

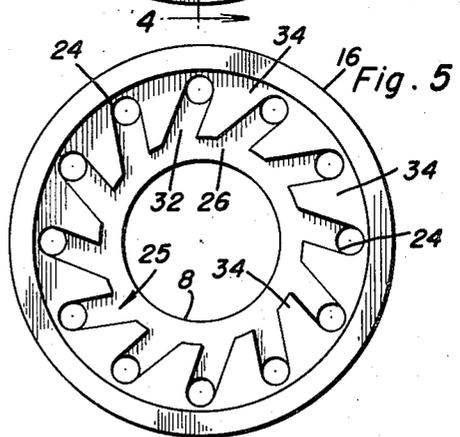
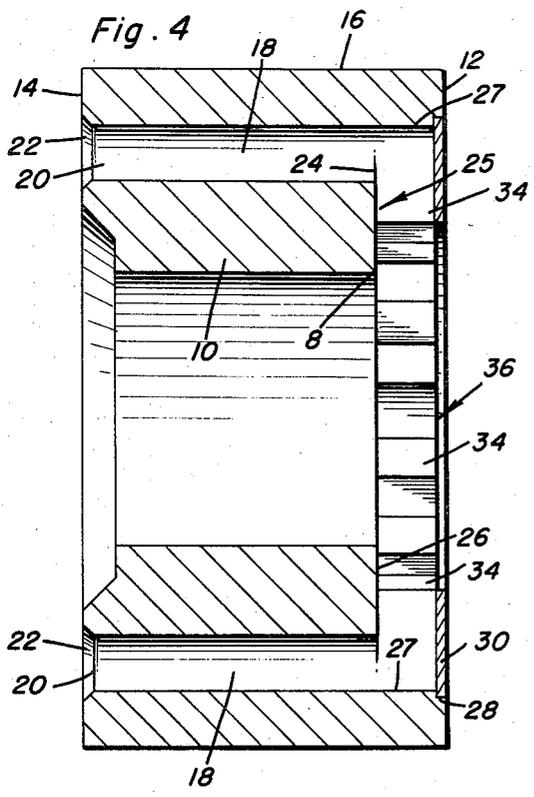
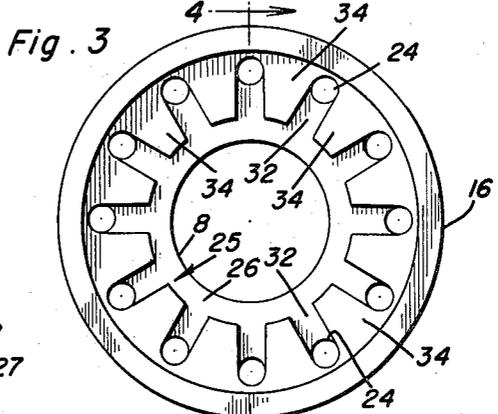
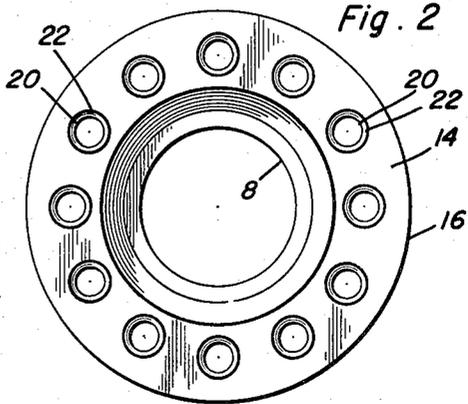
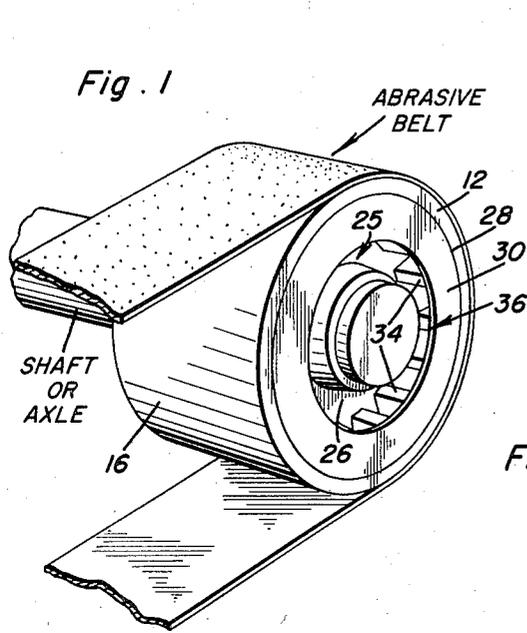
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AIR COOLED PULLEY FOR ABRASIVE BELT GRINDERS

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AIR COOLED PULLEY FOR ABRASIVE BELT GRINDERS

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4 Claims. (Cl. 51—135)

The present invention relates to certain new and useful improvements in pulleys, either drive or driven types, and, as the title implies, pertains, but not necessarily, to a pulley which is expressly adapted and designed to be used in connection with abrasive belts such as are employed for grinding and polishing.

More specifically, the concept has to do with a pulley which is possessed of the prerequisites and characteristics required in a driving or driven pulley but which is also such in construction that it embodies self-contained means for keeping itself and the abrasive belt at the same temperature as the normal atmosphere surrounding the same whereby to appreciably and greatly extend the service life of belts and pulleys and to achieve other and beneficial end results amounting to a satisfactory solution of the problems which may now be worked out and solved.

Needless to say, so-called air cooled and ventilated pulleys are not new. Others seeking to solve the problems under advisement have evolved and produced pulleys of one type or another characterized by facilities promoting aid cooling needs. In passing reference may therefore be made, if the reader so desires, to patents issued to Austin Kimble, for example, Patent 1,388,865 of August 30, 1921, or Patent 1,443,541 of January 30, 1923. This information is given here not to dwell upon structural differences and analogies but to provide a general background indicative of the state of the art and to again revert to the fact that the instant invention has to do primarily with pulleys which lend themselves to use in conjunction with abrasive belts in abrasive belt grinding and polishing services.

As is a matter of common knowledge, abrasive belts track on two or more pulleys, that is, a driving pulley and at least one more which serves to complete the belt circuit, one pulley being mounted on a universally adjustable axle providing a means of maintaining central and even trackage of the abrasive belt on driving or other pulleys which are used as grinding wheels, and in maintaining proper tension or tautness of the belt.

For the most part abrasive belt pulleys must be of the same width as the belt and can have neither crown nor flanges to promote central trackage of the belt. Manifestly, as in most cases the pulley is used as a grinding wheel and a crown would destroy the needed flat grinding surface. Further, flanges or any other protrusion on sides or edges of pulley would limit the shape of work-pieces that could be ground or polished.

During grinding or polishing operations with abrasive belts, objectionable heat is generated at the point of contact between work-piece, belt and pulley surface. Being cumulative, such heat soon builds up to a degree where it destroys the glue or resin which bonds the abrasive particles to the belt. When the adhesive bond becomes softened or charred the abrasive particles are thrown and scattered from the belt and it soon becomes useless. Not only this, the heat generated is absorbed

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by the pulleys and causes them to become so hot that it is most difficult to keep their axles lubricated.

In carrying out the principles of the instant invention the principle objective is to structurally, functionally and otherwise improve upon ventilated pulleys and, in doing so, to provide a construction whereby the heat generated at the rim from belt friction and the pressure of the work-piece against the selected belt surface is absorbed by the pulley while, at the same time, air set into motion by a blower, which is embodied in the pulley, is forcibly circulated through passages in the pulley body picking up and discharging the accumulated heat. Briefly summarized, the improved pulley is characterized by a body and rim, said body having an axial hole for the shaft or axle on which the pulley is to be operatively mounted, said body having distributed venting ports exhausting through one end of the body, passages in said body leading to said ports, and a centrifugal blower operatively arranged at the other end of said body and communicating with the passages and designed to accumulate and gather in atmospheric air and forcibly circulate and exhaust it through the passages for escape by way of said ports, the outside diameter of said blower being of a diameter less than the outside diameter of the rim so that the full width of the rim is unobstructedly available for use.

Novelty is also predicated on the construction stated and wherein the pulley is constructed of a material having high thermal conductivity, the blower being recessed into the other end so that no portion thereof protrudes or projects beyond said other end.

Objects, features and advantages in addition to those touched upon so far will become more readily apparent from the following description of the details, the accompanying drawing, and the subjoined claims.

In the drawings;

Fig. 1 is a perspective view of the improved pulley showing a fragmentary portion of the axle or shaft and a portion of an abrasive belt trained thereover;

Fig. 2 is an enlarged elevation of the ported end of the pulley;

Fig. 3 is a similar view of the opposite or other end with the cover plate removed;

Fig. 4 is a section on the vertical line 4—4 of Fig. 3, looking in the direction of the arrows; and

Fig. 5 is a view like Fig. 4 but showing that the vanes of the blower may be canted or angulated instead of straight.

Referring now to the drawings with the aid of reference numerals and lead lines the pulley is preferably constructed from aluminum or copper having high thermal conductivity. An axial hole 8 opens through opposite left and right hand ends of the body 10, said ends being respectively denoted at 12 and 14 in Fig. 4. The periphery or rim is denoted at 16. Manifestly, the hole 8 is for mounting on driving shaft in case of a driving pulley or an axle in case of a driven pulley. The pulley, as an entity, is cylindrical or circular in cross-section and the smooth or plane rim surface 16 is of a predetermined width in keeping with the corresponding width of the abrasive belt which is intended to track thereon. Between the rim and hole 8 the body is provided with a plurality of transverse open ended passages 18 formed with a drill or forming mill. The discharge ends of the passages communicate with their respective venting or discharge orifices or ports 20. These are circumferentially arranged at equidistant points and preferably marginally beveled as at 22 to diminish whistling as the pulley rotates at a high speed. The opposite or intake ends of the passages are denoted at 24 and they open through the bottom 26 of a recess or cavity 25 formed in the end 12, the outer perimeter of the cavity

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being denoted at 27. At this point there is a groove, if desired, at 28 to accommodate the outer peripheral edge or margin of the washer-like cover 30, the latter being fixed in place in any suitable manner. This cover plate bridges the intervening spaces or passageways 32 between the circumferentially spaced integrated vanes 34. The vanes are preferably truncated pyramidal in form and may be radially straight as seen in Fig. 3, or obliquely canted as seen in Fig. 5. The vanes span the space between the cover plate and the bottom wall 26 of the recess or cavity. Together these parts form a built in centrifugal blower. It will be noticed that the air intake opening 36 is of a diameter greater than the diameter of the hole 8 to facilitate the intake of air. Thus the passages 18 afford communication between the recess or cavity portion of the blower and the venting ports 20. The ends 24 are the intakes for the air which is discharged from the passageways 32 into the passages 18.

In operation, heat picked up by the abrasive belt in contact with work-piece is absorbed by pulley as belt travels over it, while coincidentally air is being forced through the body of the pulley and picking up and discharging the accumulated heat.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly, all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. For use with an abrasive belt such as is employed for abrasive belt grinding and polishing work, a pulley constructed of a material possessed of high thermal conductivity comprising a body having an axial hole opening through opposite ends of said body to accommodate a shaft or an axle on which the pulley is mounted for operation, a belt accommodation rim concentric to said hole, one end of said body having circumferentially spaced venting ports located inwardly of the rim surface, and a centrifugal blower embedded in the other end and communicatively connected with said ports by way of passages extending through the body and having their discharge ends communicating with the ports and their intake ends operatively communicating with the outer peripheral portion of the blower, said blower having a central atmospheric air collecting opening of a diameter greater than the diameter of the axial hub-forming hole in said body, having circumferentially spaced truncated pyramidal vanes, and a flat washer-like cover plate bridging the passageways between the vanes, said cover plate being flush with the cooperating edge surface of said rim.

2. For use with an abrasive belt such as is employed for abrasive belt grinding and polishing work, a pulley constructed of a material possessed of high thermal conductivity comprising a body having an axial hole opening through opposite ends of said body to accommodate a shaft or an axle on which the pulley is mounted for operation, a belt accommodation rim concentric to said hole, said body having circumferentially spaced venting ports opening through one end of the body, the other end of said body being recessed and provided with circumferentially spaced radial vanes which together with

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a washer-like cooperating plate provide a centrifugal blower, that portion of the body between said ends and inwardly of said rim having transverse circumferentially spaced passages opening at one end into said recess and aligned with the spaces between said vanes and registering at their opposite ends with their respectively intended ports.

3. For use with an abrasive belt such as is employed for abrasive belt grinding and polishing work, a pulley constructed of a material possessed of high thermal conductivity comprising a body having an axial hole opening through opposite ends of said body to accommodate a shaft or an axle on which the pulley is mounted for operation, a belt accommodation rim concentric to said hole, and a centrifugal blower built into and constituting an integral part of said body, and wholly situated within the confines of the body between respective ends of said body, whereby heat generated by a friction driven abrasive belt in contact with the work-piece is absorbed by the over-all pulley, the heat absorbed by the latter being dissipated and discharged by the simultaneous functioning of the blower and the cooling draft induced by the blower's action, said blower located adjacent to one end of the pulley, the other end of the body thereof having air discharge ports, and said body proper having passages, the inlet ends of which are in air flow communication with the outer peripheral portion of said blower and the outlet ends of which register with said discharge ports, said discharge ports being circumferentially spaced and disposed in close proximity to said rim and said passages extending transversely through said body parallel and close to said rim and being likewise spaced about the circumference of said body.

4. For use with an abrasive belt such as is employed for abrasive belt grinding and polishing work, a pulley constructed of a material possessed of high thermal conductivity comprising a body having an axial hole opening through opposite ends of said body to accommodate a shaft or an axle on which the pulley is mounted for operation, a belt accommodation rim concentric to said hole, one end of said body having circumferentially spaced venting ports located inwardly of the rim surface, and a centrifugal blower embedded in the other end and communicatively connected with said ports by way of passages extending through the body and having their discharge ends communicating with the ports and their intake ends operatively communicating with the outer peripheral portion of the blower, said blower having a central atmospheric air collecting opening of a diameter greater than the diameter of the axial hub-forming hole in said body, having circumferentially spaced vanes, and a readily applicable and removable cover mounted on said other end and bridging the passage ways existing between said vanes.

References Cited in the file of this patent

UNITED STATES PATENTS

137,465	Messer	Apr. 1, 1873
566,638	Wallis	Aug. 25, 1896
698,126	Miskolczy	Apr. 22, 1902
1,385,396	Rayburn	July 26, 1921
1,400,671	Fischer	Dec. 20, 1921
1,512,546	Kimble	Oct. 21, 1924
2,530,960	Hall	Nov. 21, 1950
2,594,647	Hendrickson	Apr. 29, 1952