June 29, 1954 W. I. GLADFELTER 2,682,135

WIRE CUTTING ATTACHMENT FOR BLAST CLEANING OR PEENING MACHINES

Filed Nov. 4, 1949 2 Sheets-Sheet 1

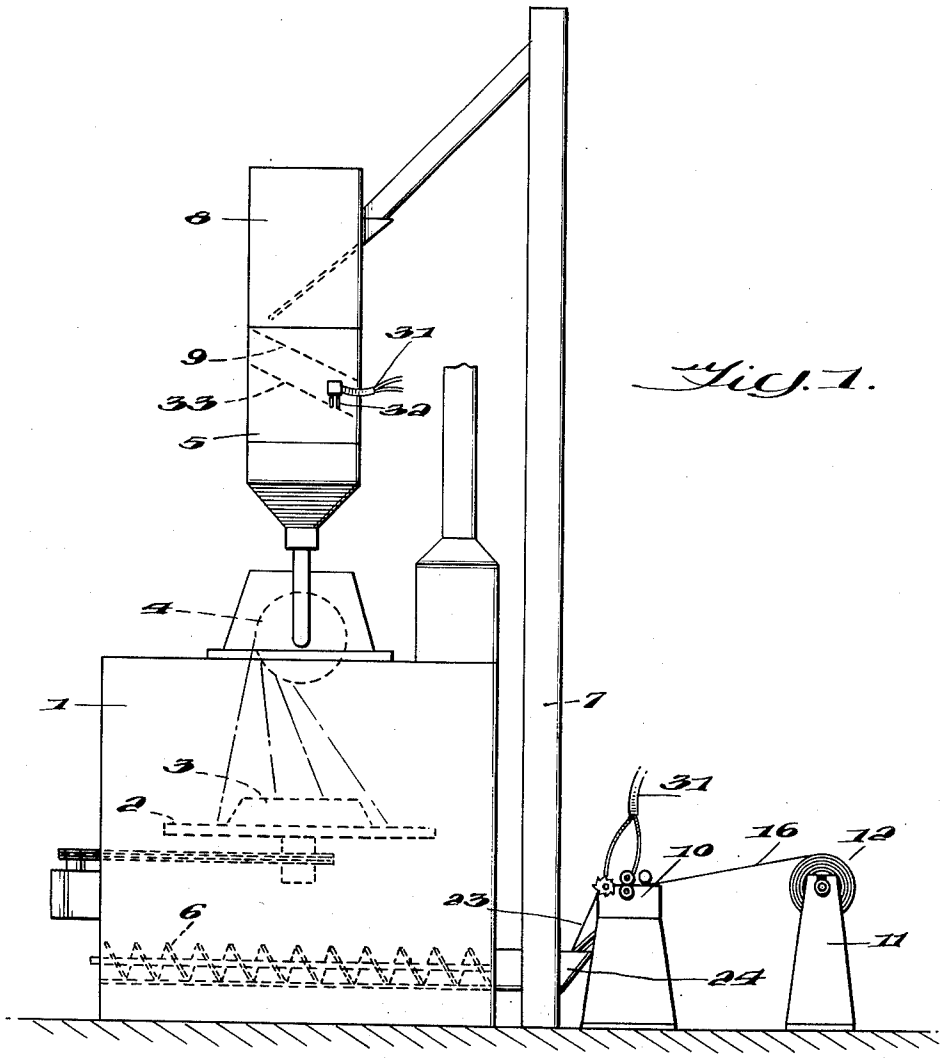


Fig. 1.

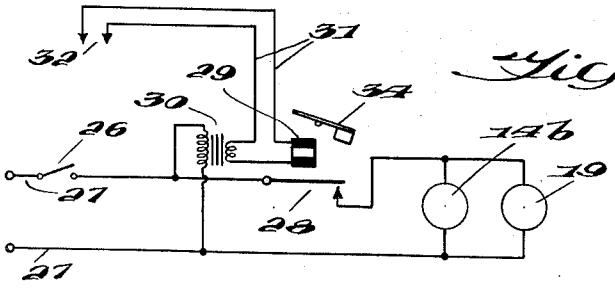


Fig. 4.

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Fig. 2.

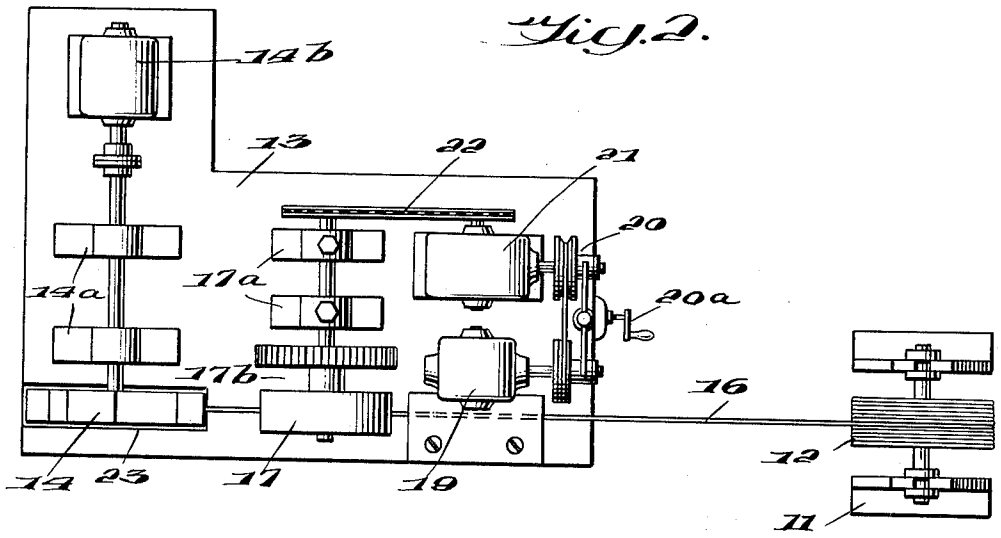
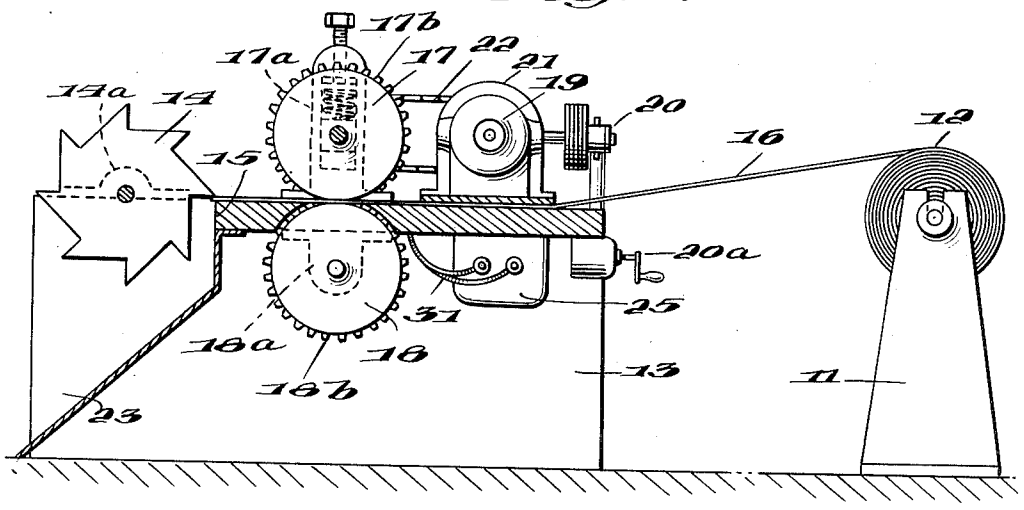


Fig. 3.



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WIRE CUTTING ATTACHMENT FOR BLAST CLEANING OR PEENING MACHINES

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7 Claims. (Cl. 51—9)

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This invention relates to blast treating machines, more particularly shot peening and blast cleaning machines, and aims generally to improve the same.

In the prior practice of shot and grit blasting the blastant most used has been chilled cast iron grit or shot. Recently much blastant has been made by malleabilizing cast iron shot. Cast steel shot has also been made and used in certain plants.

Furthermore, in all blast peening and blast cleaning operations, a portion of the blasting material is broken down or consumed and has to be replaced by addition of replenishing blastant to the system. Replenishing blastant is normally supplied in bags, and has been simply dumped into the machine or a feed hopper therefor, and in such practice a considerable part of the blastant may be spilled or otherwise wasted. In addition, failure to add blastant as required may result in insufficient treatment of the work, with consequent need for retreatment or special cleaning operations resulting in economic loss.

In accordance with the present invention drawn wire is preferably employed as the material for the production of the blasting particles, and is preferably severed into short sections having approximately the same length as the diameter of the wire. With so formed abrasive it is found that upon several impacts of the slug on the work the slug assumes substantially the shape of a round ball. With such wire-formed blastant it is also found that the blastant particles stand up under more impacts against the work than do those of cast steel, malleabilized abrasive, or chilled cast iron shot. The wire-formed shot is also more uniform in size, analysis and hardness. These factors, while especially important in shot peening, are equally desirable in blast cleaning operations.

Furthermore, in accordance with the present invention a supply of blastant stock in continuous form, for example, a roll of drawn wire, is delivered to the blasting apparatus in its unsevered state, and is there severed or cut to form blastant particles which are delivered to the blastant handling system as needed. To this end the invention also aims to provide means as a part of a blasting machine to manufacture from a supply of blastant stock in continuous form replenishing blastant in particle form when the machine needs the same.

A further object of the invention is to provide in such a machine automatic control means responsive to the absence or presence of an adequate supply of blastant in the machine, for initiating and stopping operation of the wire chopping or blastant particle forming means. With such object attained, and the machine supplied with continuous blastant stock such as a coil or coils of wire, the machine automatically is continually supplied with the proper amount of blasting material.

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Other objects and advantages of the invention will be apparent from the following detailed description of a preferred embodiment illustrative of the invention. The invention resides in the novel features and combinations herein disclosed and defined in the appended claims.

In the accompanying drawings of such illustrative embodiment

Fig. 1 is a diagrammatic side elevation of a blasting machine including the invention;

Figs. 2 and 3 are more or less diagrammatic plan and vertical sectional views of a preferred form of wire cutting device;

Fig. 4 is a circuit diagram of an illustrative control circuit.

As exemplified in Fig. 1, the blasting machine may comprise a blasting chamber or housing 1; means, for example a rotatable table 2, for supporting work 3 therein; and means, exemplified by the blasting wheel 4, for projecting blastant material at blastant velocity onto the work 3. It may also include in its blastant handling system an abrasive bin or hopper 5 for supplying abrasive to the projector 4, and a spent abrasive collector, shown as a screw conveyor 6, for delivering the spent abrasive to an abrasive elevator 7 of any suitable type. The elevator 7 may discharge to a suitable separator 8 that separates the reusable abrasive from the fines and other detritus, and returns it, as through screen 9, to the abrasive hopper 5. The path from and to the bin 5 may be termed the blastant or abrasive circuit.

Still referring to Fig. 1, the means for manufacturing abrasive as needed is shown as a wire cutter or chopper 10 located to discharge into the abrasive handling system or circuit of the machine at any convenient point. In the form shown this delivery of the freshly cut abrasive is made to the foot of the elevator 7 as shown, as this enables the supports 11 for the roll or rolls 12 of wire or abrasive stock to be conveniently located.

The wire cutter, chopper, or other stock severing mechanism may be of any desired form, that shown herein being of the rotary cutter type. In

this illustrative form, as shown in Figs. 2 and 3, the chopper comprises a base 13 supporting a chopper wheel 14 in cooperative relation to a stationary cutting edge or hardened die plate 15, over which the wire or stock 16 to be cut into pellet lengths is fed, as by feeding means 17—18. In the illustrated form, for simplicity, a single wire supply 16 drawn from a single stock roll 12 is shown, but more than one wire may be fed to the cutting means simultaneously.

Suitable means is preferably provided to enable adjustment of the length of the cut sections of wire, herein by providing for varying the rate of feed of the wire 16 relative to the speed of the cutter 14. As is shown in Fig. 3, the cutter 14 resembles an ordinary conventional 8-toothed milling machine cutter, though any number of teeth may be used. This cutter 14 is supported in shaft bearings 14*a* and driven by a motor 14*b* at an approximately predetermined speed. The bottom roll 18 of the wire-feeding means 17—18 is supported in fixed bearing 18*a* and the upper feed roll 17 is supported in bearings 17*a* adjustably resiliently urged toward the lower bearings 18*a*. Such floating support affords compensation for any irregularities in diameter of the wire, and applies controlled pressure for proper feeding of the wire. Interconnecting means, shown as meshing gears 17*b*—18*b* insure rotation of the feed rolls at the same speed when one of them is driven by the motor 19 through variable speed drive 20, speed reducer 21, and sprocket drive 22. By this arrangement, the variable speed drive 20 may be set by its control crank 20*a* to advance the wire 16 over the hardened die plate 15 and into the cutter 14 so that the wire is fed one diameter for the passing of each cutter tooth, or at any other desired rate. Wire of $\frac{1}{16}$'' diameter is preferably fed $\frac{1}{16}$'' longitudinally per cutter tooth; $\frac{1}{32}$'' wire, $\frac{1}{32}$'' per tooth; etc. The cut pellets of wire, preferably about equal in length to their diameters, pass down the chute 23, in the form shown, and into the elevator boot 24 (Fig. 1) of the blasting machine.

The means for controlling the operation of the wire cutter to manufacture abrasive only as the same is needed by the machine, in the form shown, comprises a motor controller 25 (Fig. 3) operating in response to the quantity of blastant in the system, e. g., to falling and rising of the level of abrasive in the hopper 5 (Fig. 1). As is diagrammatically shown in Figs. 1 and 4 the controller 25 may comprise a main off-on switch 26 in one or both of the power leads 27, feeding current through an automatic switch 28 to the wire chopper motors 14*b*, 19. The automatic switch 28 may be of the circuit breaker type as shown in Fig. 4, normally closed, and opened on energization of its operating coil 29. The power for the coil 29 may be supplied from a transformer 30 connected across the leads 27 as shown, and its circuit 31 may be controlled by a detector 32 of any appropriate form, herein shown as a level indicator comprising a pair of prongs positioned in the abrasive hopper to be bridged by the metallic abrasive when the hopper is filled to the proper level 33 (Fig. 1). A visual indicator, illustrated by the flag 34 thrown up when the level is correct and circuit 31 is energized, may be employed if desired. A circuit making rather than a circuit breaking arrangement may be used if desired.

With the exemplifying arrangement shown, when the level 33 in hopper 5 drops and opens circuit 31 at 32, the switch 28 is closed and manufacture of blastant is initiated. When sufficient blastant has been added to the system to again raise the level 33 in the hopper to the position shown in Fig. 1, the circuit 31 is closed at 32 and coil 29 then opens switch 28 and discontinues operation of the wire cutter. At the same time, if desired, the signal 34 may be raised to indicate the presence of an ample supply of blastant in bin 5. Further blastant level indicators and further signals or safety devices may be employed if this is deemed desirable.

The embodiments of the several features of the invention shown and described herein are to be considered as illustrative and not restrictive, the scope of the invention being defined by the appended claims.

I claim as my invention:

1. In blast treating apparatus, in combination, a bin for storing blastant material in particle form, blastant particle projecting means, means providing a circuit for delivering blastant particles from said bin to said projecting means and for returning projected particles to said bin, means for receiving blastant stock in continuous form and for severing the same into particle form and delivering the severed particles to said circuit, means for feeding blastant stock in continuous form to said severing means, and means responsive to the level of blastant particles in said bin for initiating and terminating operation of said feeding and severing means.

2. In blast treating apparatus, in combination, a bin for storing blastant material in particle form, blastant particle projecting means, means providing a circuit for delivering blastant particles from said bin to said projecting means and for returning projected particles to said bin, means for receiving blastant stock in continuous form and for severing blasting particles therefrom and delivering the severed particles to said circuit, means for feeding blastant stock in continuous form to said severing means, and means responsive to the quantity of blastant particles in said bin for initiating and terminating operation of said feeding and severing means.

3. In blast treating apparatus, in combination, a bin for storing blastant material in particle form, blastant particle projecting means, a blastant handling system for delivering blastant particles from said bin to said projecting means and for returning projected particles to said bin, means for receiving blastant stock in continuous form and for severing blasting particles therefrom, and delivering the severed particles to said system, means for feeding blastant stock in continuous form to said severing means, and means responsive to the quantity of blastant particles in said system for initiating and terminating operation of said feeding and severing means.

4. A blast treating machine comprising a blastant feeding and recovery system including a blast projector and means for detecting the presence or absence of a predetermined quantity of blastant material in said system, a blastant former comprising a wire cutter arranged to cut into particles wire fed thereto and deliver the particles to said system, said former further comprising means for supporting and feeding wire to said wire cutter, and means controlled by said detecting means for initiating and terminating operation of said blastant former to maintain in the system substantially the predetermined quantity of blastant material.

5. A blast treating machine comprising a blastant feeding and recovery system including a

blast projector associated with a work space, means for detecting the presence of a predetermined quantity of blastant in said system, means for supporting a supply of blastant material in continuous form and for progressively subdividing the same into particles and delivering the particles to said system, and means controlled by said detecting means for operating said subdividing means to form and feed blastant particles to said system to maintain the quantity of blastant therein substantially equal to said predetermined quantity.

6. An attachment for blast treating machines comprising means for severing blastant particles from continuous blastant stock, means for driving said severing means and for feeding continuous stock thereto, means for delivering the severed particles of stock to the blastant circuit of a blasting machine, means for detecting the quantity of blastant in such blastant circuit, and means controlled by said detecting means for controlling said driving and stock feeding means.

7. An attachment for blast treating machines comprising means for severing blastant particles from continuous blastant stock, means for driving said severing means and for feeding continuous stock thereto, means for delivering the severed particles of stock to the blastant circuit of a blasting machine, means for detecting the quantity of blastant in such blastant circuit, means for varying the size of blastant particles severed from said stock by said severing means, and means controlled by said detecting means for controlling said driving and stock feeding means.

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