Dec. 13, 1938. H. H. GILES 2,139,952

APPARATUS FOR GRINDING METALLIC ARTICLES

Filed Aug. 26, 1936

Fig. 1.

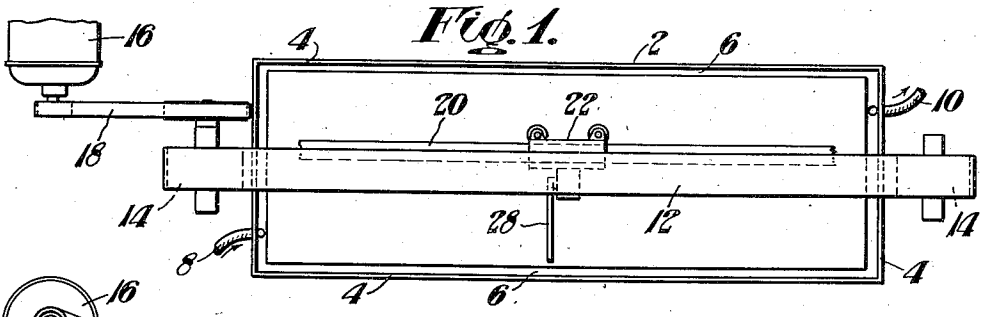
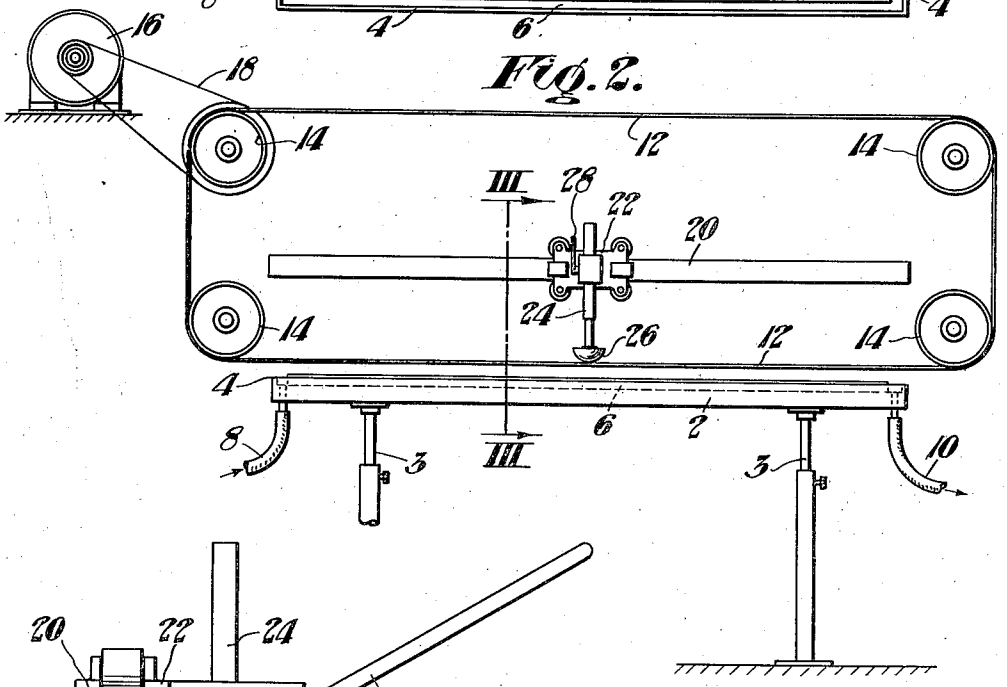


Fig. 2.



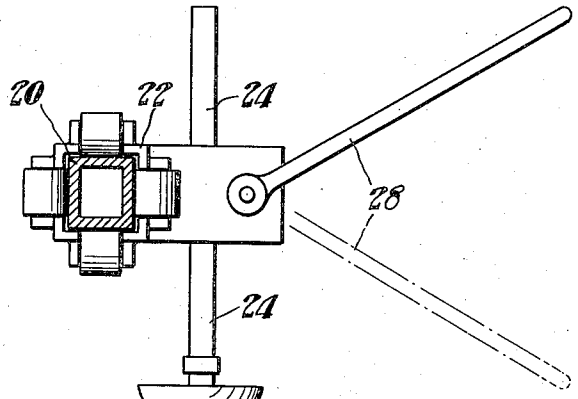
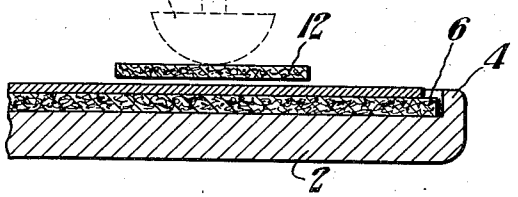


Fig. 3.



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APPARATUS FOR GRINDING METALLIC ARTICLES

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3 Claims. (Cl. 51—141)

This invention relates to improved apparatus for grinding metallic articles and, more particularly, relates to apparatus for grinding thin, wide stainless steel sheets and the like.

In order to remove scattered pits, scratches and other defects from the face of a metal sheet, a localized grinding action is ordinarily used. This grinding action produces localized heating in the metal sheet as, when relatively thin sheets are being ground, the heat is not dissipated as fast as it is generated and thus causes, within these localized areas, rapid expansion of the metal. This, therefore, causes the ground sections to warp, swell or otherwise become distorted in relation to the surrounding flat unground sections.

While some metals have the characteristic of equal expansion and contraction upon heating and cooling, chromium and chromium-nickel bearing metals of the stainless steel classification exhibit the property of having a contraction on cooling which is less than their expansion on heating. This necessarily means that after localized grinding of the above described class of metals, the heated area fails, upon cooling, to return to its original shape or plane and thereby breaks the flat, lustrous surface demanded of this class of metals.

An object of this invention is to provide apparatus for intensely grinding thin sheets of metal in localized areas without overheating or expanding the metal sheet in such localized areas.

The above and other objects will be apparent from the following description of the invention and by reference to the accompanying drawing, in which:

Figure 1 is a plan of a preferred embodiment of my invention;

Figure 2 is an elevation of the embodiment of my invention shown in Figure 1; and

Figure 3 is an enlarged cross-section taken on line III—III of Figure 2.

Referring to the accompanying drawing, the numeral 2 indicates a table or plate which is preferably rectangular in shape. The table 2 is supported in a horizontal position by rods 3 which preferably are adapted to permit the table 2 to move vertically and horizontally. The table 2 has means, such as flanges 4, around the sides thereof so that a liquid can be held therein and a pad 6 received thereon. The pad 6 is adapted to hold liquids such as water or the like, and readily permits a flow of such liquids throughout its mass to prevent localized heating thereof. The material of which the pad 6 is composed should be strong enough that it is not appreciably compressed by localized pressures. In actual practice, I prefer to form the pad 6 from a closely woven long-fibered felt. This closely-woven, liquid-holding means also should be adapted to receive localized pressures without forming any appreciable permanent surface demarkations or indentation therein due to repeated localized pressures thereon.

In order to supply the pad 6 with a liquid, a flexible hose 8 is connected to a source of such liquid (not shown) and the table 2 so that the liquid can be continuously supplied to one end of the table 2 and thereby to the pad 6. At the other end of the table 2 than that supplied by the tube 8 is a drain tube 10, also flexibly connected to the table 2. The tubes 8 and 10 are adapted to furnish the pad 6 with a supply of liquid sufficient to continuously saturate the pad 6 or to produce a flow of liquid therethrough, the liquid being of such volume in either case that localized heating of the pad 6 is prevented.

The articles to be ground, which necessarily are substantially flat metallic articles, are placed upon the pad 6 with the surface to be ground facing upwardly therefrom; and can be manually held at the desired location or suitably fixed in place by mechanical means.

In order to furnish grinding means which are adapted to operate on the articles to be ground, means, such as an endless abrasive or grinding belt 12, is mounted immediately above and preferably parallel to the table 2. The abrasive side of the belt 12 is adjacent the table 2. The belt 12 is mounted by any conventional means, such as pulleys 14, and driven by a motor 16 connected to the shaft of one of the pulleys 14 by any suitable means, such as a belt 18.

To position means which are adapted to bear upon the back of the abrasive belt 12 and force it against the articles to be ground, a bar 20 is preferably secured parallel to and above the table 2. The bar 20 is, as shown in Figure 2, inside the periphery of the endless abrasive belt 12 and extends substantially the length of the table 2. A block 22 is slidably mounted on the bar 20 and supports movable means, such as a cylindrical rod 24, which extends downwardly therefrom. Fixed to the end of the rod 24 is a semi-spherical head 26. The rod 24 is adapted to be moved in a vertical plane so that it can force the head 26 against the back of the abrasive belt 12 and thus force the abrasive belt 12 to bear upon the surface of the article to be ground. The vertical position of the rod 24, and thereby the head 26, is controlled by a handle 28 which is ro-

tatably secured to the rod 24 by any suitable means, such as a rack and pinion gear. The handle 28 thereby directly controls the pressure exerted by the head 26 against the back of the abrasive belt 12. The apparatus is designed to be manually handled and the operator thereof adjusts the pressure exerted on the article to be ground by exerting the desired pressure on the handle 28. The position of the block 22 on the rod 24 or the position of the article to be ground can be varied so that all defects therein can be removed.

It will be appreciated that the invention is not limited to the specific form illustrated and described, but is actually defined in the appended claims.

I claim:

1. Apparatus for grinding small selected areas of thin flat metal sheets including, in combination, means for supporting the sheet to be ground, means for exerting a localized grinding action on said selected areas of a sheet, liquid retaining means between said supporting means and said sheet, said liquid retaining means contacting substantially the entire bottom surface of said sheet.

2. Apparatus for grinding small selected areas of thin flat metal sheets including, in combination, means for supporting the sheet to be ground, means for exerting a localized grinding action on said selected areas of a sheet, means between said supporting means and said sheet constructed and arranged to permit a restricted flow of cooling fluid therethrough and in contact with substantially the entire bottom surface of said sheet, and means for causing a flow of cooling fluid through said last named means.

3. Apparatus for grinding small selected areas of thin flat metal sheets including, in combination, means for supporting the sheet to be ground, means for exerting a localized grinding action on said selected areas of a sheet, a layer of porous material between said supporting means and said sheet adapted to permit a restricted flow of cooling fluid therethrough, said porous material being in contact with substantially the entire bottom surface of said sheet, and means for causing a flow of cooling fluid through said porous material.

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