

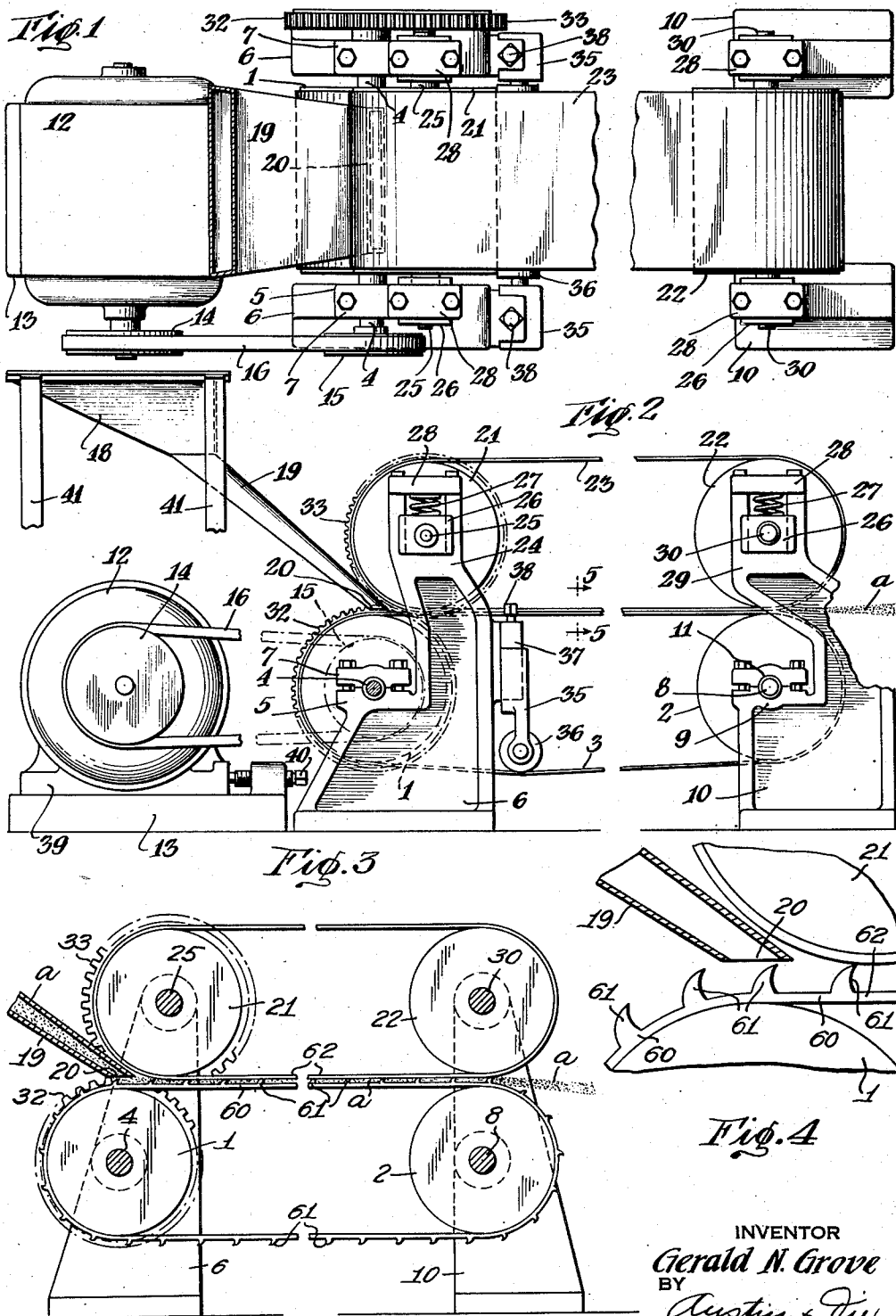
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ABRASIVE THROWING EQUIPMENT

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ABRASIVE THROWING EQUIPMENT

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This invention relates to abrasive throwing equipment, and more particularly to moving apparatus designed to throw abrasive at a velocity effective for the cleaning of metal sheets, castings, forgings and the like.

5 This invention comprehends the provision of an endless belt, driven by motor or other power device at a high lineal speed. The belt is carried and supported by two or more rollers, one of which directs the belt around a turn. The abrasive is deposited on the outer surface of the belt and when the belt is driven at a lineal speed of 5000 feet per minute and upward, the abra-
10 sive is thrown from the belt tangentially at the turn. The belt is positioned and arranged to hurl the abrasive in a direction so as to impinge the work surface to be cleaned.

The invention comprehends the provision of means for retaining the abrasive on the moving belt during its lineal travel, the retaining means releasing the abrasive from the throwing belt when a turn in the circuitous travel thereof is reached. The abrasive retaining apparatus may take the form of a secondary endless belt positioned in close juxtaposition to the abrasive receiving belt. The secondary belt may be movably mounted for lineal travel upon two or more rollers provided with adjustable journals which hold the secondary belt in pressing contact with
30 the abrasive carrying belt. Both belts are designed to travel in the same direction and at the same speeds.

The abrasive is deposited on the abrasive throwing belt by means of a gravity feed chute, the discharge end of which is positioned closely adjacent the abrasive carrying belt so as to effect even distribution of the abrasive thereon and prevent the abrasive from being blown or otherwise misdirected off from the belt surface.

40 The secondary belt retains the abrasive on the carrying belt until a sharp turn in the lineal travel thereof is reached, at which point the abrasive is thrown tangentially at a speed effective to clean and abrade metallic surfaces. The abrasive carrying belt may be provided with a rubberized or wear-resisting outer surface adapted to grip the abrasive and retain the abrasive thereon until tangentially thrown therefrom at the turn. The outer surface of the belt may also
50 be provided with retaining side flanges and with transversely extending vanes or ribs providing abrasive receiving pockets therebetween designed to retain the abrasive on the swiftly moving belt until the throwing turn is reached.

55 The width of the belt may vary from one inch

to twelve inches and upward, depending upon the width of the surface to be impinged by the thrown abrasive. The lineal speed of the belt will vary with the surface to be cleaned. Where sharp steel grit of considerable coarseness is used, effective abrading action can be obtained when the belt is driven at a lower lineal speed than where a finer abrasive is used. Where the surface to be cleaned is coarse and hard, the lineal speed of the belt will necessarily be increased to produce the desired cleaning action. For the cleaning of metal sheets, castings, forgings and other hard metallic surfaces, the throwing belt is preferably driven at a speed of 5000 lineal feet per minute and upward. By a proper selection of the abrasive material used, and by adjusting and regulating the lineal speed of the throwing belt a large variety of different metallic surfaces having different surface characteristics may be cleaned by means of the apparatus herein described.

The invention also consists in certain new and original features of construction and combination of moving parts, as hereinafter set forth and claimed.

Although the novel features which are believed to be characteristic of this invention will be particularly pointed out in the claims appended hereto, the invention itself, as to its objects and advantages, and the manner in which it may be carried out, may be better understood by referring to the following description taken in connection with the accompanying drawing, forming a part thereof, in which

Fig. 1 is a top plan view of my abrasive throwing apparatus;

Fig. 2 is a side elevational view of the abrasive throwing apparatus shown in Fig. 1;

Fig. 3 is a side elevational view through the abrasive throwing apparatus, the abrasive carrying belt associated with the apparatus herein shown being provided with transverse vanes, lugs or ribs providing pockets for receiving the abrasive, certain parts being shown in cross section to more clearly illustrate the construction; and

Fig. 4 is an enlarged fragmentary vertical cross sectional view through the apparatus shown in Fig. 3, illustrating more particularly the means and method used for depositing the abrasive within the abrasive receiving pockets of the throwing belt and retaining the abrasive in said pockets by the secondary abrasive retaining belt.

Similar reference characters refer to similar parts throughout the specification.

Referring to the drawing, and more particularly to Figs. 1 and 2, the abrasive equipment

comprises spaced rollers 1 and 2 adapted to support and carry a continuous abrasive throwing belt 3. The roller 1 is supported upon a shaft 4 journaled in suitable bearings supported by blocks 5 enclosed by the removable blocks 7. The shaft supporting blocks 5 may be supported upon suitable pedestals 6 which rest upon the floor or other surface. The roller 2 is similarly carried by a shaft 8 journaled in suitable bearings supported by the shaft blocks 9 suitably supported upon a pedestal 10. The shaft 8 may be retained in position by removable enclosing blocks 11.

The throwing belt 3 may be driven by a high speed motor 12 supported upon a suitable base 13. Power from the drive wheel 14 attached to the motor shaft is transmitted to the pulley 15 secured to shaft 4 of the drum 1 by means of a suitable power belt 16. The drive belt 16 is preferably V-shaped in cross section and the drive wheel 14 and pulley wheel 15 are suitably grooved to receive the belt 16, insuring a positive transmission of power. It is understood, however, that other forms of driving mechanism may be used for rotating the roller 1 at the desired speed. Adjusting means, such as screw 40 which seats against the motor support 39, may be used to keep the belt taut.

The abrasive *a*, which may comprise quartz sand, steel shot, or steel grit, is directed onto the surface of the belt 3 by means of a suitable conduit 19. The discharge end 20 of the conduit is positioned closely adjacent to the surface of the belt to prevent the abrasive particles from being scattered or thrown therefrom. The abrasive *a* is carried by the belt 3 until the supporting roller 2 is reached, at which point the abrasive *a* is thrown tangentially at a high velocity from the surface of the belt as the belt turns or moves around the drum 2. To effectively abrade and clean metallic sheets, forgings, castings and the like, the belt 3 should be driven at a lineal speed of 5,000 feet per minute and upward. The lineal speed of the belt required for effective abrading will depend somewhat upon the character of the abrasive used as well as the hardness and surface characteristics of the material to be cleaned or treated. Where coarse and sharp abrasive is used, more drastic cleaning and cutting action can be obtained than where fine powdery abrasive is used. The speed at which cleaning can be accomplished also varies with the velocity at which the abrasive is thrown against the surface to be cleaned, and this velocity is dependent upon the lineal speed of travel of the belt 3.

Under certain conditions it may be desirable to give the abrasive an initial velocity as it is deposited upon the belt 3, to reduce the drag upon the belt 3 at the point where the abrasive is deposited thereon. As illustrated more particularly in Fig. 2, the abrasive may be contained within a suitable hopper 18 resting upon the supports 41. The hopper 18, connected to the conduit 19, is raised above the belt 3 so as to give the abrasive flowing from the hopper 18 the desired velocity at the discharge end 20 of the conduit 19.

It is important to keep the abrasive carrying section of the belt 3 taut if the greatest abrading and treating efficiency is to be realized. This may be accomplished by providing a suitable belt tightening roller 36 over which the belt 3 rolls, as clearly shown in Fig. 2. The belt tightening roller 36 is carried and rotatably supported by

an adjustable bracket 35 which slidably engages a bracket 37 fixed to the supporting pedestal 6 of the machine. Suitable means such as an adjusting screw 38 may be provided to regulate and control the pressure exerted by the roller 36 against the belt 3. Other mechanical means for taking up the belt "stretch" and keeping the belt taut may be used within the purview of this invention.

The abrasive throwing belt 3 should be made of the strongest possible material so that it may be driven at very high speed without breaking under strain. The outer surface of the belt should be such that the abrasive will adhere thereto until thrown therefrom. The belt may be of almost any width desired, depending upon the width of path it is desired to sweep by the thrown abrasive. Belts one inch to twelve inches and even twenty-four inches in width and upwards may be used. The width of belt which can be efficiently used, however, is somewhat limited by reason of the fact that the wider the belt the more difficult it becomes to drive the same at an effective lineal speed sufficient for metal cleaning purposes. To effectively clean metal sheets, castings, forgings and other metallic materials the belt should be driven at a lineal speed of 5000 feet per minute and upwards. Where the material to be abraded is unusually hard, lineal speeds of 8000 feet per minute and upwards are preferred. The belt supporting rollers 1 and 2 may be made in diameters ranging from 5 inches to 20 inches and upwards, depending upon the characteristics of the material to be cleaned and other operating conditions.

It is preferable to provide some means for retaining the abrasive on the throwing belt during the lineal travel thereof between the point of deposit and the point of discharge. As illustrated in Figs. 1 and 2, I have provided a continuous abrasive retaining belt 23 supported by suitable rollers 21 and 22. The roller 21 is mounted upon a suitable shaft 25 journaled at each end thereof in a suitable block 26 adapted to ride or float in the guide frame 24 projecting upwardly from the pedestal support 6. The roller 22 is similarly mounted upon a shaft 30 journaled at each end thereof in a suitable block 26 which floats in the guide frame 29 projecting from the supporting pedestal 10. The belts 3 and 23 are driven in the same direction and are operably connected to be driven at the same speed by means of a gear 32 fixed to the shaft 4 which meshes with a gear 33 affixed to the shaft 25. The continuous belts 3 and 23 are in juxtaposed position from the point where the abrasive is discharged onto the belt 3 by the conduit 19 to the point where the throwing belt 3 departs from the straight line path and turns or moves around the roller 2. When no abrasive is moving through the machine the belts would substantially be in contact, as illustrated in Fig. 1. When abrasive is moving through the machine the abrasive *a* would be sandwiched in between the belts 3 and 23. The abrasive confining belt 23 substantially rests upon the belt 3 with sufficient pressure to properly retain the abrasive. The contacting pressure between the belts 3 and 23 may be regulated and controlled by the provision of suitable spring elements 27 arranged to press against the shaft blocks 25 and 30, and retained in this position by the enclosing blocks 28.

The belt 60, shown in Figs. 3 and 4, is provided with spaced vanes or partition elements 61 ex-

tending transversely across the belt and designed to receive and pocket the abrasive therebetween. The partition elements 61 may be inclined forwardly in the direction of the belt movement if desired to insure more effective hurling action of the abrasive as the belt 60 moves around the roller 2. The partition elements 61 however should be so shaped that the abrasive will freely leave the elements so that the velocity given the abrasive by the belt will not be reduced. A flat abrasive retaining belt 62 such as the belt 23 illustrated in Figs. 1 and 2 may be used to enclose the abrasive *a* within the pockets formed by the partition elements 61. The retaining belt 62 as well as the throwing belt 60 may be supported and carried by suitable rollers as heretofore described.

While certain novel features of the invention have been disclosed and are pointed out in the annexed claims, it will be understood that various omissions, substitutions and changes may be made by those skilled in the art without departing from the spirit of the invention.

What is claimed is:

1. Apparatus for throwing abrasive at blasting velocities including in combination, an endless belt, a roller supporting said belt and directing the belt around a turn in its lineal travel, power means for driving said belt at high lineal speed,

partition elements having curved longitudinal cross-sections and extending transversely across the belt surface providing abrasive receiving pockets therebetween, means for depositing abrasive in said pockets, and means comprising a belt having a relatively smooth surface traveling in the direction of said first named belt and operative to retain the abrasive within said pockets until the turn in the lineal travel of said first named belt is reached.

2. Apparatus for throwing abrasive at blasting velocities including in combination, an endless belt, said belt having transversely extending partitions defining abrasive-retaining pockets, a roller supporting said belt and directing the belt around a turn in its lineal travel, a feed chute for depositing abrasive on said belt, an endless secondary belt operative to retain abrasive on said first named belt until the turn in the lineal travel of the first named belt is reached, said secondary belt having a relatively smooth surface, means for adjusting the relative spaced position of said belts, and power means for driving both belts in the same direction so as to throw the abrasive from the first named belt at an abrading velocity when the turn in the lineal travel of the first named belt is reached.

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