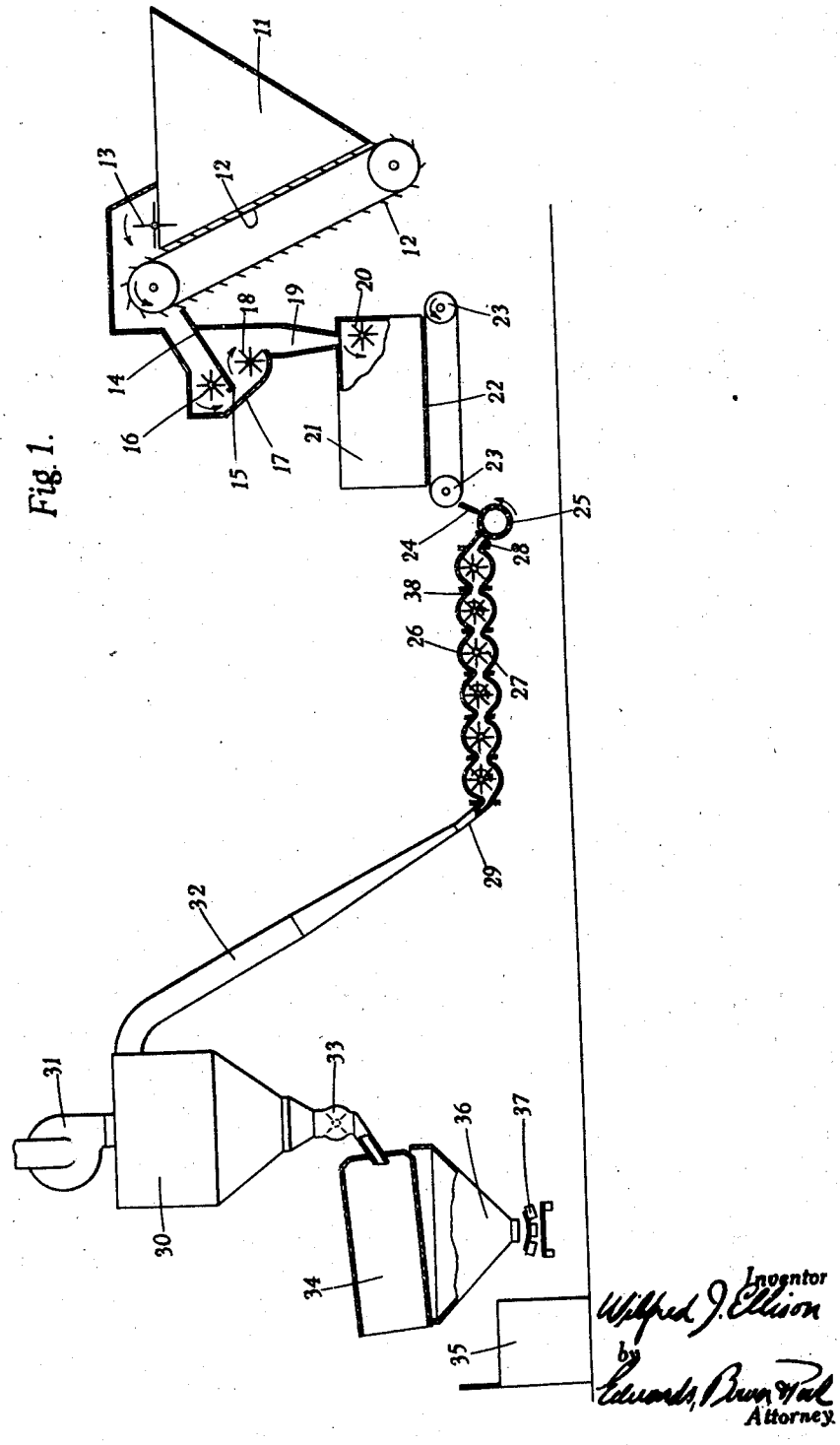
April 28, 1942. W. J. ELLISON 2,280,902

OPENING AND CLEANSING OF ASBESTOS FIBROUS MATERIAL

Filed Jan. 23, 1940 4 Sheets-Sheet 1

Fig. 1.



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OPENING AND CLEANSING OF ASBESTOS FIBROUS MATERIAL

Filed Jan. 23, 1940 4 Sheets-Sheet 2

Fig. 2.

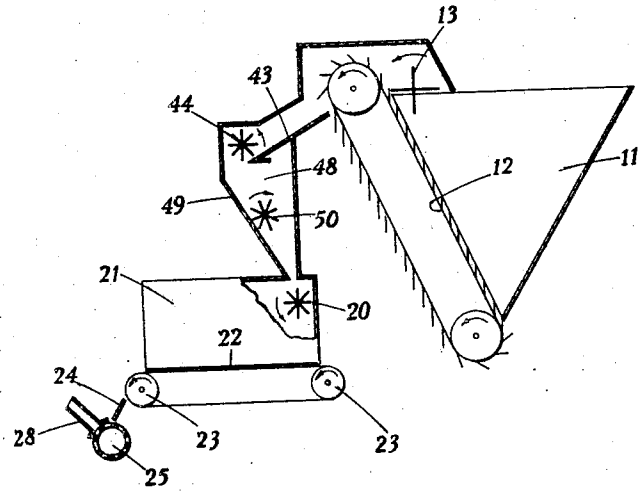
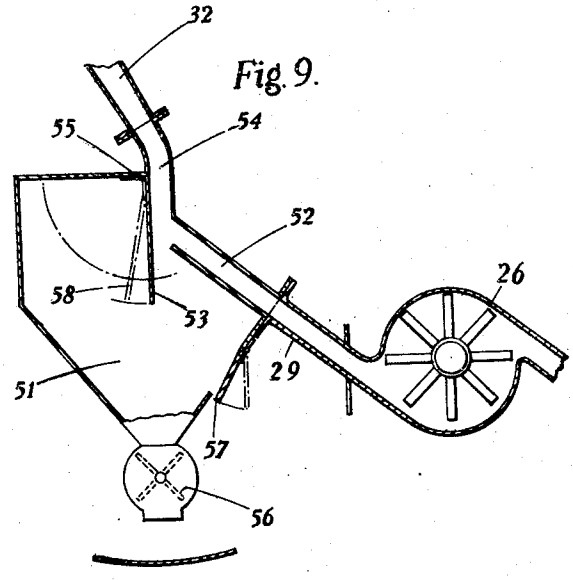


Fig. 9.



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OPENING AND CLEANSING OF ASBESTOS FIBROUS MATERIAL

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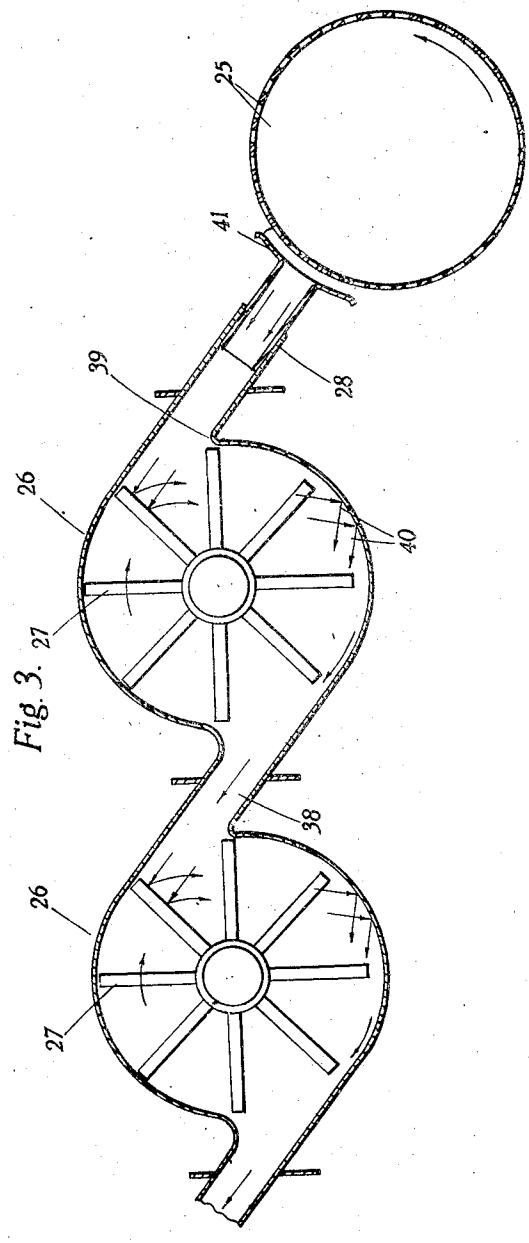


Fig. 3.

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OPENING AND CLEANSING OF ASBESTOS FIBROUS MATERIAL

Filed Jan. 23, 1940 4 Sheets-Sheet 4

Fig. 4.

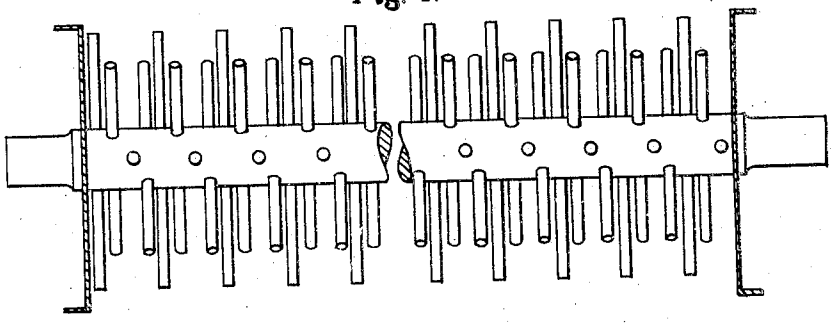


Fig. 5.

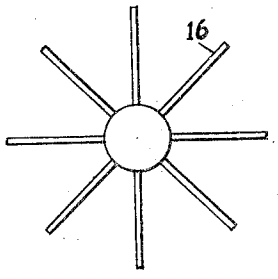


Fig. 6.

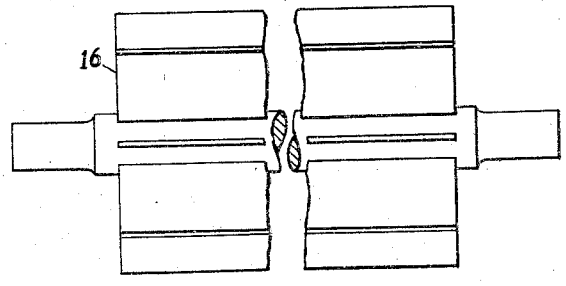


Fig. 7.

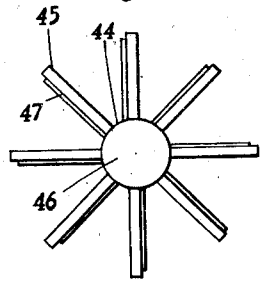
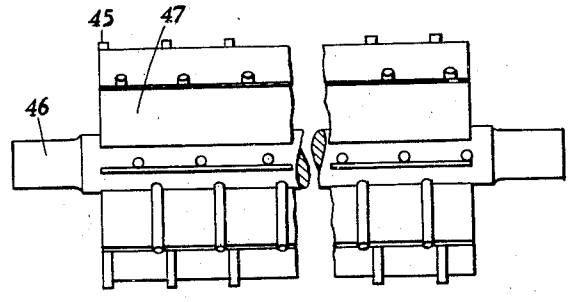


Fig. 8.



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Patented Apr. 28, 1942 2,280,902

UNITED STATES PATENT OFFICE

2,280,902

OPENING AND CLEANSING OF ASBESTOS FIBROUS MATERIAL

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Application January 23, 1940, Serial No. 315,191
In Great Britain November 14, 1939

17 Claims. (Cl. 209—2)

This invention relates to the opening of asbestos fibrous materials and their cleansing or separation from rock and other foreign matter. The invention also includes the opening of asbestos together with a proportion of other fibres of animal or vegetable origin, whereby a mixture of asbestos and such other fibres is effected, in cases where the product desired is a mixed one. Asbestos-bearing rock when mined is crushed to separate the fibrous matter from the rock, is screened to discard rock particles, dirt and dust, and is then opened to separate the constituent fibres by a variety of processes, which may include further crushing, beating and similar operations, and screening to separate the fibres from the residue. The beating machines used, even when the partially separated asbestos has been carried forward by an air blast, have been of types in which the asbestos is forced against the wall of a casing or other surfaces, causing trapping and grinding actions to occur which result in deterioration of the fibres while the product is imperfectly separated and cleansed.

It is the principal object of the present invention to improve the separation and cleansing of the fibrous asbestos in the opening operation while minimising damage to the fibres due to trapping, grinding and so forth. This object is attained in the main by causing the asbestos to travel at high speed, while freely suspended in air, through one or more casings in which beaters move at a high speed in a direction generally opposed to the travel of the asbestos at entry, the clearances and the speed of travel through the casing being such that the opening is effected by impact between the material and the beaters without any tearing or grinding between moving and stationary members. In general, a number of successive treatments in beating machines of the character indicated are required to complete the opening of the fibres, after which the fibres are separated from the dirt by centrifugal or other separators and by screening apparatus of known types.

For insuring success in effecting the opening of the asbestos by the means indicated above, it is necessary to subject the partially broken asbestos material to preliminary operations which eliminate grosser impurities and reduce the size of any lumps, while spreading the material out into a stream of more or less uniform consistency where it is fed to the intake of the opening apparatus. Another object of the invention is therefore to effect the preliminary treatment and feeding of the asbestos material to the opening apparatus in such a manner as to enable this apparatus to operate as efficiently as possible.

The invention is of use not only at the mines where the asbestos-bearing rock is broken, the asbestos fibre separated from crude impurities, and prepared for transport, but also at factories where the partially treated asbestos is subjected to further opening and cleansing before its use for commercial purposes, whether for spinning and textile productions or for making into such products as asbestos cement, asbestos with rubber, or asbestos with resin products and the like. The invention is of use also where the partially treated asbestos is to be mixed with wool, cotton or other textile fibres, in which case the opening operation mixes the fibres together in a substantially uniform manner.

In its preferred form the opening apparatus includes a number of casings arranged in series, each containing a high speed rotary beater, the feeding apparatus being caused to deliver a continuous stream of partially separated fibrous material to the inlet of the first casing, while a powerful air current induced by a fan carries this material through the series of casings in each of which the beating action takes place while the material is air-borne. The beaters may consist of arms projecting radially from an axle, and moving towards a tangentially directed throat through which the air blast carrying the asbestos material enters the casing. From the outlet of the last casing of the series the products are delivered to separators such as centrifugal or other settling apparatus, followed by screening and other apparatus as may be required for separating and delivering the fibrous asbestos product.

The invention is illustrated by way of example in the accompanying drawings wherein:

Figure 1 is a diagram showing a complete feeding, opening and separating plant;

Figure 2 is a diagram showing a modified form of the feeding portion of the plant;

Figure 3 shows two sections of the opening apparatus to a larger scale;

Figure 4 shows a side view of part of a beater such as is used in the opening apparatus of Figure 3, and in the feeding apparatus also;

Figure 5 is an end view, and

Figure 6 is a partial side elevation of a form of paddle member used in feeding apparatus of the Figure 1 type;

Figure 7 is an end view, and

Figure 8 is a partial side elevation of another

form of paddle member used in feeding apparatus of the Figure 2 type;

Figure 9 shows an additional form of separator which may be introduced into the system when required.

Referring first to Figure 1, the opening apparatus forming the basis of the invention is the set of interconnected casings **26** with a rotary beater **27** in each. These are more fully described hereinafter with reference particularly to Figure 3. In order that their operation may be appreciated, however, it is desirable first to trace the path of the material through the complete installation, indicating its condition and how it is fed forward at the various stages.

The crushed and screened rock asbestos, or the partially opened fibrous asbestos to be treated, is charged into a hopper **11** from which it is carried forward by a slowly moving apron **12** furnished with rows of projecting teeth. A paddle member **13**, rotating so that its blades tend to check the lifting of the material, strikes back all but a comparatively thin layer of material on the teeth of the apron, and this material is discharged upon an adjustable inclined plate **14**. A reversely rotating paddle wheel **16**, whose blades may be of the type shown in Figures 5 and 6, operates in close juxtaposition to the plate **14**, and lifts up portions of the material from the plate, dropping it clear over the end of the plate into a receptacle **17** below. The lip **15** on plate **14** holds back any material which may escape underneath the paddle wheel **16**. The receptacle **17** has a curved bottom, and within it near the edge of the curved plate rotates a beater **18** consisting of arms or pins projecting from an axle as indicated in Figure 4. This beater rotates at a considerable speed, lifting portions of the fibrous material and showering them down the narrowing chute **19**. The showered material falls upon a more rapidly rotating beater **20** below the entrance to a chamber **21**, distributing the material upon a conveyor belt **22** which travels continuously over rollers **23** along the bottom of the chamber. The belt discharges the material in a comparatively uniform and continuous stream over the plate **24** upon the surface of a perforated drum **25** which serves to deliver the fibrous portion of the material to the inlet **28** of the opener **26, 27**. The material is drawn into the inlet **28** by a strong air current entering partly through the interior of the hollow drum **25** and through the holes on its surface, and partly around the edges of the inlet **28**.

The outlet **29** of the last section of the opener communicates with a trunk **32** leading to a centrifugal separator **30**, connected to a fan **31**. This fan draws air at high velocity from around and through the perforated drum **25** and through the inlet **28**, the opener casings **26** and the trunk **32** to the separator **30** in which the air and dust are discharged while the heavier solid matter consisting of the opened asbestos, and particles of rock and waste material, is delivered through a rotary discharge valve **33** to a rotating screen **34**. This separates the fibrous product from the rock and waste matter, the fibres passing over to a receptacle **35** while the solid waste and short fibres passing through the screen drop into a hopper **36** which may discharge them upon a conveyor belt **37** for removal.

The fibrous material to be opened, when it enters the first opener casing **26**, is entirely air-borne, and is in the form of smallish clusters or bunches of fibre. It is directed by the inlet passage **28** tangentially into the path of the beater arms **27** which are moving oppositely to the incoming air current at this point. The beater **27** revolves at a high speed, such as 2000 revolutions per minute, this speed varying according to the consistency of the material to be treated. It may be as low as say 750 revolutions for some grades and well above 2000 for others, and the speeds may be varied, the beaters in the succeeding casings being driven at higher speeds than those through which the material to be treated first passes for example. The air current induced by the fans **31** is such that in the inlet **28** to the first opener casing, and the communicating ducts or passages **38** between the following casings, the air speed is high, of the order of 1500 to 5000 feet per minute, again depending upon the consistency of the material to be treated and the strength of the impact required at each blow between the beater arms and the bunches of asbestos fibres to be opened out. The opening action depends mainly upon the impacts between the beaters and the bunches of fibre moving at high speeds in opposite directions, and there is no tearing or grinding action between relatively moving surfaces, such as would tend to break up and reduce the length of the fibres. Moreover, the strength of the blow varies with the density of the material, being stronger for the heavier bunches of unseparated fibres which require more opening and whose momentum is higher, while the impact is less and the opening action more gentle for the lighter and more separated portions of the material treated.

The invention does not depend upon the selection of any particular dimensions for the beaters **27**, but a suitable dimension is of the order of one foot in diameter and four feet in length. The casing **26** in which each beater works has smooth walls throughout. The clearance between the walls and the beater arms at the top is small, say ⅛ inch, up to the point where the casing merges tangentially into the inlet passage **28**. At the other side of the inlet passage a rounded corner is formed at **39**, and the wall of the casing comes very close to the ends of the beater arms at this point, the clearance being of the order of $\frac{1}{16}$ inch or less so as to form an air dividing edge where no asbestos can be trapped. From the point **39** onwards the clearance rapidly increases up to a maximum of about ⅞ inch at the bottom leading into the communicating passage **38** between the first casing and the second. The clearance may be a little less as the surface of the casing rises from the bottom into the passage **38**.

The bunches of fibres struck by the beater arms near the entry of the casing are knocked downwards by the impact and are thrown against the wall of the casing at about the region marked **40** in Figure 3, unless they are so light as to be carried forward by the air current without effective contact with the casing. The impact with the wall of the casing at **40** effects further opening of the fibres. The speed of the air and air-borne matter emerging from the inlet **28** ensures that the material being struck downwards by the rods is kept away from the point **39** and no trapping or damage to the material can occur between the ends of the rods and the point **39**. At the lower part of their travel the beater arms are moving in the same direction as the air current, tending to pick up and impel the

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rebounding asbestos material towards and through the passage **38**, and assisting the air current to pick up and carry forward the material. By the time that the asbestos enters the second casing through the passage **38** it has attained approximately the same velocity as at the entry to the first casing, and the beating action is repeated in each casing in turn until the desired degree of opening has been attained.

Six casings **26** in succession are shown in Figure 1, but more or less than this number may be used, depending upon the degree of opening desired. From the tangential outlet **29** of the last casing in the series the air current, with the opened asbestos fibres substantially evenly distributed in it, passes up through the air trunk **32** leading to the centrifugal separator **30**, where any air and fine dust are discharged through the fan **31** while the fibres and other solid matter are collected and discharged through the valve **33** to the rotary screen **34**.

Although it is preferable to use a beater having radial arms arranged in rows, as indicated in Figure 4, and relatively staggered so that the arms lie in spiral tracks, any other convenient arrangement may be adopted. The arms are not necessarily made truly radial, but may be at any desired angle to the axle, and they are not necessarily round but may be flat or otherwise shaped. The form of beater illustrated is therefore to be regarded as an example only of a construction which is capable of attaining the desired object. It is essential, however, that the beater should have separate arms with substantial spaces between them so that the air current may pass comparatively freely between the arms in order to bear the bunches of asbestos up to the point of impact with the arms. A beater with paddle blades would not serve the purpose.

Reverting now to the feed end of the machine, the operations which occur in distributing the bunches of fibres to be opened before they enter the passage **28** at the first opener casing require some further explanation. The projecting teeth of the slowly moving apron **12** discharge the material intermittently upon the inclined plate **14**, and this intermittent delivery should be converted into a more uniform stream of material before reaching the opening apparatus. Moreover, the feed apparatus can be made to take a share in the preliminary opening and cleansing of the material. The paddle wheel **16** operating over the plate **14** turns very slowly, at say two revolutions per minute, according to the grade of material to be treated, and its function is to lift the material as it accumulates on the plate **14**, delivering portions of it into the receptacle **17**. The material carried over by the paddle wheel **16** accumulates in the receptacle **17** up to a level such that the beater **18** is constantly coming into contact with it and lifting portions of the material to be thrown over into the chute **19**.

The function of the beater **18** is quite different from that of the paddle wheel. It has separate beater arms, and may be of the form indicated in Figure 4, for example. It operates at a considerable speed, of the order of say 150 revolutions per minute, and serves to lift bunches of asbestos fibrous material from the receptacle **17** and to throw them into and down the chute **19**. The beater **20** at the inlet to the casing **21** may also be of the form indicated in Figure 4 and its speed of rotation may be still higher, say of the order of 600 revolutions per minute. It therefore serves to some extent to open up the material by the same kind of action as occurs in the casings **26** as described above, although the velocity of the falling material is comparatively low and the speed of the beater **20** is not so high as that of the beaters **27**. The material is showered by the beater **20** in the casing **21**, causing it to be distributed more or less uniformly over the apron **22** from which it is dropped down over the guide plate **24** on to the surface of the perforated drum **25**. This drum may rotate at any convenient speed, such as 50 revolutions per minute, and it is at this point that the coarse foreign matter separated or loosened from the asbestos in the feed mechanism described above, is discharged before it can enter the opener proper. The foreign matter may consist of hard pieces of rock or uncrushed asbestos agglomerates which have escaped appropriate treatment in the earlier processes and require further crushing before they can be opened. Foreign matter also includes chips of wood, nails, and so forth. The heavier foreign bodies are thrown with sufficient momentum from the end of the conveyor **22** to drop upon a lip **41** above the inlet aperture **28**, whence they are removed by hand or by any suitable mechanism. A further separation occurs at the mouth of the inlet **28**, where the fibres are drawn in by the air current while particles of rock and other matter too heavy to be lifted by the air current are carried forward by the perforated drum and deposited beneath the same. The deposited matter may be collected and sorted, the lumps containing asbestos being sent back for further crushing and treatment.

The feeding apparatus shown in Figure 1 is more particularly suitable for dealing with shorter grades of asbestos fibre. For the longer grades such as are generally used for textile purposes, the feeding apparatus may with advantage be modified as indicated in Figure 2 for example. The hopper **11**, toothed apron **12** and paddle wheel **13** are the same as in Figure 1, but the inclined plate **43** on which the apron discharges the material now has no lip at its lower end and the paddle wheel **44** operates differently from the paddle wheel **16**. It preferably has blades with short projecting pins or arms at their ends, and a convenient construction for the purpose is that shown in Figures 7 and 8, in which rods **45** are fitted into the axle **46** and have blades **47** attached to them on the front side in the direction of rotation, leaving only short lengths of the rods **45** projecting. The amount of the projection may be varied according to the grade of material treated, being greater when the fibres are already more opened as they are received in the feeding apparatus and shorter when the fibres are more dense. The paddle **44** is arranged at some little distance from the plate **43**, say from ¼ inch upwards, and it revolves at a comparatively high speed, say 60 revolutions per minute. Most of the fibre deposited on the plate **43** passes under the paddle wheel **44** and falls directly over the end of the plate **43** into the narrowing chute **48** below. Some of the material may also be picked up by the rods and thrown over the top of the paddle. The higher the velocity of the paddle the less the proportion of the material which can pass under it. The material slides down the surface of the plate **49** over which works a beater **50** of the type shown in Figure 4. This may rotate at a speed of the order of 300 revolutions per minute, for example, and its rods may have a clearance of the order of ¼ inch at their nearest approach from the surface of the plate **49**. The

smaller bunches of material can pass through the gap alongside the beater 50, but the pieces of the material too large to pass are struck up by the rods of the beater, and thereby generally separated into smaller pieces. They may be thrown upwards repeatedly by the beater 50 until they are small enough to pass. Some of the material may also be thrown over the top of the beater against the opposite wall of the chute 48, and the impact may have a further loosening effect upon the fibres. The material falls upon the beater 20 in the chamber 21 just as in the construction of Figure 1 and is distributed upon an apron 22, from the delivery end of which the material falls over an inclined plate 24 upon the rotating perforated drum 25. The air current around and through this drum and into the mouth of the passage 28 leading to the opening apparatus proper operates to carry forward the material in the same manner as has been described with reference to Figure 1.

In some types of asbestos the rock particles entrained with the fibre offer great resistance to reduction in size, and are not sufficiently reduced on leaving the openers 26 to be separated adequately from the fibre in the screen 34. If this is the case it is desirable to interpose, between the openers and the centrifugal separator, a rock separator such as that illustrated in Figure 9. A box 51 is connected to the outlet 29 from the last opener casing 26, and the air current conveying the opened asbestos enters this box through a passage 52, being caused to impinge on a baffle plate 53 before it leaves by the outlet 54 leading to the trunk 32. The baffle plate is hinged at its upper edge 55 and is adjustable in its angular position according to the consistency of the rock particles to be separated. The rock particles which fall into the bottom of the box 51 are discharged through an air-sealed discharge valve 56. The box is air-tight except that provision is made for the entry of a small regulated quantity of air at 57, sufficient to insure that the asbestos fibres are not allowed to fall where the change of direction in the air current occurs on striking the baffle plate. The opener outlet 29, the passage 52 and the separator outlet 54 are preferably made the full width of the casings 26 so that the current of air with the opened asbestos in suspension from the last opener casing strikes the baffle plate 53 in a shallow but wide stream. The heavy rock particles then fall out readily on impinging upon the baffle plate 53, while the lighter fibrous matter, small rock particles and short fibres are carried onwards by the air current through the outlet 54.

The amount of material discarded at the box 51 is regulated by adjustment of the angle of the baffle plate 53, and to some extent by the width of opening at 57 through which additional air enters. The further backwards the plate 53 is turned, as indicated by dotted lines at 58 for example, the greater is the loss in velocity of the solid matter contained in the entering air current and the greater the proportion of solid matter discharged on striking against the baffle plate. It is generally desirable only to remove the coarser rock particles there because the fine dust and the smaller particles are readily separated in the centrifuge 30 and the screen 34 respectively.

The apparatus hereinbefore described is capable of use either at the asbestos mines, or in factories where asbestos products are manufactured, or at both places, depending upon the degree to which the material is required to be opened and cleansed before transport, and upon the purposes to which it is to be applied. By adjustment of the speeds and settings of the feed mechanism, the paddles and beaters, and above all by adjustment of the speed of the air current through the opener casings, and of the speed of the beaters in those casings, the apparatus can be regulated to deal with a wide variety of raw and partly prepared asbestos materials, and to effect their cleansing and opening to any degree normally required. If the asbestos is to be mixed with other fibres of animal or vegetable origin, such as wool or cotton, these may be introduced together with the asbestos in the feeding apparatus and subjected to the opening operation simultaneously with the asbestos, whereby the fibres may be opened and intimately mixed at the same time.

Many modifications can be made in the details of the apparatus, the form and construction of the paddles and beaters, and so forth without departing from the scope of the invention. For example, the arms of the beaters are not necessarily straight; they may be articulated or otherwise made flexible, and of many different shapes in cross section. The opener casings are not necessarily disposed in a row in a horizontal plane as in Figure 1, but they may be arranged in any convenient relative positions.

However the successive opener casings may be disposed, the apparatus according to the present invention tends to effect uniform opening throughout the mass of fibres and opening to the required degree without damage to the individual fibres, because the impacts are greater and the opening more severe when the bunches or groups of fibres to be opened are more dense. There is no appreciable tendency to break the fibres because they are never struck or dragged between relatively moving elements, but are always freely suspended in air when struck by the beaters or when thrown against the casing walls. It will be appreciated that the material is always travelling at high velocity through the opener casings so that a substantial output of opened asbestos is obtained although the amount of material in each casing 26 at any time is comparatively small. The avoidance of any accumulation of bulky material in the casings is of great importance in insuring that no part of the material is left untreated, that the opening is effected without substantial breakage, and that the separated rock particles and other waste matter do not become embedded again among the opened asbestos fibres.

I claim:

1. In the opening of fibrous asbestos material, the steps which comprise providing the material in tufts of a size adapted to be air-borne, conveying at high velocity in air a stream of said detached tufts of asbestos material and striking said tufts by an impacting member while they are being so conveyed and are freely suspended in air and without disintegration of the material by rubbing or tearing action.

2. In the opening of fibrous asbestos material, the steps which comprise providing the material in tufts of a size adapted to be air-borne, directing an airstream continuously from end to end of a casing containing beater members moving in said airstream, suspending the individual tufts of said material in said airstream so that said airstream carries said individual tufts of asbestos into impact against said moving members, thus subjecting said material to open-

ing action consisting solely of said impacts against said tufts while so suspended.

3. In the opening of fibrous asbestos material, the steps which comprise providing the material in tufts of a size adapted to be air-borne, directing an airstream continuously from end to end of a casing containing beater members moving in and opposite to said airstream, conveying at high velocity in said airstream said tufts of asbestos material against said oppositely moving members, and striking said tufts by said members while they are being so conveyed and are freely suspended in air without disintegration of the material by rubbing or tearing action.

4. In the opening of fibrous asbestos material, the steps which comprise rotating beater members at a high speed within confining walls, independently setting up a high velocity air current within said confining walls in a direction substantially tangential to the movement of said rotating beater members, suspending in said air current detached tufts of asbestos material so that said tufts, while freely suspended in said air current, are struck by said beater members, and providing between said beater members and said confining walls in the path of said air current an air-swept clearance sufficient to prevent disintegration of the material by rubbing or tearing action on the tufts at said walls.

5. In the opening of fibrous asbestos material, the steps which comprise setting up a high velocity air stream through a casing containing beater members, introducing detached tufts of asbestos material into said stream so as to be suspended therein, and striking said suspended tufts by said beater members moving through said stream in a direction opposite thereto.

6. In the opening of fibrous asbestos material, the steps which comprise conveying tufts of asbestos material suspended in a high velocity air stream passing from end to end and while said tufts are suspended freely in said current directing them against beating members and successively striking them by said members without disintegration of the material by rubbing or tearing action.

7. In the preparation of a fibrous mixture, the steps which comprise producing a mixture of detached tufts of asbestos material with other fibres, conveying said detached tufts and fibers at high velocity suspended in air passing through a casing, striking said tufts and fibers by impact members while being so conveyed and without subjection of said mixture to rubbing or tearing action, said impact members moving in a direction opposite to the movement of the fibers borne by said air.

8. In an apparatus for treating fibrous asbestos material, the combination of a casing having imperforate walls, a rotary beater mounted to rotate within said walls of said casing, a substantially tangentially disposed inlet passage on one side of said casing, a substantially tangentially disposed outlet passage on the other side of said casing, means for setting up a current of air at high velocity through said inlet passage and into said casing, means for suspending asbestos material in said air current passing through said casing, and means for rotating said beater in a direction such that at the inlet passage it moves in a direction opposite to said air current.

9. In an apparatus for treating fibrous asbestos material, the combination of a casing having imperforate walls, a rotary beater mounted to rotate within said wall of said casing, said beater comprising an axle and a large number of beating elements projecting from said axle, a substantially tangentially disposed inlet passage on one side of said casing, a substantially tangentially disposed outlet passage on the other side of said casing, means for setting up a current of air at high velocity through said inlet passage and into said casing, means for suspending asbestos material in said air current passing through said casing, and means for rotating said beater in a direction such that at the inlet passage said beating elements move in a direction opposite to said air current.

10. In an apparatus for treating fibrous asbestos material, the combination of a plurality of casings having imperforate walls, a rotary beater mounted to rotate within said wall of each of said casings, a substantially tangentially disposed inlet passage on one side of each of said casings, a substantially tangentially disposed outlet passage on the other side of each of said casings, said casings being arranged in series by the connection of the outlet passage of each with the inlet passage of the next, means external to said casings for setting up a current of air at high velocity through said inlet passages and casing in series, means for suspending asbestos material in said air curent, and means for rotating said beaters in a direction such that as each approaches the inlet passage to its casing it moves in a direction opposite to said air current.

11. In an apparatus for treating fibrous asbestos material, the combination of a casing having imperforate walls, a rotary beater mounted to rotate within said walls of said casing and comprising beater elements, a substantially tangentially disposed inlet passage on one side of said casing, a substantially tangentially disposed outlet passage on the other side of said casing, means external to said casing for setting up a current of air at high velocity through said inlet passage and into said casing, means for suspending asbestos material in said air current, and means for rotating said beater in a direction such that at the inlet passage it moves in a direction opposite to said air current, the clearance between said beater elements and said casing in the area between said inlet and outlet passages being sufficient to allow tufts of asbestos fibrous material to pass through without being subjected to rubbing or tearing between said beating elements and said casing.

12. In an apparatus for treating fibrous asbestos material, the combination of a casing, a rotary beater comprising beating elements mounted to rotate within said casing, a substantially tangentially disposed inlet passage on one side of said casing, a substantially tangentially disposed outlet passage on the other side of said casing, means external to said casing for setting up a current of air at high velocity through said inlet passage and into said casing, means for suspending asbestos material in said air current, and means for rotating said beater in a direction such that at the inlet passage it moves in a direction opposite to said air current, said casing being formed with a surface curved to provide a relatively small clearance beyond said beating elements circumferentially from the point at which said beating elements leave said outlet passage to said inlet passage and said casing being formed with a smooth surface curved to provide a relatively large clearance

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beyond said beating elements from the point where said beating elements leave said inlet passage to the said outlet passage, whereby grinding of asbestos material between said beating elements and said casing wall is avoided in the area between said inlet and outlet passages.

13. In an apparatus for treating fibrous asbestos material, the combination of a casing having imperforate walls, a rotary beater mounted to rotate within said walls of said casing, a substantially tangentially disposed inlet passage on one side of said casing, a substantially tangentially disposed outlet passage on the other side of said casing, a fan for setting up a current of air at high velocity through said inlet passage and into said casing, means for suspending asbestos material in said air current, means for rotating said beater in a direction such that at the inlet passage it moves in a direction opposite to said air current, and centrifugal separating means disposed between said fan and said outlet passage for separating said material from the air in which it is suspended.

14. In an apparatus for treating fibrous asbestos material, means for opening tufts of said material, conveyor means for delivering a uniform supply of tufts to said opening means in a thin stream and readily carried by an air current, and feeding means for supplying tufts to said conveyor means, said feeding means comprising means for separating the asbestos material into small tufts, means for delivering bunches of said material in a regular but intermittent flow, and beating means for transforming said intermittent flow of bunches into a substantially uniform flow of tufts.

15. In an apparatus for treating fibrous asbestos material, means for striking tufts of said material suspended in a high velocity air current, an inlet passage leading to said striking means and arranged adjacent the periphery of the drum, a rotary perforated drum arranged close to said inlet passage to said striking means, means for delivering tufts onto said drum, and means for setting up said air current to cause air to flow through said passage and the perforations in said drum and pick up said tufts.

16. In an apparatus for treating fibrous asbestos material, means for causing tufts of said material to be carried in suspension in a continuous air current, means in said air current for opening said tufts while so suspended, and means for separating material delivered from said opening means and carried by said air current, said separating means comprising a baffle plate adjustable in an angular position in the path of said air current and adapted to deflect massive particles downwards while permitting said air current to carry onward lighter particles of said material.

17. In an apparatus for treating asbestos material, a casing formed with an inlet in one side and an outlet on the opposite side and having imperforate walls, and rotary beating means mounted within said walls of said casing, said beating means comprising an axle and a plurality of separate arms arranged in a series along said axle, means external to the casing for setting up a current of air therethrough, and said casing being formed with a surface curved to provide a relatively small clearance beyond said beating elements circumferentially from the trailing edge of said outlet to the leading edge of said inlet and with a smooth surface curved to provide a relatively large clearance beyond said beating elements from the trailing edge of said inlet to the leading edge of said outlet.

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