No. 698,126. Patented Apr. 22, 1902.

J. MISKOLCZY.

GRINDING OR POLISHING METALS.

(Application filed June 1, 1901.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

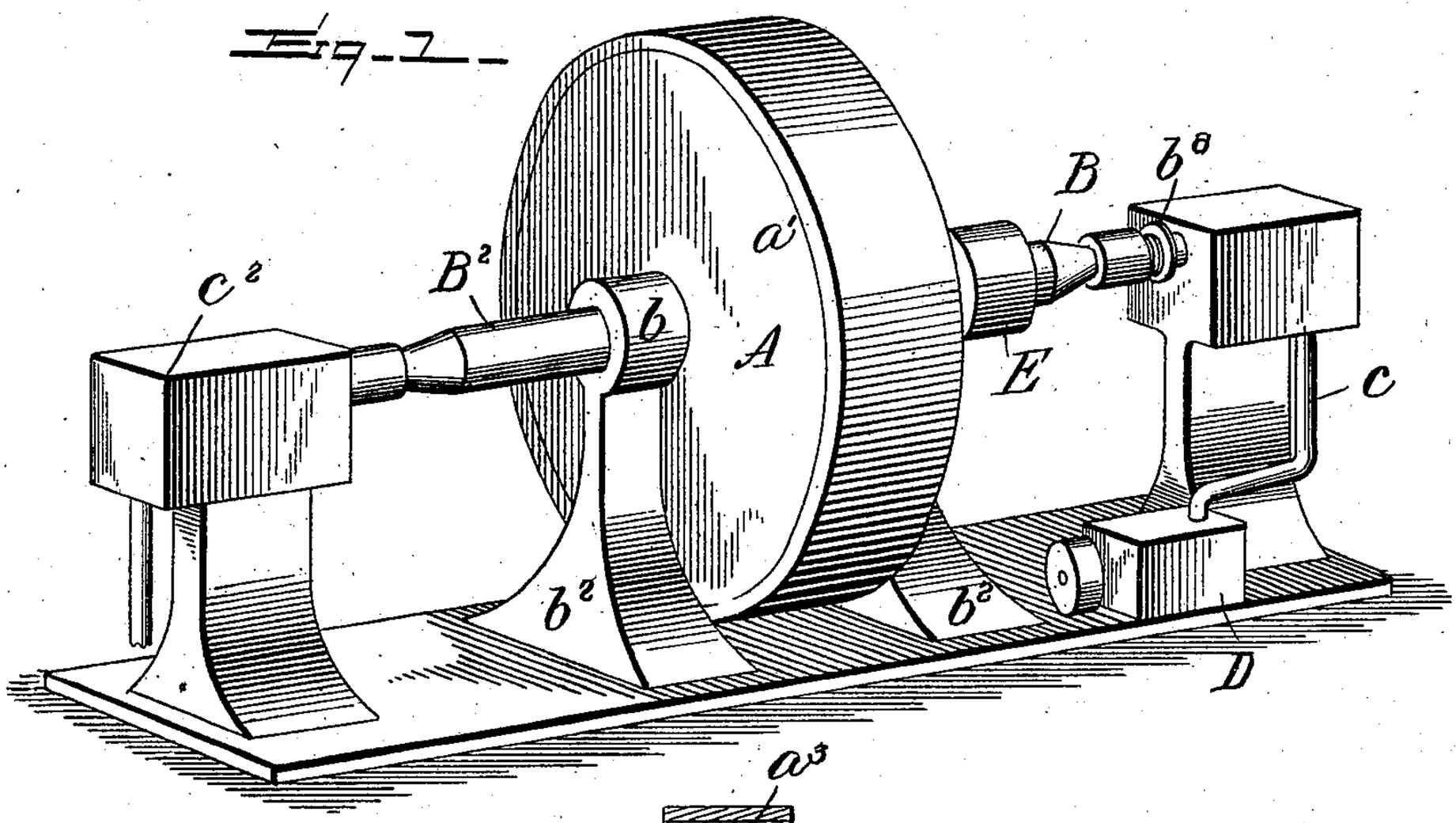

Fig. 4.

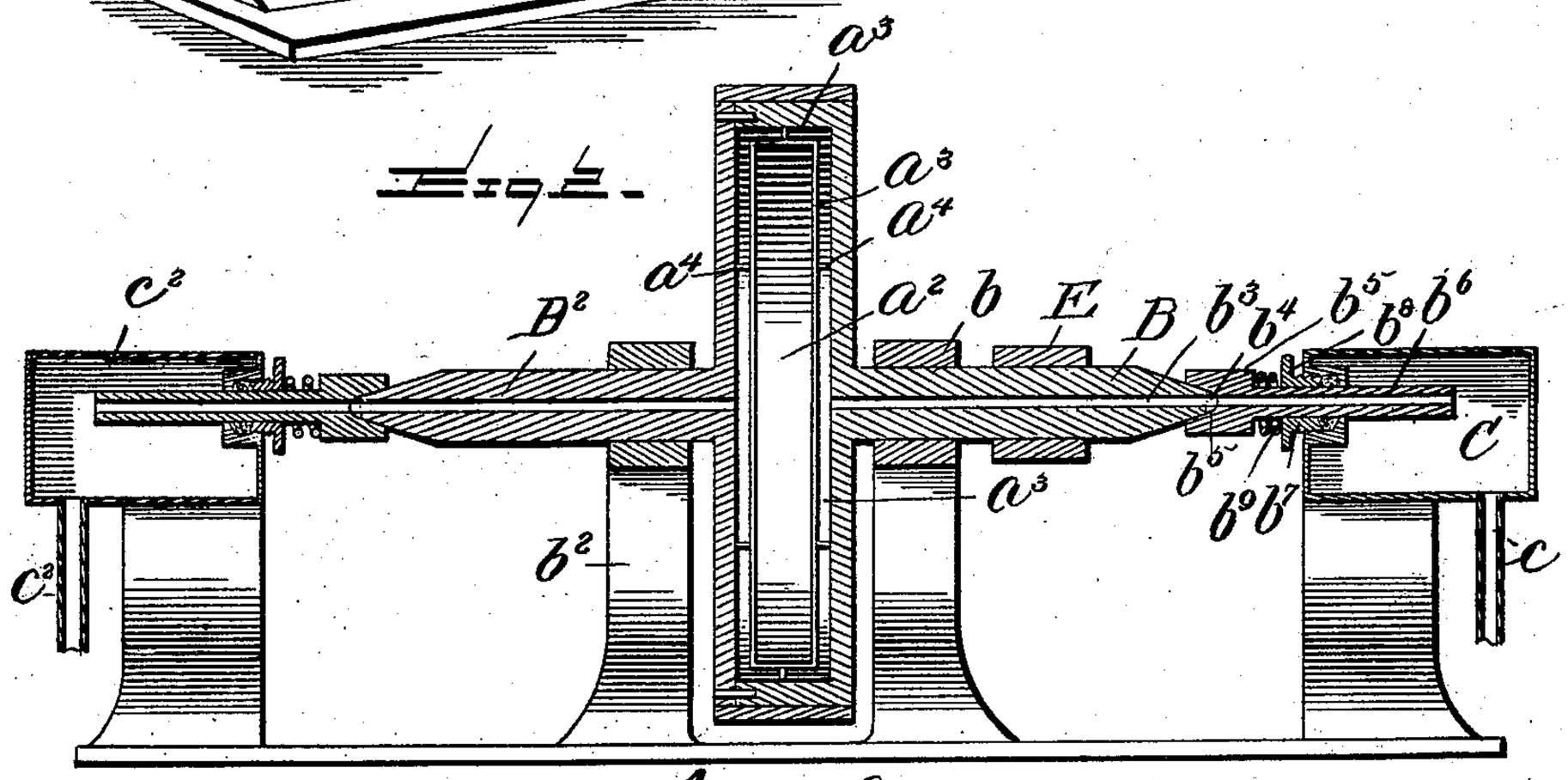

Fig. 3.

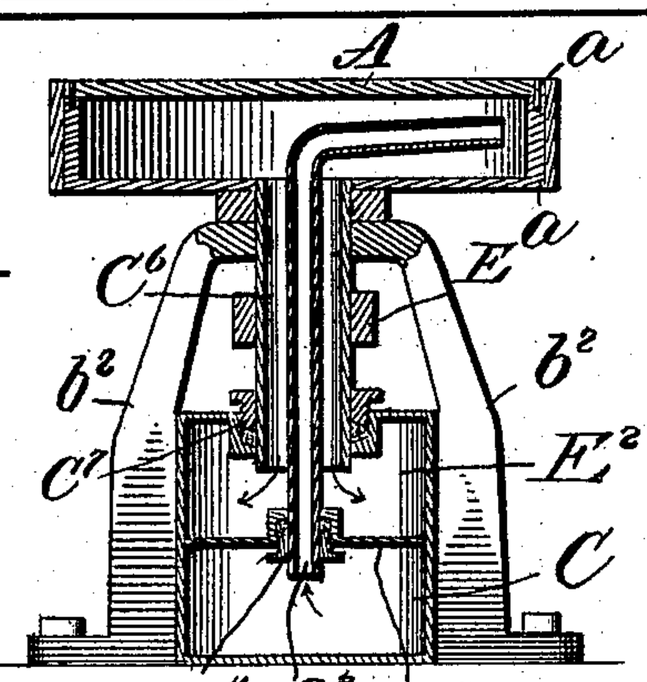

Fig. 5.

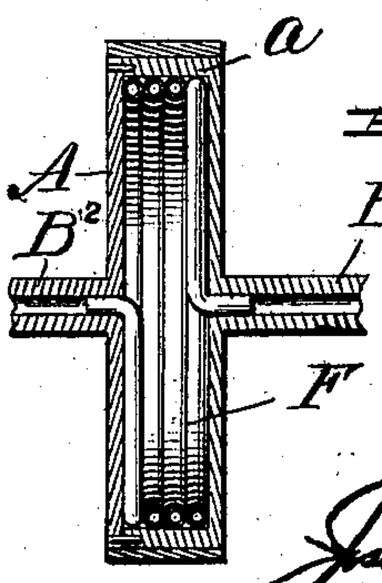

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Fig. 5.

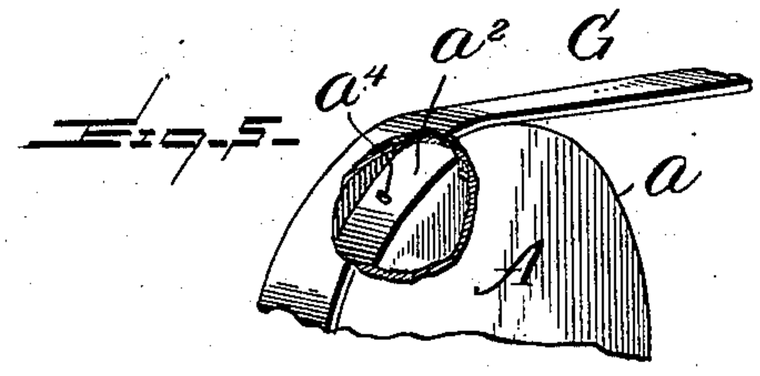


Fig. 6.

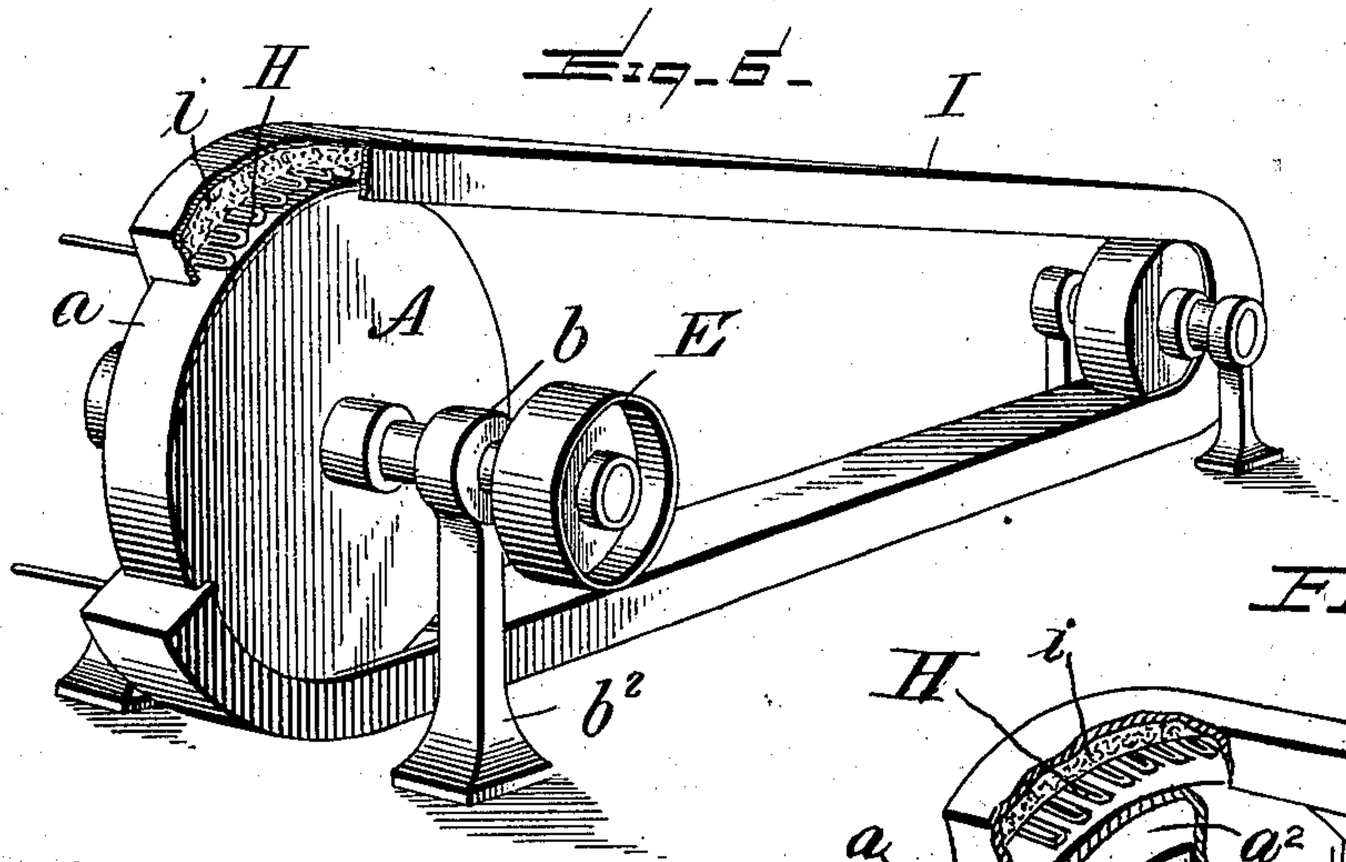


Fig. 8.

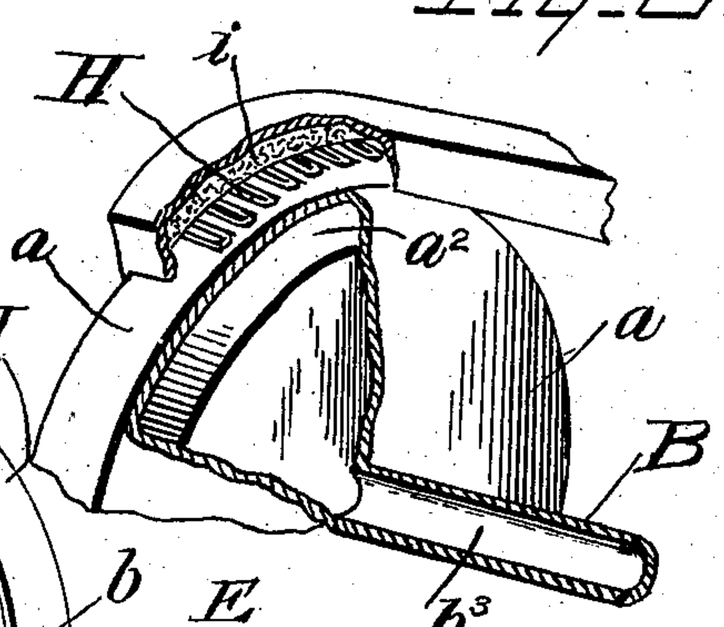
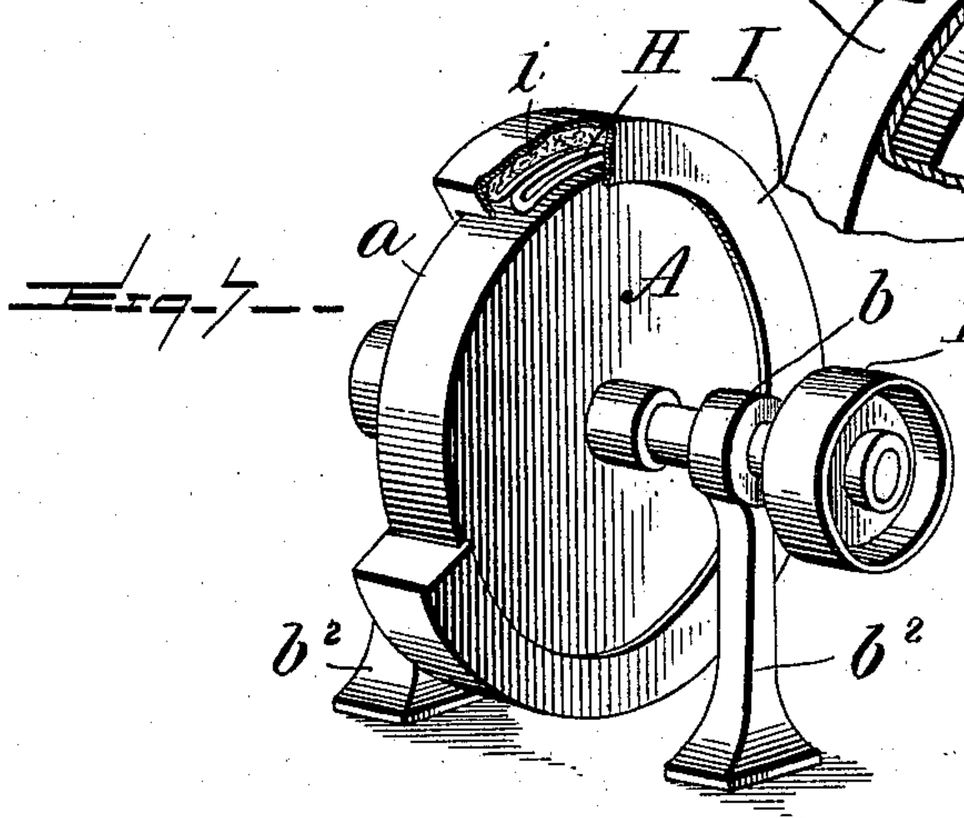


Fig. 7.



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UNITED STATES PATENT OFFICE.

JOSEPH MISKOLCZY, OF NEW YORK, N. Y., ASSIGNOR TO THE MISKO CUTLERY COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

GRINDING OR POLISHING METALS.

SPECIFICATION forming part of Letters Patent No. 698,126, dated April 22, 1902.

Application filed June 1, 1901. Serial No. 62,857. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH MISKOLCZY, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Grinding or Polishing Metals, &c.; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The object is to provide means for preventing articles of steel or other materials when being ground or polished from becoming heated, and thus prevent the drawing of the temper or hardness thereof—that is, to provide means whereby the grinding or polishing surface, and thus the article, may be kept cool constantly, and therefore the heat generated by friction of the grinder or polisher upon the article may be allayed.

It is well known that the grinding or polishing of cutlery or articles of steel, or other materials, which have edges or surfaces so thin that the heat produced by friction incident to the grinding or polishing frequently renders the articles unsatisfactory and sometimes useless, because the heat generated therein by the contact of the articles with the grinding or polishing device is not readily conducted away from the surface and taken up by the atmosphere to prevent the drawing of the temper. The articles to be ground or polished having, primarily, the temperature of the outside atmosphere, upon being placed in contact with the grinding or polishing surface, acquire and hold the temperature of this surface, which has become heated by friction, and the temper or hardness of the article is partly drawn, so that it becomes an unsatisfactory product, the edge thereof not being of sufficient degree and quality of hardness throughout its length. It is the purpose of my invention to obviate this by providing means for cooling or chilling—that is, refrigerating—the surface of the grinder or polisher.

Generally stated, I take a suitable body to be given movement, the surface of which may be of cold conducting and holding properties and be provided with a suitable grinding or polishing exterior, and this surface I make and keep cool—that is, refrigerated.

More specifically stated, I take a suitable body capable of rapid movement, such as a rotating wheel or a belt passing around a suitable revolving wheel, (the periphery of the wheel or the outer face of the belt being provided with suitable abrading or polishing surface,) and to this surface, whether it be that of a wheel or of a belt, I convey by suitable means a proper cooling or refrigerating medium at all times—that is, constantly—to keep the surface which is to be in contact with the article being ground or polished cool, and thus render it and the article free from heat. In other words, I present the grinding or polishing surface to the presence of a cooling or refrigerating medium to prevent it from generating heat upon contacting with the article being ground or polished.

In the accompanying drawings, forming a part of the specification, and in which like letters of reference indicate corresponding parts, I have illustrated various forms of embodiment of my invention, though it is to be understood that even these may be greatly varied without departing from the spirit of my invention.

Figure 1 is a view in perspective, displaying apparatus embodying one embodiment of my invention—that is, one wherein the grinding or polishing surface of a wheel is cooled or refrigerated from within—that is, interiorly. Fig. 2 is a view in longitudinal vertical section of the same. Fig. 3 is a view in section of a revolving wheel containing means for refrigerating the periphery of the wheel somewhat different from that illustrated in Figs. 1 and 2. Fig. 4 is a view in vertical section of a modified form of apparatus, wherein the cooling or refrigerating medium instead of entering the wheel at one part of the wheel and passing out of the same at another, as in Fig. 1, enters and passes out at the same part. Fig. 5 is a view in perspective of the same apparatus as illustrated in Fig. 1, with an abrading or polishing belt passing over the surface of the wheel, the belt by its contact with the cold or refrigerated surface of

the wheel absorbing the cold thereof and conducting it to the article being ground or polished. Fig. 6 is a view in perpective also of a modified form of apparatus with a belt passing around the wheel and nearly for its entire length in the presence of the cooling medium, the same in this instance being coils of pipe protected by asbestos or the like suitably housed; and Fig. 7 is a view, also in perspective, of a modified form of apparatus for cooling or refrigerating the exterior surface of a wheel by passing that surface in the presence of a suitable cooling medium, likewise coils of pipe suitably protected and housed. Fig. 8 is a view in perspective, displaying apparatus for refrigerating the interior and the exterior of the periphery of the wheel.

Referring to the drawings, and particularly to Figs. 1 and 2, A designates a suitable hollow moving body, the same in this instance being a vertical wheel, the periphery a of which may have an appropriate abrading or polishing surface. If preferred, one side of the wheel may be removable to permit easy access to its interior. The wheel being preferably hollow, as clearly shown in Fig. 2, forms a receptacle for the cooling medium conveyed to it, preferably under pressure, in the manner hereinafter described. To obviate the necessity of using a great quantity of the cooling medium to perform the desired end, I may mount within the interior of the wheel a suitable cylindrical casing a^2, which for lightness may likewise be hollow and be of less width and diameter than the wheel to form a space a^3 entirely around it—that is, between its sides and the inside face of the wheel A and also between its periphery and the under face of the periphery of the wheel A. To retain this cylindrical casing a^2 in proper position, suitable pins a^4 may be provided to project from it to the interior surface of the wheel.

The wheel A may be mounted on shafts B B^2, revolving in suitable bearings b in a proper support or standard b^2. The shafts B B^2 are preferably hollow or provided with a central passage b^3, opening at its inner end into the space a^3 in the wheel A. The shafts at their outer ends b^4 are preferably tapered to form conical terminals, as shown in Fig. 2. These ends are designed to fit snugly in sockets in the head b^5 of an extension pipe or duct b^6, the passage therein registering with the passage in the shafts B B^2. While the shafts B B^2 and other parts of the device are made sufficiently thick to withstand the pressure incident to the expansion of the refrigerating medium, yet the pointed ends b^4 of the shafts are sufficiently large to allow liquid, &c., to pass through the same. These extension-pipes b^6 project, respectively, into inlet and outlet reservoirs C C^2, provided, respectively, with inlet and outlet pipes c c^2, the former connecting with any source of supply of cooling or refrigerating medium, such as with a suitable refrigerating plant D. The extension-pipes b^6 may be slidingly held in suitable stuffing-boxes b^7, which may be screwed into the sides of the reservoir C C^2. Between the heads b^5 of the extension-pipes b^6 and an enlarged end b^8 of the stuffing-box b^7 may be located coiled springs b^9, which, by reason of the extension-pipes b^6 being slidingly held in the stuffing-boxes b^7, hold the head b^5 against the tapered or conical ends b^4 of the shafts B B^2 to permit the same freely to revolve in the head, and yet at the same time to prevent any leakage of the cooling medium at the point of connection. It is obvious that the shafts B B^2 are freely rotatable independent of the extension-pipes b^6, and thus of the reservoirs C C^2.

Where compressed air is used and its expansion acts as the cooling medium, the stuffing-boxes may, if desired, be dispensed with, and an ordinary air-compressor may be used in lieu of the ice-making plant.

Mounted upon either of the shafts B B^2 may be a band-wheel, preferably of small diameter, so that the wheel A may, if desired, be rotated at high speed.

It is to be understood that any preferred kind of wheel or other body may be used and be rotatable horizontally, vertically, or otherwise. It is likewise to be understood that the periphery of the wheel may be of any preferred contour—that is, involute, concave, convex, or flat, as shown. It may, if desired, be covered with any suitable yielding material, such as leather, or have a covering of emery or other abrading substance.

It is apparent that without departing from the spirit of my invention I may, in lieu of the construction illustrated in Fig. 2, (consisting of cylindrical casing a^2, with the spaces a^3 around it,) employ coils of pipe F, lying in close proximity to the inner surface of the periphery a of the wheel, as shown in Fig. 3, the ends of the coils terminating preferably in the passages b^3 in the shafts B B^2.

The operation of the apparatus will be obvious. The cooling or refrigerating medium is preferably forced from the refrigerating plant D through the pipe c into the reservoir C, whence it passes through the extension-pipe b^6, the pin-pointed end b^5, the shaft B into the interior of the wheel A and circulates around through the spaces a^3, contacting particularly with the under face of the periphery a of the wheel, and then passes out of the same through the shaft B^2, the extension-pipe b^6 in contact therewith, thence into the reservoir C^2, and out of the same through the pipe c^2 to a suitable receptacle or back to the refrigerating plant D.

In the device of Fig. 3 the cooling medium passes from the shaft B into and around through the coils F and thence into the shaft B^2 and out, as before described.

It is obvious that instead of the wheel A being mounted vertically, as in Figs. 1, 2, and 3, it may, as in Fig. 4, be desirable to mount it horizontally. In this event it may be preferred to have the refrigerating medium en-

ter and pass out of the wheel A at the same point. In this figure the wheel A may be suitably mounted upon the standard or base b^2, which in this instance may be hollow, the lower portion of which may be chambered to form the inlet and outlet reservoirs C and C^2. The wheel A may in this embodiment be hollow, as in that of Figs. 1, 2, and 3, and I may omit the hollow cylindrical casing a^2 of Fig. 1 and have leading into the interior of the wheel A from the reservoir C a pipe or duct c^3, suitably supported in a stuffing-box c^4, formed in the partition c^5 between the reservoirs C and C^2. The pipe or duct c^3 is preferably bent nearly at right angles at a point considerably removed from its center, so that its end projects far into the interior of the wheel—nearly to the inner face of the periphery a thereof—so that the refrigerating medium during the rotation of the wheel may be kept constantly projected against the inner face of the periphery to cool or refrigerate it. To afford a means for the outlet of the refrigerating medium, I may make the shaft c^6 hollow, and this may extend from the bottom of the wheel A to the outlet-chamber C^2, forming an outlet-pipe c^6. The shaft forming in this instance the outlet-pipe c^6 is larger than the inlet-pipe c^3 and, in fact, houses it and is suitably mounted in the bearing c^7, which may be a stuffing-box, if desired. The shafts B and B^2 revolve with the wheel A, and the shaft B may have a band-wheel E mounted thereon, by which it may be given rotation, and likewise that of the wheel A. While the shaft c^6 revolves, the inlet-pipe c^3 may remain stationary. It is to be understood, of course, that it is not necessary to employ this form of apparatus for a horizontal wheel, as that illustrated in Figs. 1 and 2 may be used instead. The operation of this form of device is obvious. The cooling medium is preferably forced from the refrigerating plant into the reservoir C, thence through the pipe c^3 into the interior of the wheel, and against the inner face of the periphery a of the same. Then it may pass, as by gravity, down through the outlet-pipe c^6 into the reservoir C^2 and to any desired place.

In lieu of refrigerating the periphery of the wheel I may, if desirable, pass an abrading or polishing belt G over this periphery and allow the belt to absorb the cold therefrom and conduct it to the article being ground or polished, as illustrated in Fig. 5.

It is to be understood, of course, that it may in some instances be desirable to refrigerate the exterior or face of the periphery of the grinder or polisher. In Fig. 7 I have illustrated one manner of doing this. In this embodiment of the invention I pass the periphery in the presence of refrigerating-coils H, the coils for the greater portion of their circumference being housed in a suitable casing I, which may be packed with asbestos i or other substance for maintaining the refrigerative effects of the coils. In this form of apparatus I may omit the means for refrigerating the interior of the wheel, though it is to be understood that I may, if desirable, use the two means of refrigerating together, as shown in Fig. 8. I may also, if desired, use this same form of embodiment for refrigerating an abrading or polishing belt, as shown in Fig. 6, the housing, in this instance, preferably extending entirely around the belt, except at the point of operation.

The gist of my invention resides in refrigerating the contact-surface of a body being used for grinding, polishing, &c., and, if desirable, in keeping the same constantly refrigerated—that is, cooled or cold during the entire operation. The surface may, if desired, be kept so cold as to be below the ordinary freezing-point, when moisture of the atmosphere will settle upon the surface, and thus provide a continuous moistened surface, which is not always possible when a body is revolved at a very high rate of speed.

The refrigerated surface of the moving body when brought into frictional contact with the article to be ground or polished will not generate heat. Therefore the article will retain its normal temperature and not have its temper drawn. For this reason the usual care that is at present required in grinding ordinary steel articles will be entirely sufficient with my invention to grind and polish articles of the finest kind without danger of drawing the temper therefrom. The cooling or refrigerating medium employed by me in this instance may be air compressed or gas, or it may be compressed air or gas expanded in or about the grinding or polishing device, the cooling effect incident to the expansion being utilized, or it may be liquid air or any freezable liquid and may, as heretofore described, enter the wheel or other moving body at one point and after performing its function of cooling or refrigerating the peripheral part of the same pass out at another point and, if desirable, back to the cooling plant to be recooled—that is, relieved of the heat which it has absorbed from the peripheral grinding-surface. In lieu of this where compressed air is employed it may after subserving its function pass out either at the point it entered or at some other point and again become a part of the outside atmosphere.

While I have described my invention as used for grinding or polishing, it is obvious that it may be utilized for any other appropriate purpose.

It is to be understood that this invention is to be distinguished from one employing ordinary water, where on account of the high speed of the wheel the water will not be retained on its surface. The point of the invention is by any means to refrigerate the moving body or its surface in order that in contacting with an object it will not generate heat.

Without limiting myself to the precise con-

struction shown, since the invention is capable of various modifications and various changes in the construction shown may be made without departing from the spirit or scope of the invention, what I claim is—

1. An apparatus for grinding or polishing articles, comprising a movable body, means for moving the body, and means for refrigerating the same, the refrigerant not being in direct contact with the exterior of the body, substantially as described.

2. An apparatus for grinding or polishing articles, comprising a movable body carrying an abrading-surface, means for giving motion to the body, and means for refrigerating the same, the refrigerant not being in direct contact with the exterior of the body, substantially as described.

3. An apparatus for grinding or polishing articles, means for preventing generation of heat therein consisting of a refrigerant out of direct contact with the abrading-surface of the body, substantially as described.

4. An apparatus for grinding or polishing articles, comprising a movable body, and means for refrigerating the same internally, substantially as described.

5. An apparatus for grinding or polishing articles, comprising a movable body, and means for refrigerating the same internally and externally substantially as described.

In testimony whereof I affix my signature in the presence of two subscribing witnesses.

JOSEPH MISKOLCZY.

Witnesses:
CHAS. E. RIORDON,
EDMUND H. PARRY.