March 4, 1941. H. B. COLESTOCK 2,233,913

POWER HAMMER

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Fig. 2.

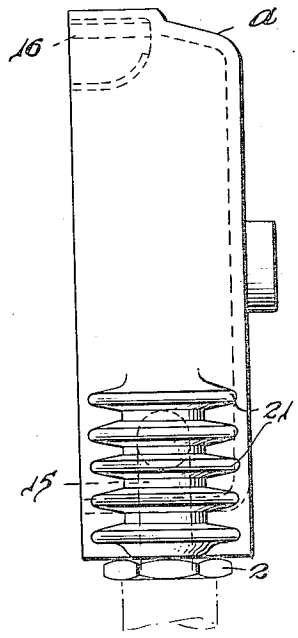


Fig. 1.

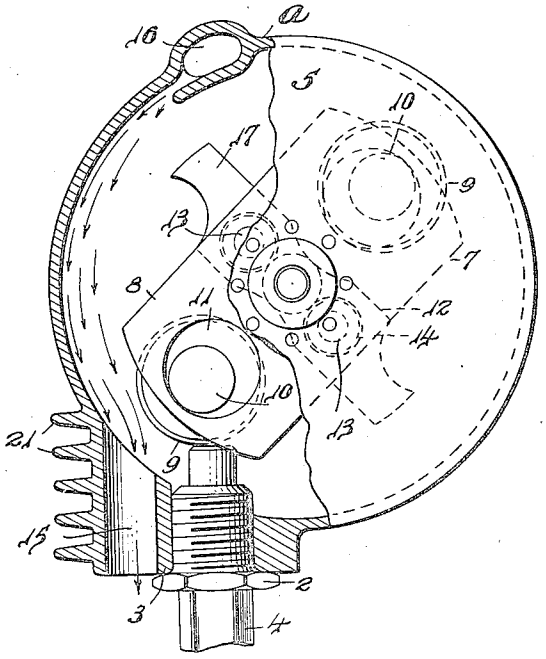


Fig. 3.

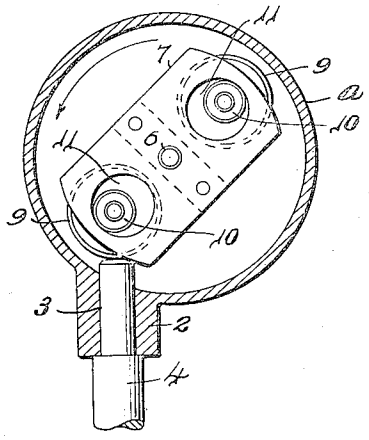
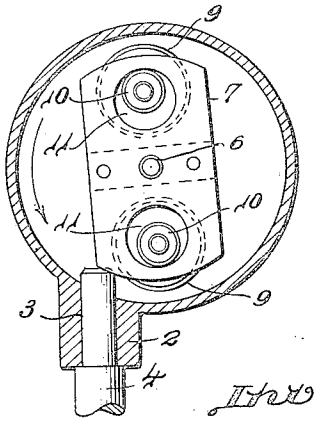


Fig. 4.



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FIG. 6.

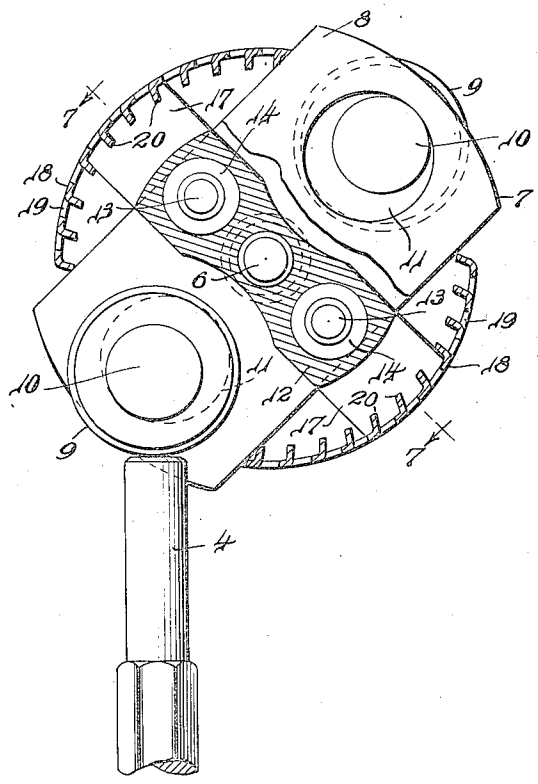


FIG. 5.

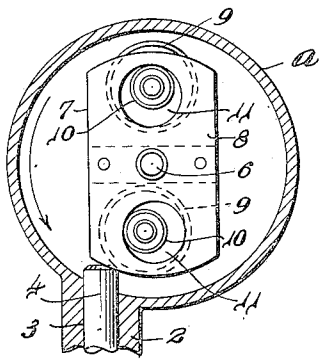
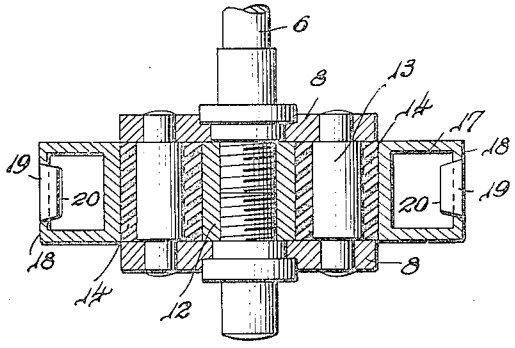


FIG. 7.



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UNITED STATES PATENT OFFICE

2,233,913

POWER HAMMER

Harry B. Colestock, St. Paul, Minn.

Application October 10, 1938, Serial No. 234,330

3 Claims. (Cl. 125—33)

The present invention relates to improvements in power hammers, particularly of the rotary type where hammer impact or driving elements are supported in a rotatably mounted member.

The invention is characterized by the feature of a movable hammer member freely mountable in a rotatable carrier element.

Among the features of invention are the particular method of mounting the driving member so as to permit self-clearing and to obviate friction drag and retarding of the driving member and the supporting carrier; to cushion and relieve the shock brought about by the impact of the driving member with the tool and to dissipate the heat generated in the operation of the striking member.

These and other features of the invention will be more particularly set forth in the following description and the accompanying drawings, wherein:

Figure 1 is a side view of the invention with the cover sheet partly broken away and shown partly in section.

Figure 2 is a half view in side elevation of the device.

Figures 3, 4, and 5 are views in vertical cross section of the invention taken immediately back of front cover plate and eliminating certain of the features shown in Figures 1 to 3, and illustrating successive stages of movement of the hammer element carrier.

Figure 6 is a plan view of the hammer element carrier shown partly in section with included ventilation feature.

Figure 7 is a view in vertical cross section on line 7—7 of Figure 6.

Referring to the drawings in detail, A represents a casing containing the operating parts, said casing being formed at its lower side with a tool-holding guide or bearing 2, secured in the opening 3 in the bottom of the casing and forming a support for the tool 4 to be operated upon. The casing is provided with a suitable cover plate 5. The casing may be provided with a suitable handle, not shown.

Journaled in the side walls of the casing is a drive shaft 6. Fixedly mounted upon the drive shaft within the casing is a rotary member 7 made up of connected side walls 8. Supported in the opposite ends of the rotary member between its side walls are the driving elements. These drive elements consist of rollers 9 formed with projecting spindles 10. The spindles at their ends project into circular openings 11 in the side plates of the rotary member. The spindles of the driving element are materially smaller than the openings 11, and as will be hereinafter more particularly pointed out, will in the operation of the device roll around the wall of the opening, eliminating friction and strain existing in ordinary constructions where driving elements are anchored or restricted in a slot. The striking elements are freely supported by their spindles in the openings 11 so as to be drawn in a rolling action around the wall of the openings 11 preliminary to being brought into striking position against the tool.

The rotary member 7 is supported upon a cross member 12 secured upon the shaft 6 through the medium of spindles 13 anchored at their ends in the side plates of the rotary member, shown particularly in Figure 7; a resilient sleeve 14 surrounding the spindles between the cross plates of the rotary member to take up shocks imparted in the striking of the tool and relieve the operating mechanism from the effect of such shocks. The cross member 12 rigidly secured upon the driving shaft 6 is provided with a series of shock absorbing pockets into which the resilient sleeves 14 and their respective spindles 13 are secured. The spindles 13 at their ends are secured in the side wall members 8 of the rotary member 7 which in turn through their spaced apart openings 11 house the projecting spindles 10 of the roller drive elements 9. The side walls 8 are thus yieldably secured to the shaft 6.

In order to dissipate the heat generated by the impact of the striking element against the tool, and to co-operate with other features set forth in relieving the strains and stresses resulting from such impact, the casing, as particularly shown in Figure 1, is formed with an outlet opening 15 in its lower side, immediately alongside the tool supporting head, and the casing in its upper side above the outlet opening 15 is formed with an inlet port 16. In order to draw the air through the inlet port and force it through the outlet port, a cross member 12, see Figure 6, is formed with a projecting member 17. To co-operate with the projecting end of the cross member or to be used in co-operation therewith, a fan element 18, shown particularly in Figure 6, may be used, the fan element 18 comprising curved semi-circular plates supported on the ends of the cross member and formed with openings 19 and inwardly projecting fins 20 acting as fan blades to bring about a circulation of the air in the rotation of the rotary member, and also preferably form fins 21, see Figure 1, on the sides of the lower end of the casing alongside the air

discharge opening 15 to assist in a cooling action.

In operation, the rollers constituting the driving elements are thrown by centrifugal action in the rotation of the rotary member against the tool, which tool, as shown particularly in Figure 1, is supported at the bottom of the casing at one side of the center line of the casing. The driving elements which are loose within their contained openings in the rotary member are by the impact with the tool thrown rearwardly in the openings and will travel in a rolling action around the walls of the openings.

I am aware that it is old to use driving elements supported in slots wherein by the impact of the tool the driving element is forced rearwardly in the slot, but I have found by experience that this brings about frictional impact of the driving element with the sides and the inner end of the slot and a strain and stress, generating heat and impairing the efficiency and life of the operating mechanism. A serious objection has been encountered with devices of this character because the strains and stresses caused by the impact of the driving elements of the tool, in connection with the heat generated at the point of impact, become transmitted through the working parts to the driving means, affecting efficiency and impairing the life of the device. It has been found that by the utilization of the resilient connection between the rotary member and supporting cross bar, plus the rolling action of the driving element around the circular wall of the enclosing openings and the dissipation of the heat from the point of impact of the driving rollers against the tool, that these stresses and strains are essentially relieved and the operation of the tool made more efficient and the life of the operating mechanism materially increased.

I claim:

1. A power hammer of the class described, comprising a casing, means for supporting a tool to be actuated in one wall of the casing, said casing being formed with an outlet port alongside said tool support and with an inlet port spaced from said outlet port, a driving shaft supported in said casing, a rotary member supported on said driving shaft and formed with circular openings in its end, hammer element rollers loosely supported in said openings in a position to contact with a supported tool in the rotation of said rotary member, and a fan element supported by said rotary member and directed toward said outlet port.

2. In combination with a drive shaft, a cross member fixed upon said shaft, a rotary member, a spindle support for said rotary member upon said cross member on opposite sides of said shaft and a resilient element interposed between said spindle support and said cross bar, for the purpose set forth.

3. In combination with a drive shaft, a cross member fixed upon said shaft, a rotary member, a support for said rotary member upon said cross member on opposite sides of said shaft, said rotary member being formed at its ends on opposite sides of said cross member with circular openings and roller elements loosely positioned in said openings, said element rollers being materially smaller than the openings whereby to be free to travel in a continuous movement freely around the entire walls of the openings and said element rollers standing materially separated from the opening wall opposite to the portion of the wall being contacted.

HARRY B. COLESTOCK.