

April 15, 1958

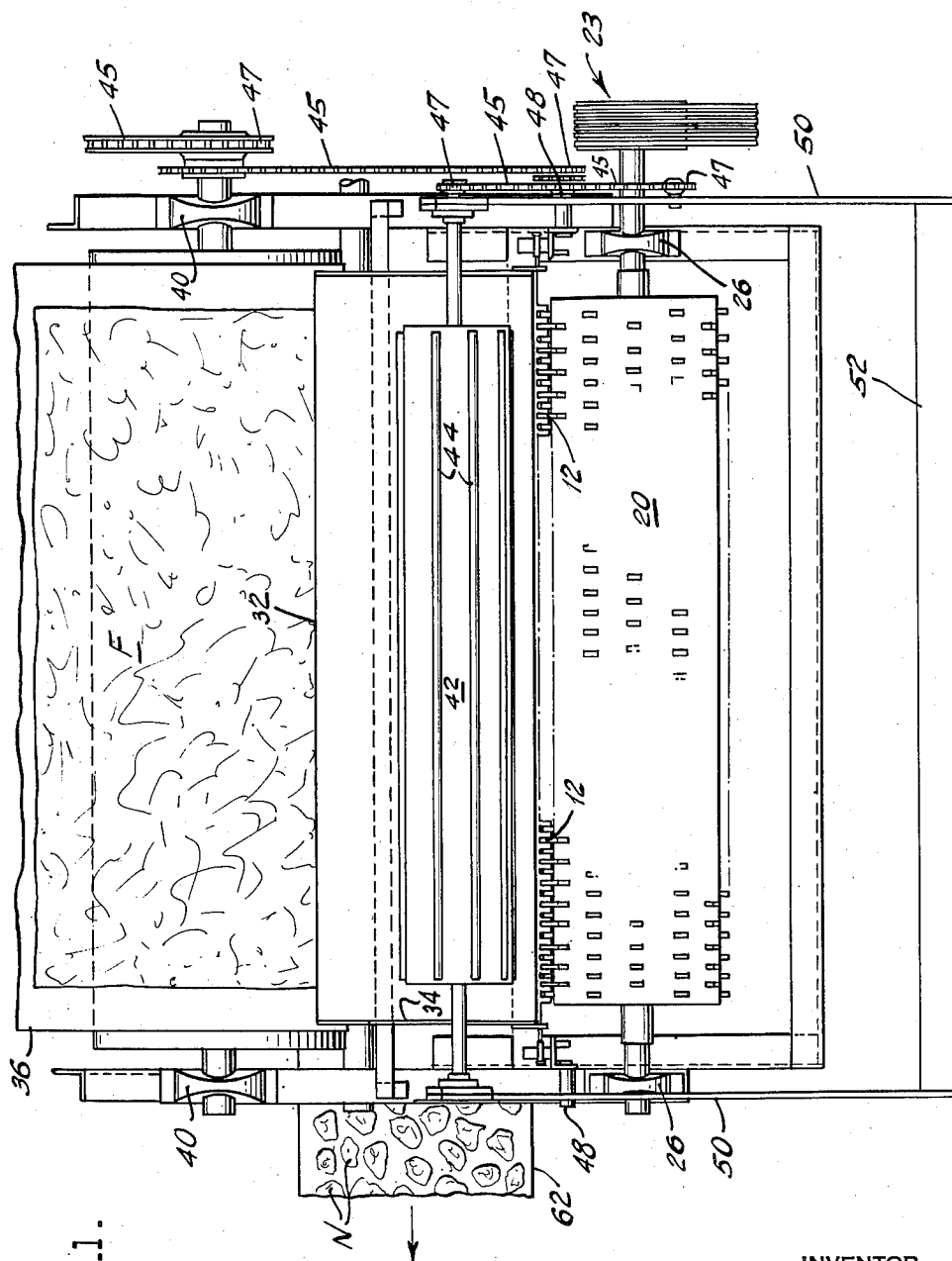
R. E. MARTIN

2,830,772

NODULATOR FOR MINERAL WOOL

Filed Feb. 24, 1954

3 Sheets-Sheet 1



INVENTOR
ROBERT E. MARTIN
BY *Nirgil C. Kline*
ATTORNEY

April 15, 1958

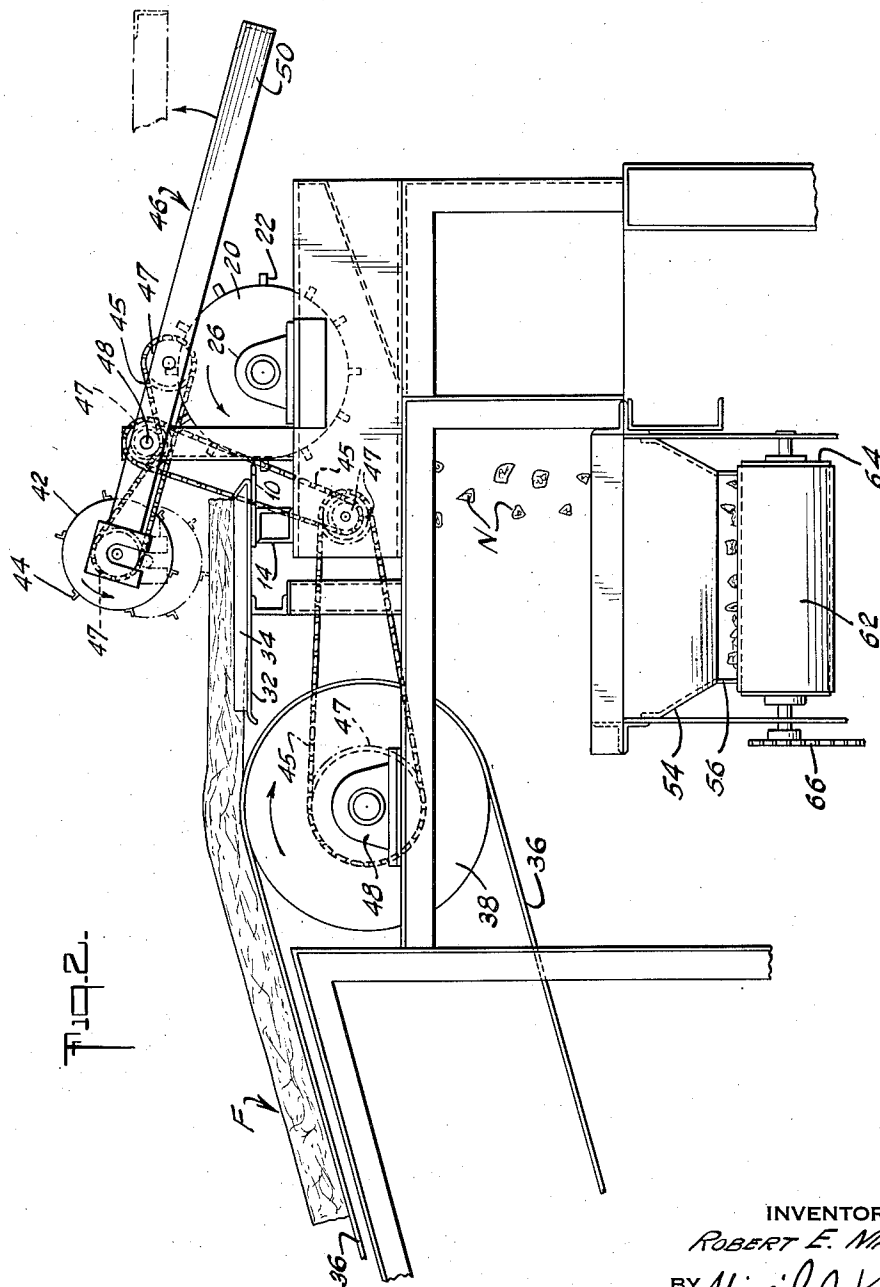
R. E. MARTIN

2,830,772

NODULATOR FOR MINERAL WOOL

Filed Feb. 24, 1954

3 Sheets-Sheet 2



INVENTOR
ROBERT E. MARTIN
BY *Nirgil O. Kline*
ATTORNEY

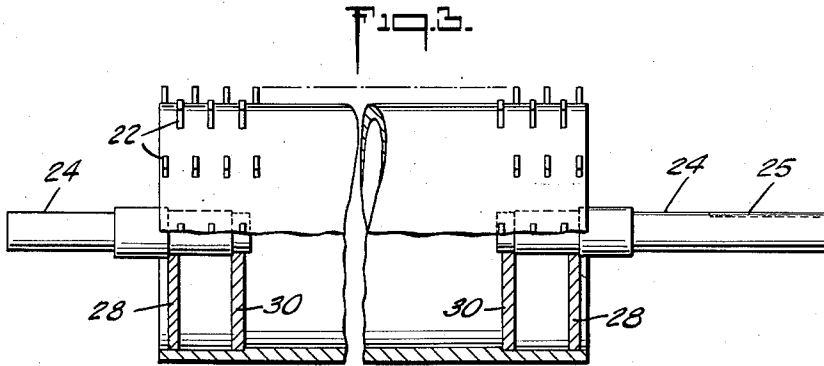
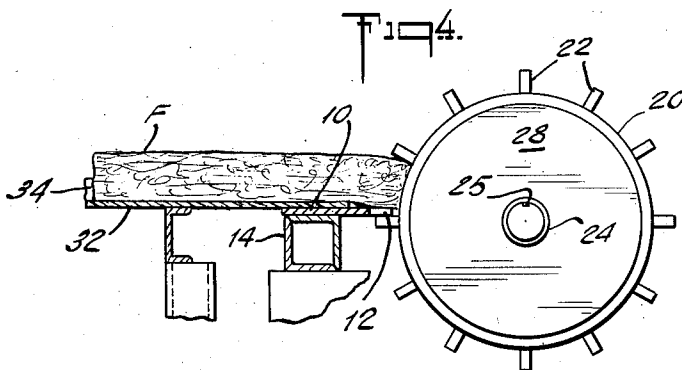
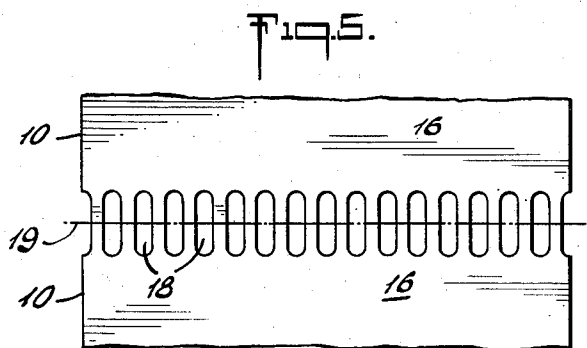
April 15, 1958

R. E. MARTIN
NODULATOR FOR MINERAL WOOL

2,830,772

Filed Feb. 24, 1954

3 Sheets-Sheet 3



INVENTOR
ROBERT E. MARTIN
BY *Nirgil C. Kline*
ATTORNEY

1

2,830,772

NODULATOR FOR MINERAL WOOL

Robert E. Martin, Toronto, Ontario, Canada, assignor to Johns-Manville Corporation, New York, N. Y., a corporation of New York

Application February 24, 1954, Serial No. 412,214

1 Claim. (Cl. 241—186)

The present invention relates to an apparatus for breaking up felted fibrous material into pieces of controlled size and is particularly concerned with a nodulator for mineral wool or like materials.

In the mineral wool industry it has long been the practice to carry fiber in gaseous currents from the fiberizer into a collecting chamber wherein the fiber is collected on a foraminous conveyor in the form of a loose felt. In the past where it was desired to utilize the fibers so collected in the form of "granulated" wool, no particularly difficult problems were incurred in nodulating the wool because of the looseness of felting. In recent years, however, improved fiberization apparatus has resulted in the production of much longer fiber which is inherently collected in highly entangled and thus relatively "tightly" felted form. Because of the frangibility of mineral wool, there has been an excessive loss of fiber in nodulating the felts of long fiber, i. e., the "tight" felting has resulted in excessive pulverizing of the fiber by known nodulating equipment.

A primary object of the present invention is to provide a nodulator for mineral wool capable of nodulating "tight" felts of long fiber without excessive fiber losses. A further object of the present invention is to provide a mineral wool nodulator with which nodules of substantially uniform size may be produced.

My invention will be more fully understood and further objects and advantages thereof will become more apparent when reference is made to the following detailed description and to the accompanying drawing in which:

Fig. 1 is a top plan view of the apparatus of this invention;

Fig. 2 is a side elevation of the apparatus of Fig. 1 as viewed from the left;

Fig. 3 is a partial sectional view of the nodulator drum;

Fig. 4 is a detailed view of the nodulator plate and drum as seen in Fig. 2; and

Fig. 5 is a detailed view of the nodulator plate during one stage of its manufacture.

Referring to the drawings, there is shown a nodulator equipment positioned at the discharge end of a foraminous conveyor which constitutes a part of a conventional collecting system for a mineral fiber producing unit. The apparatus shown is mounted on a framework of supports which need not be arranged as shown but may be arranged in any suitable manner, the various supports for the apparatus being referred to generally as the "frame."

The apparatus of the present invention consists of a plate 10 having notches 12 in one edge thereof, the plate being mounted on the frame by means of a bar 14 which is shown as consisting of two angle irons. The plate 10 may be secured to the bar 14 in any suitable manner such as by bolts or by welding, the primary requirement being that the plate be solidly supported. A drum 20 having teeth 22 projecting from the peripheral surface thereof is mounted for rotation relative to the plate 10 by means of spindles 24 journaled in bearings 26 in turn secured to

2

the frame. Bearings 26 are preferably secured to the frame so as to be adjustable and hence provide for varying the position of drum 20 relative to the plate 10. One very satisfactory manner of securing drum 20 to the spindles 24 is illustrated in Fig. 3 wherein one end of each spindle 24 is press fitted into two spaced plates 28 and 30 mounted within the drum. It will be observed that drum 20 is mounted for rotation on a horizontal axis which is substantially in horizontal alignment with plate 10 and that the direction of rotation of the drum 20 is such that teeth 22 pass downwardly through the notches 12. By adjusting the position of bearings 26, the degree of intermeshing of teeth 22 with notches 12 can be varied. On one end of one of the spindles 24 there is provided a keyway 25 by means of which a pulley of a drive means 23 may be secured to the spindle.

Referring again to Fig. 3, it will be observed that the teeth 22 of adjacent horizontal rows are positioned in vertically staggered relation, i. e., the teeth of alternate horizontal rows are in vertical alignment. The horizontal spacing of teeth 22 is therefore such that the teeth of a given row are aligned with and pass through alternate notches of plate 10. Teeth 22 are preferably made of or coated with an abrasion-resistant material such as Stellite, and it is also preferable that the same feature be incorporated in the notches of plate 10.

In Fig. 5 there is an illustration of the manner of producing the plate 10. A large plate 16 is used as the basic stock and a plurality of elongated holes 18 are milled in the plate. The plate 16 is then cut along a line 19 bisecting the row of holes 18 to form two plates 10 having notched edges. The notches are, of course, significantly wider than the teeth 22 in order to avoid any grinding of materials during the nodulating process. It has been found satisfactory to make the teeth $\frac{3}{8}$ " wide and the notches $\frac{5}{8}$ " wide, but these relative dimensions may be varied.

Supported on the frame and partially on the edge of plate 10 remote from drum 20 is a guide plate 32 provided with vertical edge guides 34. The guide plate 32 is positioned adjacent the discharge end of a conveyor belt 36 extending over a roll 38 mounted for rotation in the direction of the arrow on bearings 40. As an alternative a small conveyor belt, mounted in a conventional manner, may be placed between conveyor 36 and plate 10 to act as a guide surface and the choice between guide plate 32 and such a conveyor will depend primarily upon the space available between plate 10 and conveyor 36.

A roll 42 having cleats 44 on the peripheral surface thereof is journaled at the free ends of the side arms 50 of a U-shaped support 46. The U-shaped support 46 is pivotally mounted on the frame at 48 and the side arms 50 thereof are of such a length and the cross-arm 52 is of such weight that the drum 42 is not completely counterbalanced and tends to move downwardly. The roll 42 is preferably driven through a series of chains 45 and sprockets 47 from the roll 38 of conveyor 36, the arrangement being such that the peripheral speed of roll 42 is the same as the speed of conveyor 36. It will be understood that where a conveyor is employed in place of guide plate 32, it is not necessary to drive roll 42.

Positioned beneath plate 10 and supported on the frame is a hopper 54 (shown in Fig. 2 only) having one wall thereof cut away to provide an opening 56, and positioned beneath the hopper 54 is a conveyor belt 62 rotated by means of a roll 64 driven by any suitable means 66.

In operation a mineral wool felt F is fed by conveyor 36 from a collection chamber (not shown) onto guide plate 32 and under feed roll 42. The feed roll 42 is arranged to exert a downward pressure on the felt and the rotation of the roll aids in feeding the felt over plate 10

3

into the path of teeth 22. The action of teeth 22 in notches 12 breaks the felt F into clumps or nodules N which fall downwardly into hopper 54 and are carried therefrom by conveyor 62 to other processing equipment.

The apparatus of the present invention is not only efficient and rugged but the elements thereof are also conveniently arranged for association with other devices used in the general mineral wool process. Because of the relative widths of the drum teeth 22 and the notches 10, and because of the fact that teeth pass through only the alternate notches at a given time, the action of the nodulator does not pulverize felted mineral wool fed thereto. Moreover, the apparatus of the present invention, in contrast to prior nodulators, subjects the mineral wool to a single mechanical action which not only nodulates the wool, but results in nodules of uniform size as well. By adjusting the degree of intermeshing of the teeth and notches the nodule size can be fairly accurately controlled.

Having thus described my invention in rather full detail, it will be understood that these details need not be strictly adhered to but that various changes and modifications may suggest themselves to one skilled in the art, all falling within the scope of the invention as defined by the subjoined claim.

What I claim is:

A nodulator for mineral wool comprising a horizontal, continuous felt of relatively tightly felted mineral wool, a fixed, horizontal plate having notches in one edge thereof, a drum having a plurality of rows of teeth projecting

4

from the peripheral surface thereof, said plate being positioned with alternate notches thereof in alignment with the teeth of a given row and with the other notches thereof in alignment with the teeth of an adjacent row, means for rotating said drum in a direction to move said teeth downwardly through said notches, a guide surface adjacent the edge of said plate remote from said drum, a conveyor belt, means for driving said belt toward said surface and said plate, a rotatable driving drum pivotally mounted above said surface, means connected to said belt driving means and arranged to rotate said driving drum in a direction to feed said continuous felt over said surface and plate into the path of said teeth, and said plate being positioned so that said teeth move vertically through said felt.

References Cited in the file of this patent

UNITED STATES PATENTS

387,438	Parker	Aug. 7, 1888
740,245	Crane	Sept. 29, 1903
822,765	Perkins	June 5, 1906
1,094,557	Haldeman	Apr. 28, 1914
2,028,080	Stern	Jan. 14, 1936
2,213,906	Ebersol	Sept. 3, 1940
2,559,701	Becker	July 10, 1951
2,643,065	Clawson	June 23, 1953

FOREIGN PATENTS

267,261	Great Britain	Mar. 17, 1927
607,378	France	Mar. 26, 1926