

April 7, 1953

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2,633,602

RUBBER RECLAIMING APPARATUS

Filed Nov. 26, 1949

FIG. 1.

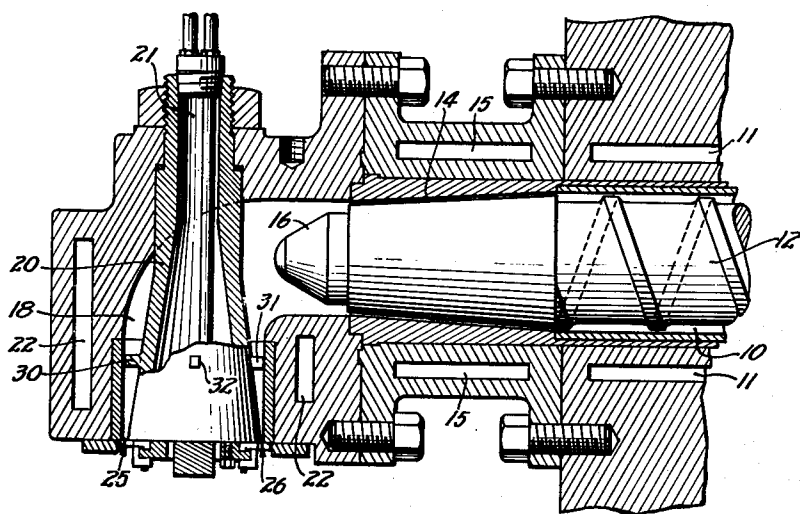
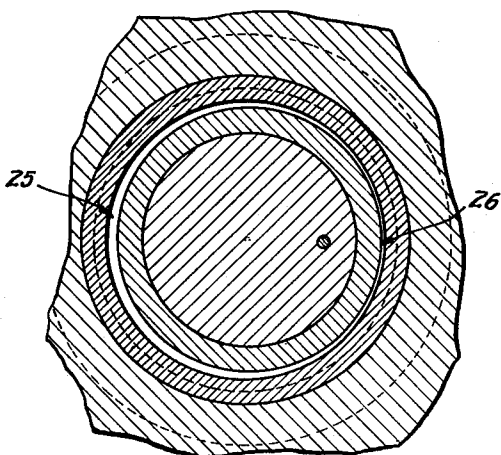
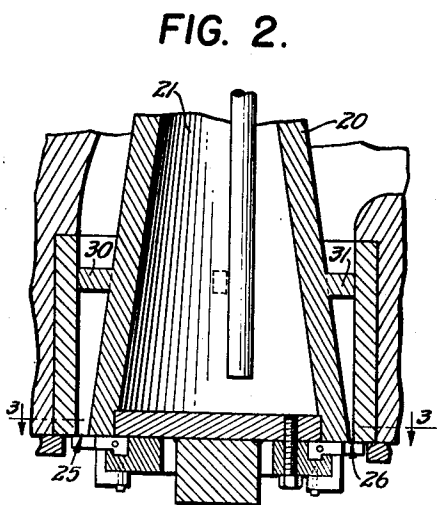


FIG. 3.



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2,633,602

RUBBER RECLAIMING APPARATUS

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Application November 26, 1949, Serial No. 129,586

5 Claims. (Cl. 18—14)

1

This invention relates to apparatus for the reclaiming of rubber, and more particularly to apparatus for treating material in an elongated channel from which it is conducted through an annular discharge channel extending at an angle thereto.

Such apparatus find their major use in methods and with materials where the control of temperature and other treating conditions are of major importance, and where there are definite time limits on various stages of the treatment. For example, a cooling step carried out as the material passes through the discharge channel must often be precisely correlated with speed of flow to have major effectiveness. It is accordingly important that the time consumed in the passage of material in all parts of the discharge channel be relatively uniform; and it has been found that unsatisfactory results are often traceable to differences in flow speeds at different sides of the discharge channel. These differences result from the effort of the flowing material to take the shortest course, so that, other things being equal, a much greater amount of material will flow through the near side of the annular discharge channel than through its far side, with the result that any given portion of the material in the near side will stay in the channel a much shorter time than a similar portion will stay in the far side.

Pursuant to the present invention, this condition is remedied by so constructing the discharge channel that the channel is thinner at its near side than at its far side so that a greater proportion of material will be forced into the far side and so that there will be a greater frictional drag on the material at the near side to slow up the flow of material. Another advantage is that the material at the far side, which takes the longest course, will include a greater proportion of material which is so far from the channel walls that it will be affected more slowly by heat transfer or other control conditions, whereas substantially all of the faster-moving material in the near side will be in close contact with the channel walls.

For a fuller understanding of the nature and objects of the invention, reference should be had to the following detailed description taken in connection with the accompanying drawings, in which:

Figure 1 is a vertical-sectional view of one form of apparatus embodying the invention;

Figure 2 is an enlarged sectional view of an end-portion thereof; and

2

Figure 3 is a cross-sectional view thereof along the line 3—3 of Figure 2.

In the exemplified form of construction there is provided a channel 10 which, in the present instance, is temperature controlled, as by fluid circulating in conduit 11. Material to be treated, as vulcanized rubber undergoing reclaiming action, is forced through the channel as by a screw 12 adapted to exert a working and forcing action on the material which heats the material. Controlled-temperature fluid in conduit 11 not only heats the material where it is not hot enough, but prevents overheating where it is too hot. Beyond the channel 10 in the present instance is a channel portion 14 in which there is a rotating cone which restricts the passageway for material to a reduced-area orifice such that the worm will exert a compacting action on the material within the channel 10. Fluid in conduit 15 serves to control the temperature of the material in the channel 14. Extending at an angle to the channels 10 and 14 (perpendicularly thereto in the present instance) is an annular channel 18 which surrounds a die 20 the interior of which is hollow to provide a conduit 21 for a cooling fluid. A conduit 22 for cooling fluid is also provided exterior to the channel 18.

As will be seen, the die 20 is eccentrically mounted, being nearer to that wall of channel 18 which is nearest the worm 12 than to that side of the channel which is distant from the worm. As exemplified, the die is 6" in diameter and the total clearance at the point of minimum clearance is 0.120"; and the die is 0.060" off center, having a clearance of 0.090" on the far side 25 and only 0.030" on the near side 26. Similar clearances (e. g. 0.090" and 0.030") have proved effective in dies of other diameters (e. g. 12"). Highly effective results are secured when the clearance at the far side is from two to three times the clearance at the near side.

Spacer arms as shown at 30, 31 and 32 are provided to steady the die.

While there are given above certain specific examples of this invention and its application in practical use and also certain modifications and alternatives, it should be understood that these are not intended to be exhaustive or to be limiting of the invention. On the contrary, these illustrations and the explanations herein are given in order to acquaint others skilled in the art with this invention and the principles thereof and a suitable manner of its application in practical use, so that others skilled in the art may be enabled to modify the invention and to adapt

3

it and apply it in numerous forms, each as may be best suited to the requirement of a particular use.

The present invention is useful in connection with the inventions of Joseph C. Elgin and myself disclosed and claimed in our co-pending applications Serial Nos. 695,630, filed September 9, 1946, 38,474, filed July 13, 1948, and 233,446, filed June 25, 1951.

I claim:

1. Extrusion apparatus comprising a working channel and an annular discharge channel having an annular restricted orifice, said discharge channel being disposed at an angle to said working channel whereby a portion of said orifice is disposed nearer said working channel than the other parts thereof, the space between the walls of the orifice being greater at a portion thereof remote from the working channel than at other portions thereof and being smaller at a portion thereof proximate to said working channel than at the other portions thereof.

2. Rubber reclaiming apparatus as set forth in claim 1 wherein there is provided in said channel an extrusion worm adapted to propel material therethrough.

4

3. Apparatus as set forth in claim 2 wherein the space at the remote portion is between about two to about three times as wide as the space at the proximate portion.

4. Extrusion apparatus as set forth in claim 1 wherein there is provided means to maintain a high but controlled temperature within said working channel.

5. Extrusion apparatus as set forth in claim 4 wherein there is also provided means to cool material within said annular discharge channel.

EDWARD F. SVERDRUP.

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