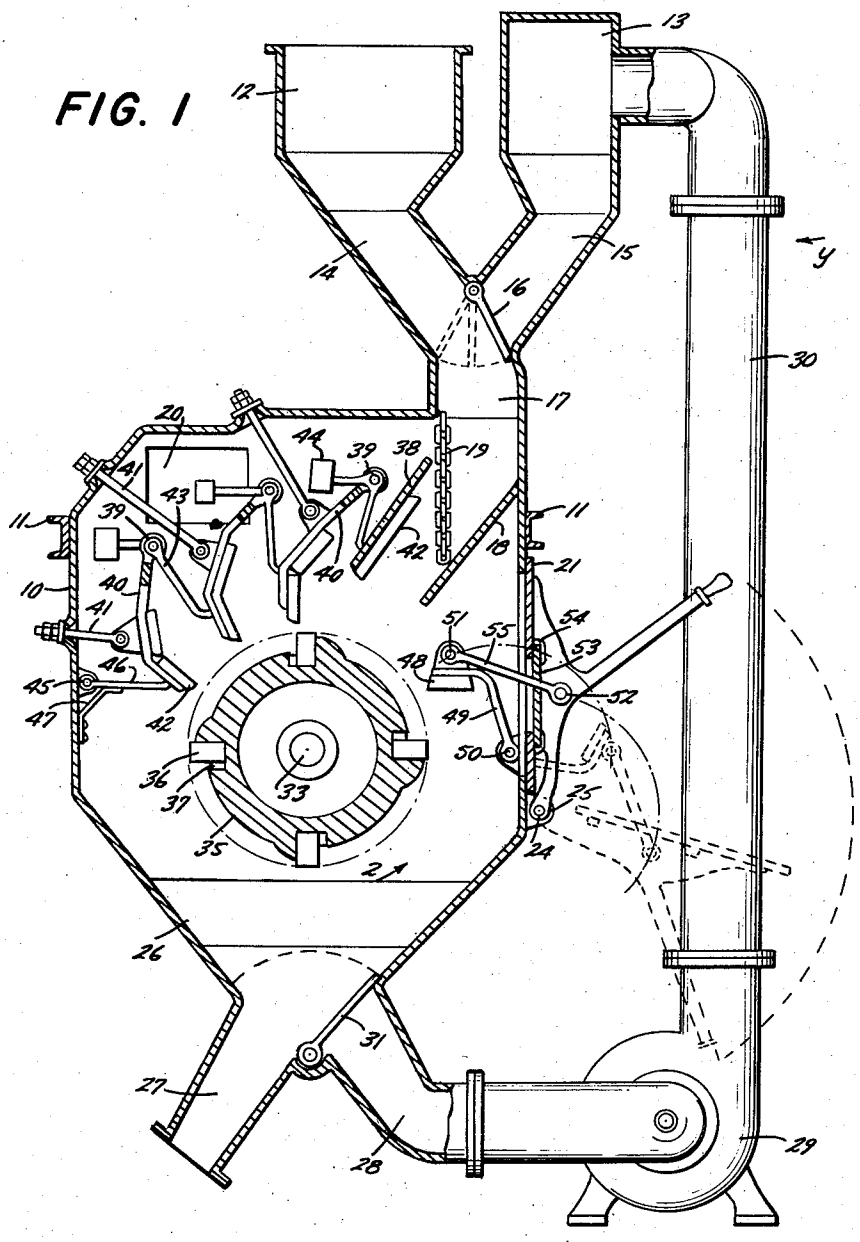
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DISINTEGRATING ASBESTOS ORES

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FIG. 1



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FIG. 2

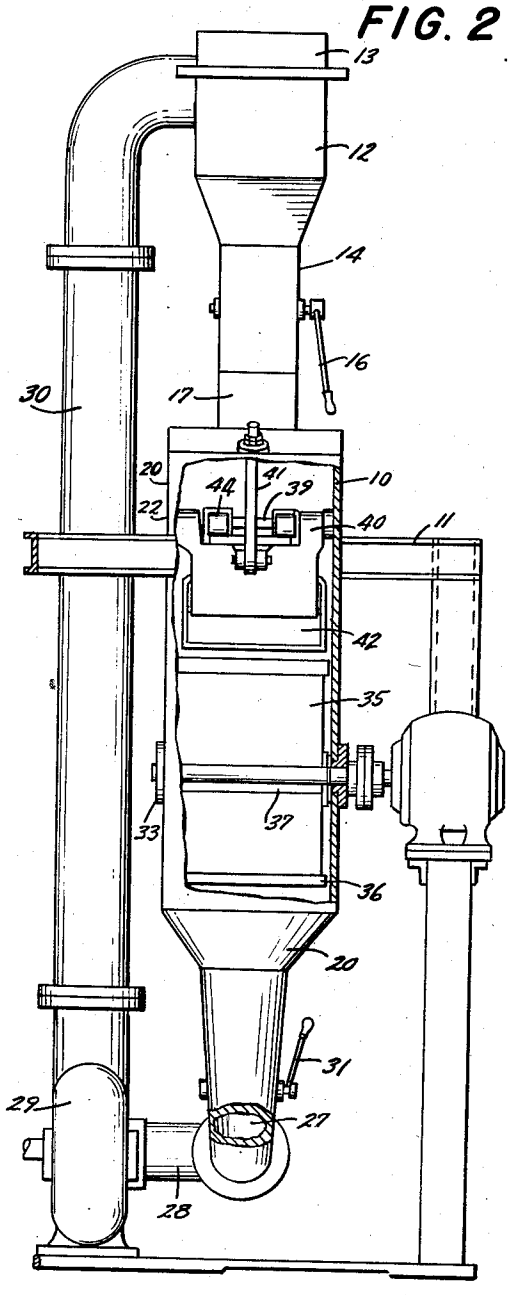
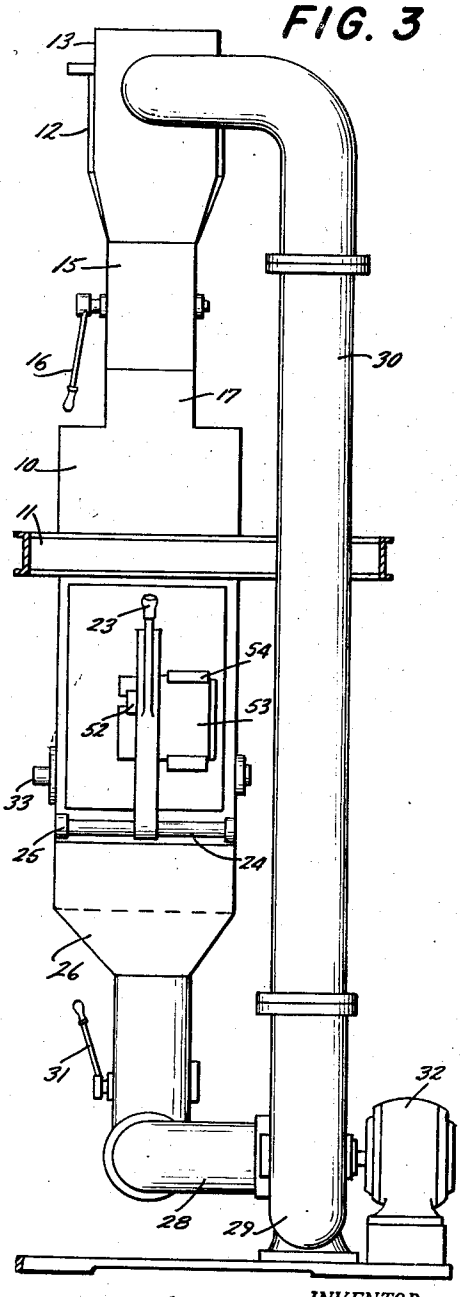


FIG. 3



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DISINTEGRATING ASBESTOS ORES

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1 Claim. (Cl. 241—289)

My invention relates to certain new and useful improvements in disintegrating asbestos ores and the like, and it has for one of its objects to provide an improved method for loosening and liberating the fibers or strands of fibers of asbestos contained in such ores without crushing and pulverizing them.

Another object of my invention is to provide a method for opening asbestos ores by slinging aggregates of asbestos ores against impinging surfaces for disintegrating the heavier particles and components of the ores by knocking and rebounding effect, while the lighter particles and components are not impinged or thrown off only with lesser force so that they cannot reach again the opposite rebounding means but are removed from the disintegrating zone by the air stream produced by the slinging means and the like, these lighter particles escaping thus from being crushed again and are discharged in a flexible form suitable for spinning.

A further object of my invention is to provide an improved disintegrating apparatus adapted for opening asbestos ores without pulverizing them, such apparatus having slinging means for throwing the ores dropping on them against impinging surfaces from which the heavier particles of the ores are rebounded against the said slinging means for again being thrown off from their surfaces, such slinging effect preferably being produced by centrifugal forces.

Another object of my invention is to provide an improved asbestos ores opening apparatus shooting the components of the ores on to rebounding surfaces, from which aggregates and heavier particles are thrown back for again being slung, preferably by centrifugally rotating means, while sufficiently loosened asbestos fibers are projected to a receptacle for being discharged.

Other objects of my invention will appear hereafter, the novel features and combinations being set forth in the appended claim.

In the accompanying drawings:

Fig. 1 is a side view in elevation of one form of asbestos ores reducing apparatus embodying my invention,

Fig. 2 is a front view of it in elevation seen in the direction of arrow *x* in Fig. 1,

Fig. 3 is a back view of it in elevation seen according to arrow *y* in Fig. 1.

Referring to the drawings, the reducing apparatus includes a housing **10** mounted on two stationary supporting girders **11**. The housing **10** is welded from sheet iron and the like and has a feeding hopper **12** provided at its top for charging fresh asbestos ores, and a closed container **13**, the outlets of this feeding hopper **12** and of this container **13** being connected to the main part of the casing **10** by tubes **14** and **15**, forming a manifold in which a flap **16** is provided that is adapted for being controlled by the operator of the apparatus. A vertical

tube **17** leads from the said manifold into the disintegrating chamber provided within the casing **10**. An inclined chute **18** is arranged in the casing **10** below the tube **17**, at the lower edge of which chains **19** are suspended forming a curtain closing the low end of tube **17** by extending down to the surface of the chute **18**.

In the lateral walls of the casing **10**, holes are provided for renewing the working parts of the apparatus and for cleaning it, these holes being closed by covers **20** and **21**. The cover **20** is secured to the casing **10** in the usual manner by means of bars **22**—see Fig. 2—while the cover **21** is fixed to a handle **23** pivoted by means of an axis **24** in the bearings **25** at the exterior side of the casing wall.

The lower part **26** of the casing **10** is pyramidically reduced to its bottom outlet which opens into a tube **27** having a discharge mouth and a tube **28** leading to the suction side of a fan **29**, the pressure side of which is connected to the container **13** by the tube **30**. At the junction of the tubes **27** and **28**, a flap **31** is provided which is operated by hand and serves to close either one of the said tubes or the other. The fan is driven by means of motor **32**.

Within the casing **10**, a rotary shaft **33** is provided driven by the motor **34** and having a body **35** secured to it. This body **35** has grooves axially extending at its surface in which slinging blades **36** are fastened by means of wedges **37**. The arrow *z* in Fig. 1 shows the direction of rotation of the shaft **33**.

In the upper part of the casing **10**, a tray **38** is fixed in sloping position near to the chains **19**, and rods **39** are disposed in parallel position to the shaft **33**. On these rods **39**, arms **40** are suspended, being adjustably held in position by means of bolts **41** and bearing rebounding plates **42**. The arms **40** are thus shaped that those of the rebounding plates which are situated next to the rotor blades **36** have their rebounding surfaces lying in planes that pass behind the corresponding rod **39** at a distance from it.

On the rods **39**, sheets **43** are suspended, too, their lower edges being pressed against the neighbouring arms **40** as well as against the tray **38**, respectively, by means of counterweights **44** secured to the sheets **43**. At the lateral wall of the casing **10** a journal **45** is provided bearing a sheet **46** that is pressed against that arm **40** which is the last in the direction of rotation of the shaft **33**. Such pressure is effected by a leaf spring **47** fixed to the wall of the casing **10**. Rebounding plates **42** are also fixed to the tray **38**.

Between the rotary body **35** and the hole closed by the cover **21**, a further rebounding plate **48** is mounted on an arm **49** pivoted on the trunnion **50** provided at the interior side of the lateral casing wall which bears the bearings **24** on its exterior side. A connecting rod **55** is linked at the trunnions **51** of the arm **49** and **52** of the handle **23** for commonly moving the said arm **49** and the cover **21**. It traverses a slit provided in the cover **21**, this slit being covered by a slide **53** put in rails **54** fixed to the cover **22**, and having a flanged edge.

The apparatus described before operates as follows: The flaps **16** and **31** as well as the covers **20** and **21** being in the position illustrated in the drawings, asbestos ores destined to be opened are fed into the hopper **12** for sliding down through the tubes **14** and **17**. They drop into the chute **18** and are stopped by the chains **19** for being charged by and by into the disintegrating chamber provided within the main part of the casing **10**.

The said asbestos ores consist of clumps and pieces of different size containing a good deal of fibers. When dropping down from the chute **18** these clumps and pieces are met by the slinging blades **36** rotating at high speed.

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By the blows which are executed by these blades upon the material falling down, the latter is disintegrated and slung against the different impacting plates 42 arranged around the rotary members of the apparatus. Impacting upon these plates, the material is further broken to smaller particles and is thrown back against the rotary blades 36 to be again thrown against the plates 42, and so on. According to the composition of the ores, fibers and strands of fibers are loosened and freed from the clumps and aggregates. These fibers and agglomerates of fibers have the structure of flocks like wool. They are too light for being respectively thrown and remain suspended in the air sinking down to the bottom part of the casing and into the tube 27 to be discharged.

Since the rotary blades according to their velocity of rotation produce a strong stream of air, all these fibers and flocks of liberated particles of asbestos are quickly removed from the disintegrating zone, escaping at once from the influence of the slinging blades. So, no disintegration happens that may unnecessarily fine or even pulverize the asbestos substance. On the contrary, the main part of the latter is delivered in a form well adapted to be spun.

If the operator finds that there are still lumps and particles in the discharged asbestos material that might cause trouble in the spinning thereof, he turns the flaps 16 and 31 to the position shown in the drawing in dotted lines. Then no fresh material is fed from the hopper 12 nor is any worked material discharged by the tube 27; instead the disintegrated substance is led through the tube 28 to the fan 29 and conveyed by it to the container 13 from which it slides down through the tubes 15 and 17 to again reach the disintegrating zone to be worked there a second time. Since flocks and fibers, when engaged by the rotary blades 36, are not thrown far, only the larger particles still contained in this charge reach the rebounding plates 41, and thus already freed from flocky parts they are rapidly and completely reduced to fibers, too. Thus, by this second operation, all asbestos material may be brought to the structure of fibers.

If necessary, a third disintegrating operation may be effected by leading the substance again through fan 29, container 13, and so on.

Eventually, the operator may set the flap 16 in a middle position as illustrated by dot-and-dashed lines, for simultaneously feeding recirculated and fresh material.

In disintegrating asbestos ores, it may happen that there are materials which can not or may not be crushed. Asbestos ores mainly consisting of magnesium hydrosilicate often contain considerable quantities of dead ores which may not be disintegrated but should be separated as much as possible, for if they were crushed, this would result in unprofitable costs, and the dead ores would only spoil the product. Then, sometimes, the charge may include tools and other iron parts which cannot be disintegrated by the apparatus and may injure it. For quickly removing all such troubling parts, the arms 40 are shaped in the manner described above. Since rods 39 are at some distance before the planes of the rebounding surfaces of the plate 42, respectively, which are arranged next to the rotary members, i.e. at the low edge of the arms 40, the arms 40 are pressed back by forces of considerable strength. Then, however, the spaces between the lower edges of the rebounding plates 42 and the rotary members are suddenly enlarged, since the arms 40 move like the jaw of a mouth. Thus, the rebounding plates remain in their operating position when asbestos is worked but recede suddenly through a substantial distance when engaged by parts which are not to be disintegrated and these plates quickly return to the operating position after such parts escape.

For preventing fibers and flocks of asbestos suspended in the air from depositing in free spaces within the upper part of the casing 10, a sort of ceiling is formed by the arms 40, the tray 38, and the sheets 43 and 46 pressed against the outer faces of arms 40, such ceiling separating the upper part of the casing 10 from the disintegrating zone. The sheets 43 are capable of receding when the arms 40 are pressed back, and they return automatically with the latter to their operating position.

For cleaning the apparatus as well as for exchanging rebounding plates 42 and other working parts, the operator stops the rotary members and opens the covers 20 and 21. For opening the cover 21, he removes the slide 53 by seizing its flanged edge and pushing it in horizontal direction till the slit in the cover 21 is freed. Then the handle 24 can be turned down moving along the cover 21 and arm 48. In Fig. 1 all these members are shown in the opening position in dotted lines. When they are in this position, the hole covered before by the cover 21 is wholly open for conveniently reaching each part of the disintegrating zone.

I claim:

In an apparatus for disintegrating asbestos ores and the like, the combination with a casing having openings for charging and discharging material and holes for exchanging working parts, of covers closing said holes, one of said covers pivotly being disposed at the wall of said casing, of an arm rotatably being disposed within said casing, of a connecting rod being linked to said cover and said arm, of a chute slopingly disposed within said casing below said charging opening, of chains being suspended in said casing and forming a curtain extending down to the surface of said chute, of a tray provided in said casing next said chains, of rods disposed in juxtaposition parallelly to the axis of said rotor in the superior part of said casing, of arms yieldingly suspended upon said rods, of rebounding plates secured to said arms, of sheets rotatably arranged upon said rods and resiliently pressing against said tray as well as against said arms and said rebounding plates, said tray, said arms, and said sheets being adapted to form a sort of ceiling separating the superior part of the said casing from its lower one, of tubes adjoining said openings, of manifolds connected to said tubes and being provided with flaps, and of tubes leading from said manifolds to a fan provided at the apparatus.

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