set at the closest position to the moving jaw while the upper hinged end of the fixed jaw L^1 is set at its farthest position from the moving jaw E. The bolts L^{15} with the nuts L^{16} and L^{17} are effective to lock the parts firmly in the desired adjustment. The bolts L^{15} are weakened by the groove L^{18} to provide a safety breaking point in the event of any uncrushable material lodging in the upper part of the throat between the crushing jaws. L^{19} is an inclined protecting plate tending to deflect the material fed into the crushing cavity and to protect the member L^3, L^5, L^9, etc., from the battering of falling particles which may be fed to the crushing cavity.

I also provide for an adjustment of the lower end of the normally fixed position of the jaws L, L^1, as follows. The side walls of the main frame are bridged by a transverse member M which lies against the member B and is held by springs M^1. The springs are held under compression between the member B and a moving abutment M^2 by bolts M^3, M^3, and nuts M^4. Midway of its length the bridge is apertured and screwthreaded as at M^5 to receive a screwthreaded adjustment sleeve N. The sleeve N is closed at its inner end as at N^1 and has at its opposite open end the inwardly projecting lugs N^2. A cap plate N^3 closes the aperture M^5 in the bridge member and has an inwardly extending flange N^4 slotted as at N^5 for

the lugs N^2 of the sleeve N. The four outwardly projecting lugs N^6 are apertured to receive four screw bolts which screw into the lugs N^2 of the sleeve N. By loosening these bolts the cap plate N^3 can be turned in either direction with a bar passed between the projecting lugs N^6, the slots N^5 of the flange N^4, engaging the lugs N^2 of the sleeve N, will rotate the sleeve and provide any desired adjustment. After the adjustment has been made the bolts N^7 are tightened and take up any slack in the threads M^5.

The lower ends of the fixed jaws have a convex surface L^{20} which is held in contact with the lower face N^1 of the sleeve N by a hook end O^1 of the bolt O engaging a rib L^{21} of the fixed jaw. The bolt extends up through the slot L^{22} in the jaw and an aperture in the bottom N^1 of the sleeve. A spring O^2 compressed between the bottom N^1 and the washer O^3 and nut O^4 serves to hold the convex surface L^{20} in contact with the adjusting sleeve. This adjustment may be made to allow for wear or to allow for a wide range of settings to meet various crushing requirements. The left hand jaw L is shown set for fine crushing and the right hand jaw L^1 is set for coarse crushing.

The heavy coal springs M^1, of which there are twelve for each stationary jaw, afford a yielding means for the escape of any uncrushable material which may happen to enter the crusher.

A feed hopper P supported on the frame A by brackets P^1 P^1 is provided with a center wall P^2 flared at the lower portion as at P^3 to divide the stream of material and direct it to each crushing cavity.

Referring to Figure 7, I illustrate in the place of the members K^5 and K^6 a unitary member S which includes a transverse locking member S^1 applied to the upper edges of the jaw plates K and K^1. Integral with it is the upper web or partition S^2 which is expanded at its top to form a bracket or plate support S^3 upon which may be mounted the feeding plate S^4 which may be of any suitable form but is herein shown as having raised rims S^5. S^6 represents a feed receiving partition at a level above the plate S^4. It is provided with a central aperture S^7 and forms part of a feeding hopper herein shown as having vertical sides S^8 in which feed is received from the delivery chute not shown. It will be understood, of course, that the form of the hopper S^8 may be varied. I find it advantageous, however, to have a feed aperture, such as S^7, with a limited diameter, vertically aligned with the plate S^4. Material escapes over one edge of the plate S^4 into one crushing cavity and over the other edge into the other, as will be clear from Figure 7. S^{10} is any suitable confining chute positioned below the partition S^6 and overlying the members L^{19}. This prevents or limits the escape of dust or flying particles.

Referring to Figure 8, T generally indicates a feed box or hopper receiving material from a chute not shown. It is provided with a bottom partition T^2 having a central aperture T^3. This form of feeding means is particularly adapted for coarse feeding or coarse crushing. The aperture T^3 is large and will admit relatively large particles. These fall upon the rounded or flattened top T^4 of the head, the member T^4 being secured in position as by the bolt T^5 and having edge portions T^6 which engage the tops of the jaw plates K and K^1 respectively. It thus serves not merely to clamp the jaw plates in position but to receive the particles fed through the aperture T^3.

Referring to Figure 9, I illustrate a screen, herein shown as a vibrating screen, having an upper screening member V, and a lower screening member V^1. The oversize from the screen V passes over the end of the screen and over and down the chute V^2 which terminates as at V^3 in general alignment with the member K^6. The material which passes through the screen V but passes over the screen V^1 is delivered to the chute V^4 which terminates as at V^5, overlapping one of the members L^{19}. The undersize from the lower screen V^1 may pass off as by the chute V^6, not undergoing crushing. V^7 is any suitable surrounding housing the side wall of which extends downwardly along the chute V^5 as at V^8 and downwardly below the chute V^2 as at V^9. The structure thus shown, in association with the partition K^6, definitely segregates the oversize and the screened material, passing the oversize to one crushing cavity and the screened material to another. The upper edge of the member K^6 terminates closely adjacent the lower edge of the member V^2. Therefore, it is substantially impossible for particles to escape from one line of feed to the other. The lower edge of the member V^3 slightly overhangs the partition K^6, delivering all of the coarse feed to the far crushing hopper, in relation to the screen. The fine feed passes to the inner crushing member, as will be clear from Figure 9.

It will be realized that whereas I have described and shown a practical and operative device, nevertheless many changes might be made in the size, shape, number and disposition of parts without departing from the spirit of my invention. I therefore wish my description and drawings to be taken as in a broad sense illustrative and diagrammatic rather than as limiting me to my specific showing. In particular, I wish it to be understood that the size and shape of the crushing cavity and of the crushing part delimiting the crushing cavities can be widely varied. Also, the particular lubricating means employed may be widely varied.

The use and operation of my invention are as follows:

I illustrate a multiple jaw crusher in which two separate crushing cavities are defined by the two normally fixed jaw plates L^7 and the two jaw plates K, K^1 on the movable head. Each crushing cavity may be individually adjusted to open it up or close it down, to make it a fine or coarse crushing cavity. I illustrate, for example, the adjustable abutment members N^1 against which each movable jaw is yieldingly drawn as by the hooks O and the springs O^2. Each of the normally fixed jaws is pivoted as at L^2. No clamping will take place, inasmuch as I provide a rolling contact formed by the lugs L^{20} at the rear of the jaw structure. As the jaw plates are readily removable a certain change or variation in the thickness or contour of the crushing cavities can be obtained by substituting jaw plates of different design.

As an overload release I provide a yoke structure generally indicated as M which abuts against the flanges B^4 of the frame and is drawn thereagainst as by the spring M^1. In response to a predetermined excess crushing stress the structure M will recede, in response to the thrust against the jaw plates L^7.

The compound link support of the crushing head imparts a crushing movement diagrammatically shown in Figure 6. The excursion of the head increases from top to bottom. The

movement is not directly toward and away from the opposed crushing plate L^7, but may be described as a species of arc, as shown in dotted lines in Figure 6. This tends to draw or hold the material undergoing crushing against the opposed normally fixed plates L^7.

The pivot points of the normally fixed jaws can also be adjusted as is clear, for example, in Figure 1. Shims L^{14} may be employed to shim out and thus vary the location of the members L^2 which define the axes of rotation of the normally fixed jaws.

I may elect to employ my crusher merely as a double jaw crusher, having an identical or substantially identical discharge opening at each side. In case I do this it may be convenient to follow the structure as shown in Figure 8 in which the rounded member T^4 is in locking engagement with the tops of the jaw plates K and K^1, being drawn downwardly thereagainst as by the spring T^5. Also, I may provide a feed limiting or feed distributing plate as shown in Figure 7, which may be used where an identical product is produced by both sides. In such case the plate S^4, by itself, or in connection with the overhanging apertured partition S^7, will slow the feed down and limit it to the desired volume. It will be understood that whereas the forms of Figures 5 and 7 are adaptable to use with the machine when it is uniformly set with both crushing cavities identical, I may also if I wish, and with the same feeding means, vary the setting of the two crushing cavities. I may, for example, wish a half inch product from one side and a three-quarters inch product from the other, where I have a call for two not too dissimilar grades of material. I can produce these different sizes from a uniform feed into both cavities.

It often happens, however, that it is necessary to crush entirely different material. I illustrate an example of such a situation and a solution for it, in Figure 9. In that case I segregate the feed between the two cavities. The chute V^2 delivers large material to a coarsely set crushing cavity. It will be noted that the shaft L^2 of the right hand crushing cavity or crushing jaw is set more widely away from the head than is the corresponding shaft L^2 of the finer set or left hand cavity. The larger material, delivered along the chute V^2, drops entirely into the coarse crushing cavity. The partition K^6 approaches so closely to the discharge edge V^3 of the chute V^2 as to prevent any material from above the chute V^2 penetrating to the fine crushing cavity. The chute V^4, on the contrary, delivers the finer material to the fine crushing cavity, the lower edge V^5 of the chute substantially overhanging the guard member L^{14}. Therefore, when the head, as shown in Figure 9, is oscillated, it causes crushing to take place in two separate crushing cavities of different contours and of different discharge apertures. The fine feed goes to the more closely set crushing cavity and the coarse feed to the more open or coarsely set cavity.

I claim:

1. In a jaw crusher, a frame, a pair of normally fixed jaws mounted upon said frame, and a moving crushing member between said jaws and means for oscillating it, said moving crushing member being provided with a crushing face opposed to each of said jaws, and supporting means for said moving crushing member including a plurality of links pivoted to said member and to said frame, the means for oscillating said moving crushing member including an eccentric and means for rotating it, a sleeve surrounding said eccentric and a sliding bearing connection between the exterior of said sleeve and said moving crushing member, at substantially the same level as the connection between the links and the crushing member.

2. In a jaw crusher, a frame, a movable jaw mounted upon said frame and means for actuating it, said jaw being provided with a pair of crushing faces, situated upon opposite sides of the jaw, supporting means for said jaw including upstanding links pivoted to the frame and to a lower portion of the jaw, the pivotal connection between the upper ends of the links and the jaw being below the crushing faces of the jaw, the means for actuating the jaw including an eccentric passing through said jaw at a level generally the same as that of the pivotal connections between the jaw and the upper ends of the upstanding links, and sliding contact means intermediate said eccentric and jaw.

3. In a double acting jaw crusher, a frame, a pair of normally fixed jaws mounted upon said frame, a moving crushing member located between said jaws and having a crushing face opposed to each jaw, and supporting means for said moving crushing member, including a plurality of links pivoted to said member and to said frame at opposite sides of said moving crushing member, the pivotal connections between the links and the frame being separated by a greater distance than the pivotal connection between the links and the moving crushing member, and means for imparting an oscillatory movement to said moving crushing member.

4. In a double acting jaw crusher, a frame, a pair of normally fixed jaws mounted upon said frame, a moving crushing member located between said jaws and having a crushing face opposed to each jaw, and supporting means for said moving crushing member, including a plurality of links pivoted to said member and to said frame at opposite sides of said moving crushing member, the pivotal connections between the links and the frame being separated by a different distance than the pivotal connection between the links and the moving crushing member, and means for imparting an oscillatory movement to said moving crushing member.

5. In a double acting jaw crusher, a frame, a pair of normally fixed jaws mounted upon said frame, a moving crushing member located between said jaws and having a crushing face opposed to each jaw, and supporting means for said moving crushing member, including a plurality of links pivoted to said member and to said frame at opposite sides of said moving crushing member, the pivotal connections between the links and the frame being separated by a greater distance than the pivotal connection between the links and the moving crushing member, said links being upwardly and inwardly inclined.

6. In a double acting jaw crusher, a frame, a pair of normally fixed jaws mounted upon said frame, a moving crushing member located between said jaws and having a crushing face opposed to each jaw, and supporting means for said moving crushing member, including a plurality of links pivoted to said member and to said frame at opposite sides of said moving crushing member, the pivotal connections between the links and the frame being separated by a greater distance than the pivotal connection between the links and the moving crushing member, and means for imparting an oscillatory movement to said mov-

ing crushing member, including an eccentric and means for rotating it, a sleeve surrounding said eccentric, and a sliding bearing connection between the exterior of said sleeve and said moving crushing member, at substantially the same level as the connection between the links and the crushing member.

7. In a jaw crusher, a frame, a movable jaw mounted in said frame and means for oscillating it, a normally fixed jaw mounted on said frame and overhanging said movable jaw, said frame including upstanding portions and relatively extended plane abutment flanges along upper edges thereof, means for releasably holding the normally fixed jaw in position in relation to the frame, including a bridge having opposed plane portions engaging and conforming to the abutment flanges of the side portions of the frame, means for holding said bridge normally in position, including springs compressed beneath said flanges, alining and compressing members for said springs, including rods extending through said flanges and secured to said bridge, abutment means at the lower ends of said rods, engaging said springs, adjusting means for adjusting the position of the normally fixed jaw in relation to said bridge, including a generally cylindrical externally screw-threaded plug positioned substantially midway between the ends of said bridge and of a diameter of the order of the width of the crushing cavity, said bridge being screw-threadedly apertured to receive said plug, means for rotating said plug in relation to said bridge, said plug including an inward face, rocking contact means between said inward face and an opposed portion of the normally fixed jaw, a compression member passing through said plug and secured to the interior thereof, and including a portion engaging said normally fixed jaw in a securing relationship, and means for drawing said compression member and jaw in the direction of said rocking contact means.

8. The structure of claim 7 characterized by the employment of yielding means tending normally to draw said normally fixed jaw against said plug.

9. The structure of claim 7 characterized by the employment of a rocking contact between the plug and the normally fixed jaw, including a rocker abutment extending horizontally along the rear face of said jaw and projecting outwardly from said rear face.

10. The structure of claim 7 characterized by the employment, in connection with said plug, of means for locking it against unintended rotation.

11. The structure of claim 7 characterized by the employment, in connection with said plug, of means for locking it against unintended rotation comprising a cover plate for the bridge aperture which receives said plug, and compression connections between said cover plate and said plug, whereby the threads of said plug are locked against the threads of said aperture.

12. The structure of claim 7 characterized by the employment of external means effective for rotation of said plug, and means for locking said external means and plug against unintended rotation.

13. In a jaw crusher, a pair of normally fixed jaws, a moving crushing member located between said fixed jaws, means for oscillating it, a plurality of jaw plates mounted on opposite faces of said moving crushing member, one being opposed to each of said normally fixed jaws, and thereby forming two crushing cavities, a unitary locking member and means for drawing it positively downwardly upon said moving crushing member and against the upper edges of said jaw plates, a partition member mounted on and extending upwardly from and moving unitarily with said member, a feed spout including a normally fixed partition alined with said first partition, and means for constantly maintaining an effective operative relationship between said partitions, whereby all the material delivered downwardly through the said spout at one side of said fixed partition falls into one crushing cavity, and all the material fed downwardly through the feed spout at the opposite side of said fixed partition falls into the opposite crushing cavity, the means for drawing the unitary locking member downwardly against the upper edges of said jaw plates extending downwardly through said first partition and said unitary locking member, to secure said first partition in relation to the moving crushing member.

14. In a jaw crusher, a frame, a movable jaw mounted on said frame and means for actuating it, a normally fixed jaw mounted on said frame, and means for varying the distance between the opposed crushing faces of the crushing cavity thus formed, including abutment means opposed to said normally fixed jaw, yielding means for urging such jaw against said abutment means and means for adjusting said abutment member toward and away from the crushing cavity, said normally fixed jaw being pivoted in relation to said frame, and rolling contact means intermediate said normally fixed jaw and said abutment member, including a relatively plane surface on one of said members, a rocker on the other generally arcuate in transverse cross section, said yielding means adapted normally to hold said normally fixed jaw against said abutment member with said rocker abutting against said plane surface, and means for limiting movement of the abutment member towards and from the crushing cavity to movement axially of the abutment member.

15. In a jaw crusher, a frame, a movable jaw mounted on said frame and means for actuating it, a normally fixed jaw mounted on said frame, means for varying the distance between the opposed crushing faces of the crushing cavity thus formed, including an abutment opposed to said normally fixed jaw, yielding means for urging such jaw against said abutment, and means for adjusting said abutment toward and away from the crushing cavity including a hollow cylindrical exteriorly screwthreaded member associated with the abutment, a corresponding screwthreaded member associated with the frame, means for limiting the movement of the abutment member towards and away from the crushing cavity to movement axially of the screwthreaded member, and means for imparting relative rotation to the screwthreaded member, and a rocker member associated with the rear face of the normally fixed jaw, the abutment on said cylindrical member being opposed to said rocker and said yielding means normally urging said rocker member against said abutment member.

OSCAR C. GRUENDER.