

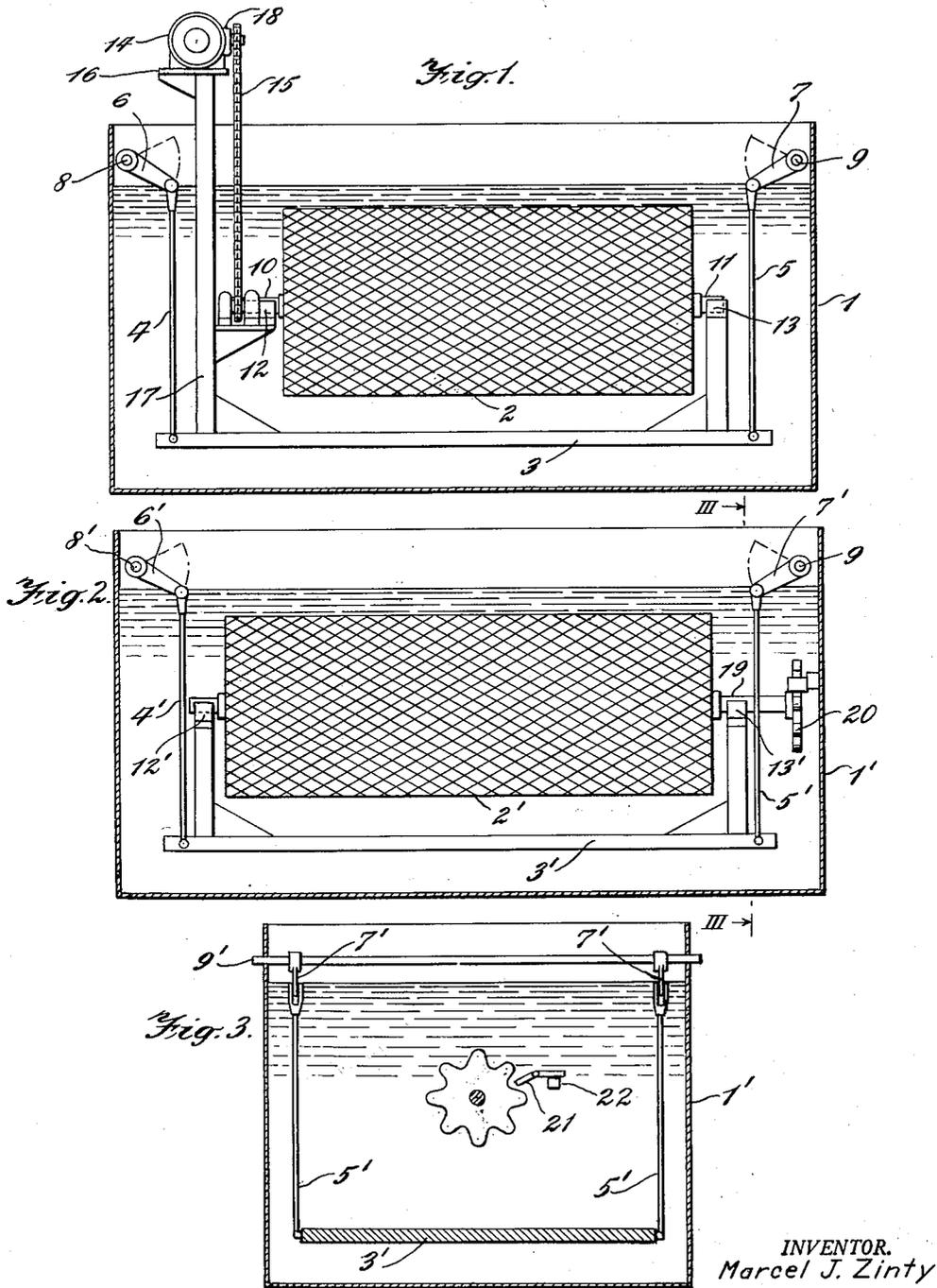
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2,628,460

CHIP REMOVING METHOD AND APPARATUS

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## CHIP REMOVING METHOD AND APPARATUS

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1 Claim. (Cl. 51-164)

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Difficulty has long been experienced in thoroughly cleaning machine parts to free them of foreign matter, particularly metallic chips, small shavings, abrasive particles and the like which are normally adhered to them following machining, lapping and other forming or finishing operations. By the more or less hand methods commonly employed, the operation is time-consuming and hence costly of labor and is satisfactory only in proportion to the degree of care exercised.

The object of the present invention is to provide an automatic method and suitable apparatus utilizing a form of washing operation which has been found to be particularly effective for the purpose.

In line with known methods of washing and degreasing, the invention contemplates the enclosure of the machine parts in a foraminous container or basket and manipulation of the basket in a suitable bath. For mere washing purposes, satisfactory results have been achieved by reciprocating the basket of parts vertically in the bath, but such manipulation of the basket is not satisfactory for removing chips and similar foreign matter from the parts. It has been discovered, however, that such material can be removed effectively by imparting to the basket a compound motion consisting of a slow rotation about a horizontal axis and, coincidentally or simultaneously, a relatively long stroke vertical reciprocation, also at a slow rate. By this method, it has been found, insoluble foreign matter is removed even from machine parts having hollows or interstices in which the foreign particles have a tendency to accumulate and from which their removal has heretofore presented difficulties.

The invention is more or less diagrammatically illustrated in the accompanying drawings, of which:

Fig. 1 is a vertical section of a tank incorporating one form of the invention;

Fig. 2 is a similar view illustrating another form of the invention; and

Fig. 3 is a section on the line III-III of Fig. 2.

In the Fig. 1 form of the invention, a tank 1 is shown and within it a basket 2 for the articles to be cleaned. The basket is supported on a frame 3 provided with reciprocatory drive means

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whereby the frame and basket are raised and lowered in the washing medium in the tank. The reciprocatory drive means is shown as consisting of rods 4, 5 suspended from crank arms 6, 7. The frame can be assumed to be of rectangular form and supported at its other two corners by corresponding rods and crank arms. The crank shafts 8, 9 may be oscillated by a suitable motor (not shown). It has been found that the best results are achieved by reciprocating the frame and basket through a fairly long stroke of the order of, say, six or seven inches and, in any event, of more than two inches.

Provision is made for rotating the basket simultaneously with its reciprocation and to that end the basket is provided with aligned trunnions 10, 11 at its opposite ends, the trunnions being supported in half-bearings 12, 13 so that the basket is readily removable from the tank. The basket is indicated as being driven by a motor 14 through sprockets and chain 15, the motor being mounted on an elevated platform 16 on a frame support 17. The motor drive for the basket includes a speed-reducer 18 to ensure slow rotation of the basket, it having been found that the pieces are not effectively cleaned if the basket is rotated rapidly. The basket speed should not exceed thirty revolutions per minute.

In the form shown in Figs. 2 and 3, the tank, frame and reciprocatory drive for the frame may be as already described and corresponding parts are correspondingly marked with primed reference characters.

In this instance, the drive motor for the basket is dispensed with, the basket being rotated coincidentally with and by the reciprocation of the frame. To that end, basket trunnion 19 is shown extended and carrying at its free end a star wheel 20; and mounted on the adjacent tank wall is a pivoted finger 21 (Fig. 3) abutting a fixed stop 22. As will be understood, the finger engages the star wheel to advance the basket on each upward movement of the frame. On the downward movement of the frame the finger yields.

The foregoing are but two of the numerous mechanical forms in which the invention can be incorporated and will be understood to be illustrative only.

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In the light of the above, the following is claimed:

A washing apparatus for removing chips and the like from machine parts comprising the combination of a tank; a frame suspended in the tank; a basket supported on the frame for rotation about a horizontal axis; reciprocatory drive means having connections for raising and lowering the frame and basket through a stroke in excess of two inches; and motor drive means coupled to the basket and arranged to rotate the same at a speed not in excess of thirty revolutions per minute.

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