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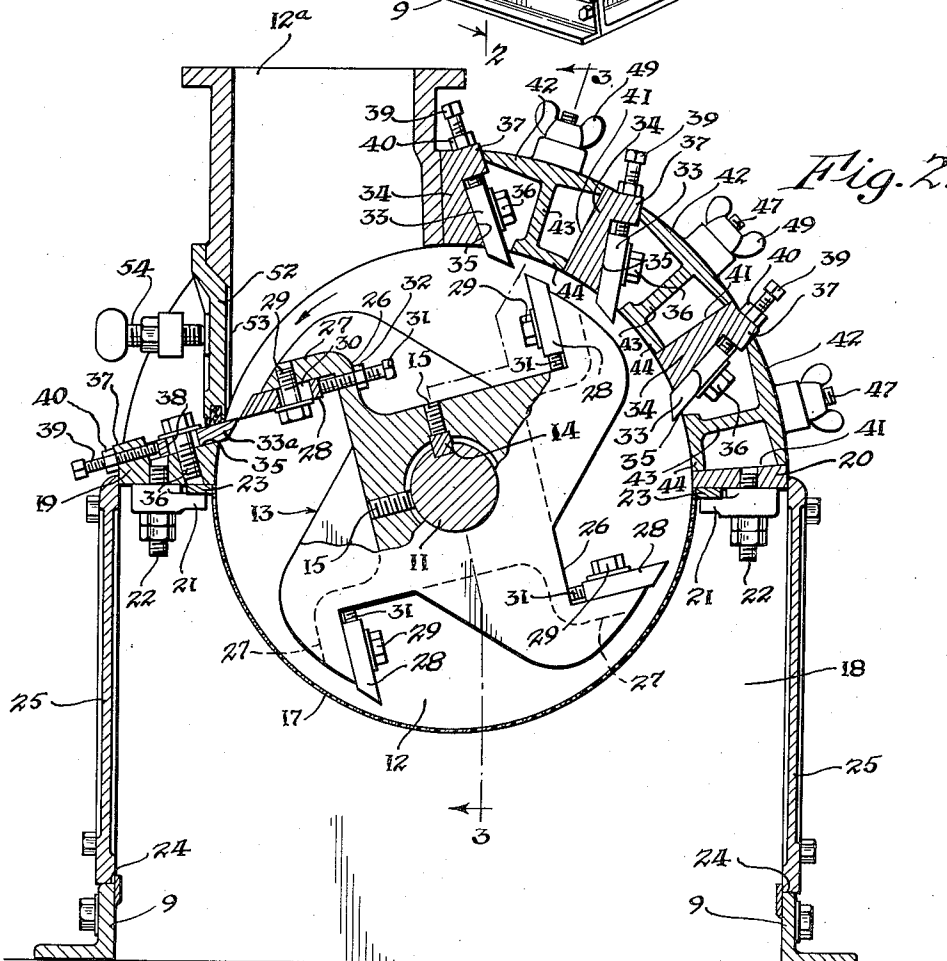
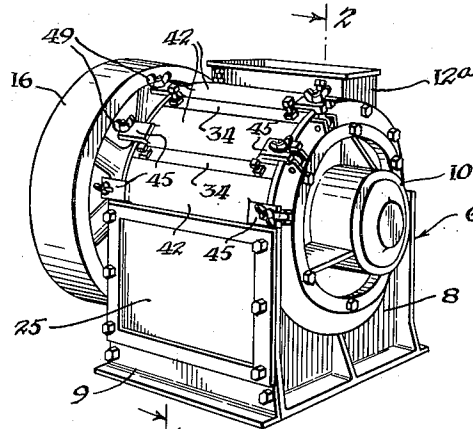
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COMMINUTING MILL

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2 Sheets-Sheet 1

Fig. 1.



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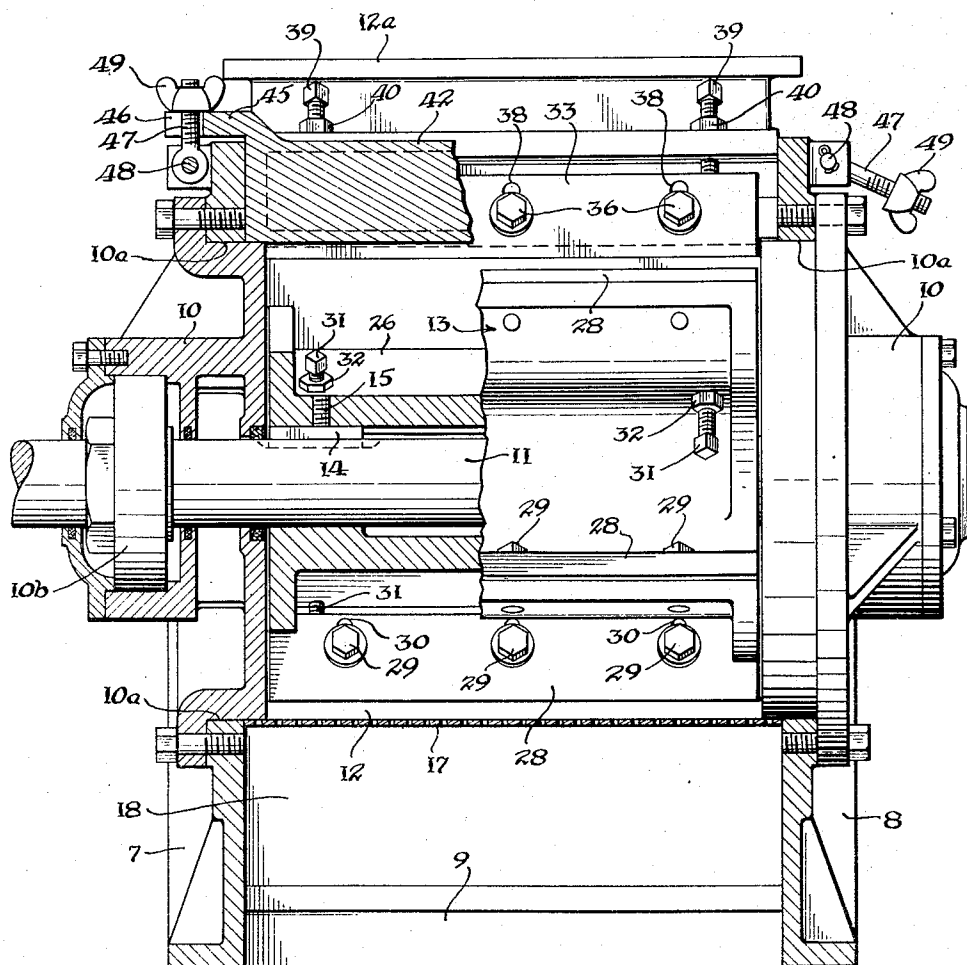
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Fig. 3.



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COMMUNUTING MILL

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Application May 28, 1938, Serial No. 210,760

3 Claims. (Cl. 83—6)

This invention relates to improvements in comminuting mills, being concerned in particular with a mill of the kind wherein the reducing operations are performed by co-operating rotating and stationary knives which are adjustable in accordance with the characteristics of the particular material and the desired degree of reduction.

One object of the invention is to provide a mill which is available for use in connection with materials having widely different properties and which is characterized by features which adapt it particularly for the reduction of tough fibrous materials.

A further object is to provide for facility and accuracy in adjusting the knives of the mill, this object contemplating a construction in which provision is made for inspecting and gauging the clearances between the knives throughout their entire length and for conveniently adjusting the knives to vary such clearances.

A still further object is to provide a novel design and arrangement of the parts of the mill, whereby the various parts may be assembled and taken apart with facility and are capable of easily withstanding the severe strains which are attendant with the use of the mill.

The invention is illustrated in the accompanying drawings in which:

Figure 1 is a perspective view of a mill embodying the features of the invention.

Figure 2 is an enlarged transverse section taken along line 2—2 of Figure 1.

Figure 3 is a longitudinal section taken along line 3—3 of Figure 2, a portion of the rotating head and one bearing housing being shown in elevation.

The casing of the mill is indicated at 6. As illustrated, it includes end castings 7 and 8 which are connected at their bases by angle bars 9 and which carry bearing housings 10 for a shaft 11. The said shaft extends through a working chamber 12 into which the material to be reduced is introduced through a hopper 12a and carries a head 13, the latter being located in the working chamber and being secured to the shaft by a key 14 and threaded element 15. A balance wheel 16 is mounted upon the shaft 11 and is available for connecting the said shaft to a suitable motor. The bottom of the working chamber 12 is provided by a semi-cylindrical screen 17, the mesh of the latter being predetermined in accordance with the desired grade to which the material is to be reduced. The said screen is located over an outlet chamber 18 and is re-

movably secured to ribs 19 and 20 by clamps 21, the said ribs being welded or otherwise secured at their opposite ends to the castings 7 and 8. The clamps 21 are carried by bolts 22 which are supported by the said ribs and co-operate with lips 23 formed or provided along the upper marginal edges of the screen. Access to the outlet chamber 18 may be had through openings 24 which are located at opposite sides of the casing and which are normally closed by doors 25.

The head 13 is formed or provided with arms 26 which terminate in flanges 27. The latter extend substantially at right angles with respect to the body portions of the arms; they are arranged lengthwise of the working chamber and carry knives 28. The said knives are secured to the flanges 27 on the sides facing the direction of rotation of the head (see arrow in Figure 2) by bolts 29 which pass through slots 30 formed in the knives and enter threaded holes in the flanges. The slots 30 extend transversely of the knives and provide for their adjustment toward and away from the co-operating stationary knives, such adjustments as are made being maintained by bolts 31 which are carried by the arms 26 and which engage the rearmost edges of the knives, the said bolts preferably carrying lock nuts 32.

The bearing housings 10, as illustrated, are removably secured in openings 10a which are formed in the end castings 7 and 8 and carry suitable anti-friction bearings 10b. Preferably the openings 10a are large enough to permit the head 13 to be passed through either of them into and out of the working chamber. Facility in assembling, dismantling and overhauling the mill is thus insured.

The knives 28 co-operate with stationary knives 33 and 33a. The knives 33 are carried by ribs 34 which are arranged in an accurate series between the hopper 12a and the rib 20 and which are welded or otherwise secured at their opposite ends to the castings 7 and 8 while the knife 33a is carried by the rib 19 and is, therefore, located at the opposite side of the said hopper. The said ribs are preferably machined to provide inclined faces 35 against which the knives 33 and 33a are secured by bolts 36. The latter pass through slots 38 (Figures 2 and 3) which are formed transversely of the knives and enter threaded openings in the ribs. The slots 38 provide for adjustment of the knives 33 and 33a toward and away from the knives carried by the head 13, bolts 39 which are carried by shoulders 37 of the ribs being available in connection with

lock nuts 40 to maintain the knives in the position to which they are adjusted.

The ribs 34 define windows 41 which extend lengthwise of the housing and which are normally closed by covers 42. One of the marginal edges of each of the said covers fits against a shoulder 37 of one of the ribs while the opposite edge fits against the upper edge of the adjacent rib. The covers are formed with inwardly directed webs 43 which carry flanges 44. The said flanges are spaced from the faces 35 of the ribs to provide openings through which the knives 33 extend. Their opposite edges, however, fit against the lower edges of the adjacent ribs. The covers also carry end extensions 45 which overlie the end castings 7 and 8 and which are formed with open ended slots 46, the latter being adapted to accommodate bolts 47 which are pivotally mounted upon pins 48. The said bolts carry wing nuts 49 which may be tightened down upon the extensions 45 to secure the covers in their respective windows.

The knife 33a extends into the working chamber below a door 52 which fits in an opening 53 and which is held in its closed position by screws 54. The said door serves the same purpose as the removable covers 42, being removable to enable inspection and gauging of the clearance between the cutting edge of the knife 33a and the cutting edges of the knives 28.

It will be apparent that the mounting of the knives 28, 33 and 33a in the manner described provides for their convenient adjustment to vary the clearances between their cutting edges. Such adjustments, including those to provide minimum clearances, may be made accurately and with facility as the removable covers 42 and the door 52 provide for the inspection and accurate gauging of the clearances between the co-operating knives throughout their entire length. It will be noted that the stationary and movable knives are so mounted that such forces as are transmitted to them during operation of the mill are only indirectly applied to the bolts by which they are secured to the head and casing. The greater portion of such forces are taken up directly by the flanges 27 in the case of the movable knives and the ribs 19 and 34 in the case of the stationary knives. The subjection of the bolts 29 and 36 to excessive strains is thus avoided. In this connection, it will also be noted that the covers 42 not only close the windows 41 but they also serve to reinforce the ribs 34. As each cover abuts the upper and lower edges of the back of one rib and the shoulder 37 of an adjacent rib, the covers and ribs provide a continuous arcuate wall which is capable of easily withstanding the forces to which it is subjected during operation of the mill without yielding of the ribs to permit movement of the stationary knives. The construction described, therefore, not only enables minimum clearances to be provided between the stationary and rotary knives but also insures the maintenance of such clearances under operating conditions. The mill thus has the advantage that it may be employed in connection with the reduction of various materials such as, for example, scrap rubber tires, leather, rags, felt, roots, bark, plastic materials and various chemicals and chemical compounds.

We claim as our invention:

1. A comminuting mill including a housing

which is formed to provide a working chamber, a rotary head in said chamber, a knife carried by said head, a window in said housing, a rib which extends substantially parallel with the axis of said head and which provides one wall of said window, a second knife carried by said wall which co-operates with said first named knife, means for adjusting one of said knives with respect to the other to vary the clearance between their cutting edges, said window providing for the inspection of said clearance and a removable cover which normally closes said window, said cover having an inwardly extending web which carries a flange, one side of said flange engaging one wall of said window and the other side extending adjacent the cutting edge of said second knife, the inner surfaces of said rib and flange being arcuate and having a common radius, the center of which is located substantially at said axis.

2. A comminuting mill including a housing which is formed to provide a working chamber, a rotary head in said chamber, a knife carried by said head, a window in said housing having stationary side walls which are substantially parallel with the axis of said head, one of said walls being formed with a longitudinally extending shoulder, a second knife, a threaded element for securing said second knife to said last named wall under said shoulder in co-operating relation with respect to said first mentioned knife, one of said knives being adjustable with respect to the other to vary the clearance between their cutting edges, said window providing for the inspection of said clearance and a cover which is removably secured in said window, said cover having outer and inner flanges joined by an integral connecting web which is spaced from said threaded element, said outer flange having longitudinal edges which engage said shoulder and the other of said walls and said inner flange having one edge which engages said last named wall and another edge which extends adjacent the cutting edge of said second knife.

3. A comminuting mill including a housing which is formed to provide a working chamber, a rotary head in said chamber, a knife carried by said head, a window in said housing, a rib which extends substantially parallel with the axis of said head and which provides one wall of said window, said wall being formed with a longitudinally extending shoulder, a second knife, means for adjustably securing said second knife to said last named wall under said shoulder, whereby the clearance between the cutting edges of said knives may be varied, said window providing for the inspection of said clearance and a cover which is removably secured in said window, said cover having outer and inner flanges joined by an integral connecting web, said outer flange having longitudinal edges which engage said shoulder and the other of said walls and said inner flange having one edge which engages said last named wall and another edge which extends adjacent the cutting edge of said second knife, the inner surfaces of said rib and inner flange being arcuate and having a common radius, the center of which is located substantially at said axis.

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