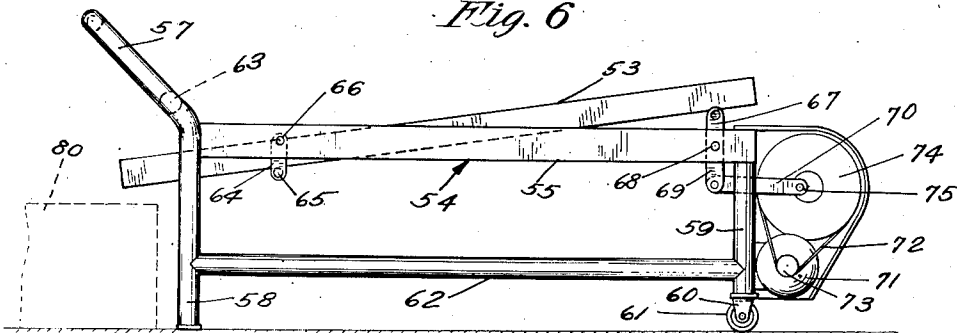


Filed July 15, 1946

DEBURRING AND POLISHING APPARATUS

3 Sheets-Sheet 1



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May 17, 1949.

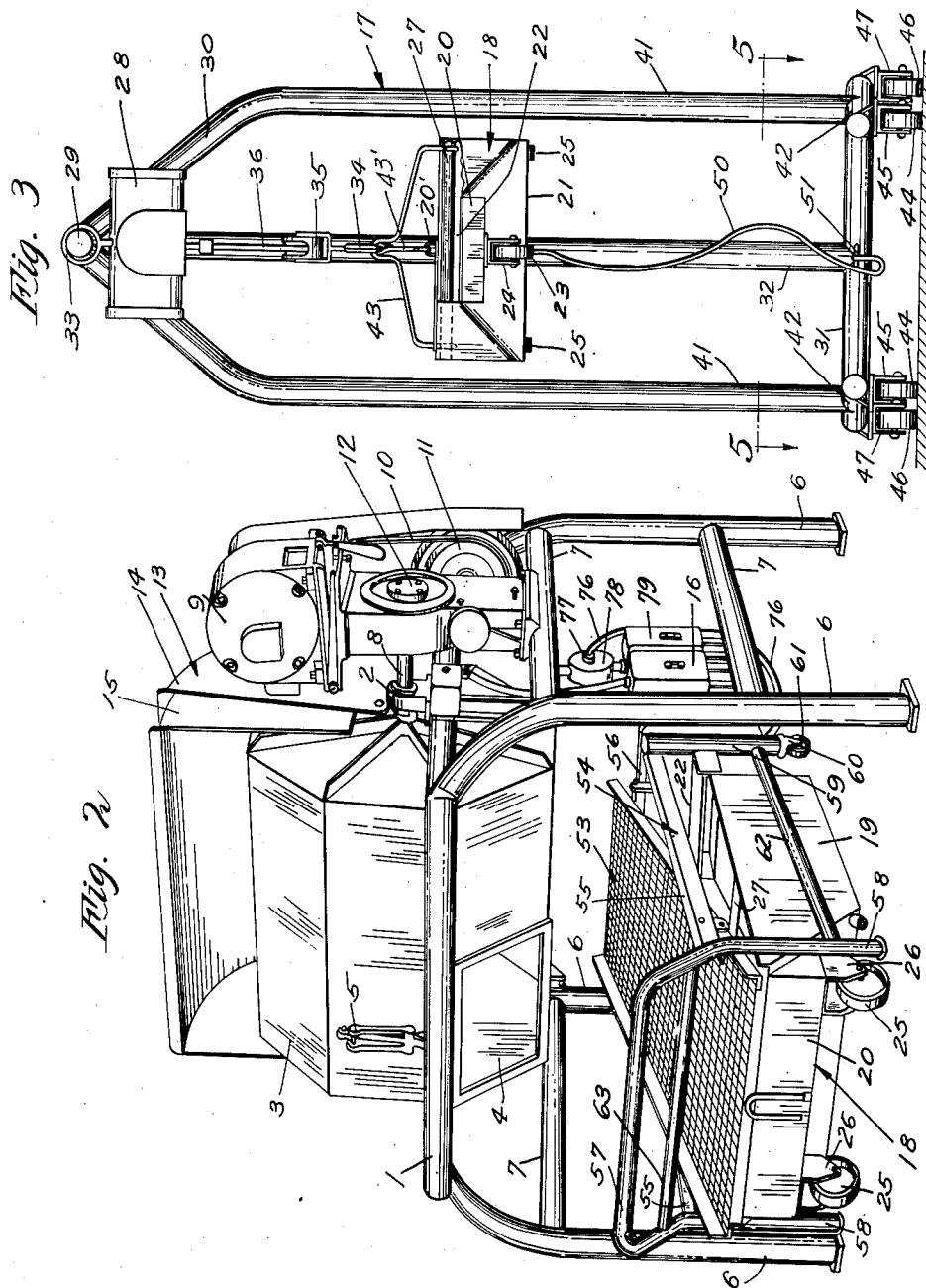
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2,470,340

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Fig. 4

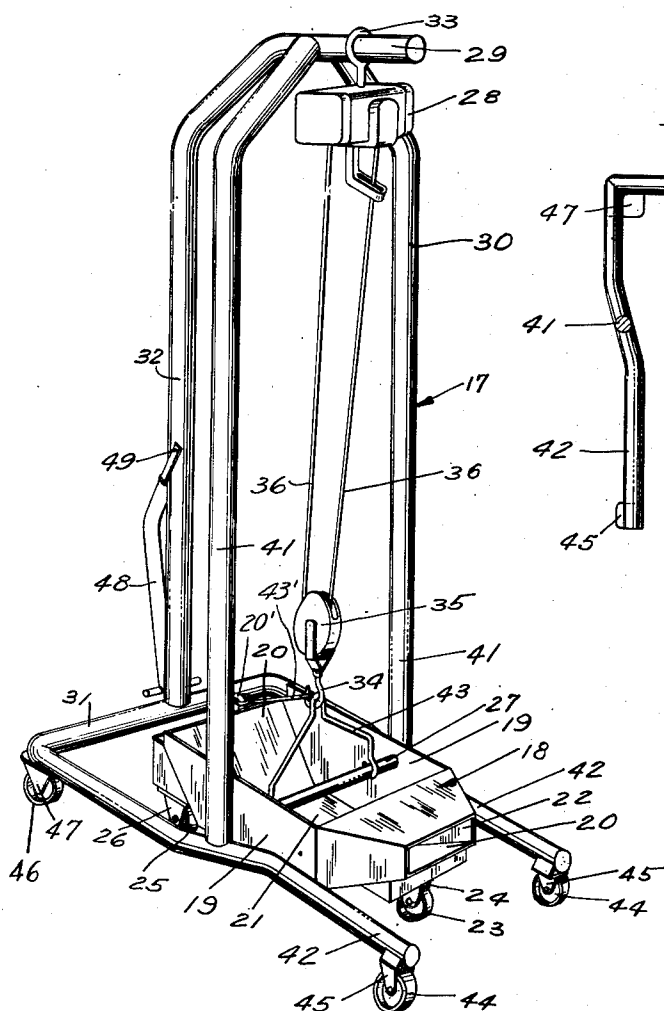
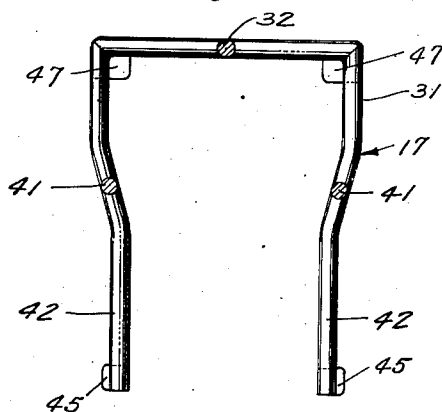


Fig. 5



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UNITED STATES PATENT OFFICE

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DEBURRING AND POLISHING APPARATUS

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3 Claims. (Cl. 214—121)

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Our invention relates to cooperating apparatus for deburring and polishing metallic pieces and the like and, generally stated, comprises a novel tumbler, a novel hoisting structure for elevating material to be tumbled and abrasive material to the tumbler, and a novel screening and transporting structure.

The primary object of our invention is to produce novel apparatus of the type generally above described, which is rugged in construction, relatively inexpensive to manufacture, which will occupy a relatively small space and which will greatly facilitate the plurality of operations required in the deburring of metallic pieces and the like.

The above and numerous other objects and advantages of our invention will become apparent from the following detailed specification, appended claims and attached drawings.

Referring to the drawings in which like characters indicate like parts throughout the several views:

Fig. 1 is a perspective view illustrating one of the phases of operation of our combined apparatus;

Fig. 2 is a perspective view of my improved apparatus illustrating a different phase of operation;

Fig. 3 is a front elevation of a hoisting mechanism, some parts being broken away;

Fig. 4 is a perspective view of the mechanism shown in Fig. 3, illustrating a different position of some of the parts, some parts being removed;

Fig. 5 is a horizontal section taken on the line 5—5 of Fig. 3; and

Fig. 6 is a side elevation of the screen of our apparatus.

Referring with greater particularity to the drawings, the numeral 1 indicates a horizontally-disposed tumbler frame, which, preferably, and as shown, is generally rectangular in form. Journalled for rotation on a horizontal axis by means of bearings 2, (only one of which is shown) is a tumbler drum 3 having a peripheral opening 4 which is normally covered by a hatch, (not shown) fastened by means of a locking mechanism identified in its entirety by the numeral 5. The bearings 2 are fastened to the sides of the frame 1. Depending from the corners of rectangular frame 1 are supporting legs 6, opposite

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pairs of which are tied together intermediate their ends by vertically-spaced tie-bars 7. Tumbler frame 1, supporting legs 6 and tie-bars 7 cooperate to form a forwardly-opening tunnel beneath the drum 3 and transversely of the axis thereof.

The tumbler drum 3 is connected to a shaft 8 which is adapted to be driven from a motor 9 through connections including a motor driven belt 10, a pulley 11 and gears within a gear housing 12. The driving mechanism as shown is secured to and supported by one of the tie-bars 7.

A hood identified in its entirety by the numeral 13 is made up of a stationary cover element 14 and a hinged cover element 15, which, as shown in Figs. 1 and 2, is in its open position. The electric motor 9 is controlled by a conventional off-and-on switch 16. Manipulation of the switch 16 permits the drum to be stopped with the peripheral opening 4 in any desired position.

The workpieces are introduced into the tumbler drum 3 through the peripheral opening 4 together with a charge of coarse pebbles of abrasive material preferably of the type commonly known as "Honite." To facilitate loading the drum 3 we use a hoise and a hoist pan indicated in their entireties by the numerals 17 and 18, respectively, see particularly Figs. 1, 3 and 4. The hoist pan 18 is in the nature of a rectangular open-topped box having vertical sidewalls 19, sloping end portions 20 and a flat bottom 21. One end of the hoist pan 18 is open and hooded to form a delivery spout 22 for the discharge of materials therefrom. At its delivery end, the hoist pan 18 is equipped with a wheel 23 journalled in a swivelled bearing 24, and at its other end the hoist pan 18 is provided with a pair of wheels 25 journalled in bearings 26, fast on the hoist pan 18. A centrally-located transverse hoisting bar 27 is secured at its ends to the sidewalls 19 of the hoist pan 18, preferably forward of the center of gravity of the hoist pan 18.

The hoist 17 comprises a hoist mechanism 28, a hoist mechanism supporting element 29 laterally projecting from the closed end portion of a vertically-disposed inverted U-shaped hoist frame member 30, a horizontally-disposed U-shaped hoist frame member 31 and a brace member 32. The hoist mechanism 28 may be of any of the commercial type of self-contained motor-

driven units and is suspended from the supporting element 29 by a ring bolt or the like 33. A hook 34, carried by a sheave 35, is raised and lowered by means of a cable 36 that is wound on a drum, not shown, but which is contained in the hoist mechanism 28. The brace member 32 is actually an extension of the support element 29 and is welded or otherwise secured to the intermediate portion of the closed end of the horizontally-disposed U-shaped hoist frame member 31.

Referring to Fig. 1, it will be seen that the hoist 17 carries an operating switch 37 mounted on a bracket 38 which, in turn, is secured to the brace member 32. The switch 37 is connected to the motor of the hoist mechanism 28 by means of wires within cables 39 and electrical current is supplied to the motor through a cable 40. The legs (indicated by the numeral 41) of the vertically-disposed hoist frame member 30 at their extreme lower ends are welded or otherwise secured to the intermediate portion of legs 42 of the horizontally-disposed U-shaped hoist frame member 31. As shown, the hoist frame elements 29, 30, 31 and 32 are constructed of steel tubing or the like and the composite structure is of a very rigid and sturdy nature. At its open end, the horizontal frame member 31 is sufficiently wide to receive the hoist pan 18 which is connected to the hook 34, for raising and lowering by means of a bail 43, the central portion of which is engaged by the hook 34 and the ends of which engage the transverse hoisting bar 27 adjacent the ends thereof. A short cable 43' has a looped end which engages the hook 34 and at its other end hooks to the end 20 of the hoist pan 18 as at 20'. This fastening, together with the bail 43, affords a three-point suspension of the hoist pan 18.

To render the hoist 17 portable, we provide a pair of wheels 44 journaled in bearings 45 fastened to the ends of frame member 31, and a pair of wheels 46 journaled in bearings 47 pivotally mounted on the closed ends of frame member 31. As shown in Fig. 1, a handle 48 is pivoted at 49 to the brace member 32 for moving the hoist 17 to different stations such as tumbler mechanism or a storage bin for the abrasive material.

It will be noted by reference to Fig. 1, that when loading material into the tumbler drum 3, a portion of the hoist frame member 31, namely the open end thereof, extends into the tunnel formed by the frame 1, legs 6 and tie-bars 7 of the tumbler frame mechanism below the drum 3. It becomes obvious from the foregoing that with such a tunnel-like arrangement of the tumbler frame structure it is not necessary to use a conventional hoist frame with an overhanging boom and the necessarily attendant counter-weighted base.

For automatically tilting the hoist pan 18 to pour material into the drum 3, we provide a cable 50 of predetermined length which is secured at one end to the hoist frame member 31, as at 51, and hooked at its other end, adjacent the spout end of the hoist, as at 52. When, under lifting operation of the hoist mechanism 28, the hoist pan 18 is raised to a predetermined level, the cable prevents the spout end from ascending further, and continued raising of the hoist pan 18 by the hoist mechanism 28 causes the hoist pan 18 to tilt forward sufficiently to discharge its contents into the drum 3 through the peripheral opening 4.

During the tumbling operation, the opening 4 is necessarily closed by a cover, not shown, and the hinged cover element 15 of the hood 13 is moved to a position wherein at least the entire upper half of the drum 3 is concealed. Of course, prior to the closing of the tumbler drum 3, closing of the hood 13, and starting the motor 9, the hoist 17 and hoist pan 18 are removed from their positions at Fig. 1.

When the tumbling operation has been completed, it becomes necessary to discharge the contents from the tumbler drum 3 and separate the work pieces from the abrasive material. This important function is accomplished in a manner and by apparatus now to be described.

A screen 53 is mounted for oscillatory movements on a substantially-rectangular screen frame 54 comprising side-bars 55, a rear end bar 56, and an inverted U-shaped handle bar 57, which at its free ends is extended to form a pair of legs 58. A second pair of legs 59 depend from the rear corners of the screen frame 54. The legs 59 terminate in bearings 60 with wheels 61 journaled therein. A pair of longitudinal tie-bars 62 (only one of which is shown) connect one each of legs 59 adjacent the bottom ends thereof. To further strengthen the screen frame 54, we provide a transverse tie-bar 63 based intermediate the closed end of the handle bar 57 and the screen 53. The screen 53 is suspended, adjacent its front end, from the frame 54, by a pair of hanger bars 64 pivoted to the screen at 65 and to the frame 54 at 66. Adjacent its rear end, the screen 53 is pivoted to one end of a pair of links 67. (Only one of which is shown), which are journaled to side-bars 55 at 68. One of the links 67 is extended as at 69, and at its lower end is pivotally secured to the end of pitman arm 70 which is driven from an electric motor 71 mounted on the rear end of the screen frame 54. A belt 72 runs over a pulley 73 on the shaft of the motor 71 and a pulley 74 journaled on the rear end of the screen frame 54. A crank 75 under the pulley 74 is pivotally connected to and drives the pitman arm 70 to thereby oscillate the screen 53 (see particularly Fig. 6).

Electrical current is supplied to the motor 71 through wires in a cable 76 at the end of which a plug 77 engages a socket 78 mounted between spaced tie-bars 7 on the tumbler apparatus. A control switch 79 for the motor 71 is also mounted between said tie-bars 7 adjacent the tumbler motor control switch 16.

It will be noted that the screen frame 54, legs 58 and 59, tie-bars 62 and screen 53 combine to form a forwardly-opening tunnel into which the hoist pan 18 is adapted to be received (see Fig. 2). It will be further seen by reference to Figs. 2 and 6 that the screen 53 slants in a downward direction from the rear end of the screen unit to the front end thereof.

During the tumbling operation and subsequent to removal of the hoist 17 from its position in front of the tumbler drum 3, the screening unit is wheeled into place in the tunnel formed by tumbler frame 1, legs 6 and tie-bars 7, directly below the opening 4 of the tumbler drum 3. The hoist pan 18 is then placed in the tunnel formed by the screen frame 54 and its associated parts. A similar hoist pan 18 or any other container such as shown by dotted lines and indicated by the numeral 80 may then be placed on the floor below the front end of the screen 53 (see Fig. 6). The plug 77 is then inserted into the socket 78. When

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the tumbling operation is completed, the screen 53 is put into operation by manipulation of the control switch 79 and the cover removed from the opening 4 in the tumbler drum 3. The drum 3 is rotated until the opening 4 is at the bottom thereof, and the contents discharged into the screen 53 through which the pieces of abrasive material fall into the hoist pan 18 under the screen 53. The finished work pieces tail over the forward end of the screen 53 into the container 80 which may then be removed. The hoist 17 may then be used for recharging the tumbler drum 3 with the abrasive material from the hoist pan 18 or the material may be dumped into a storage bin, not shown.

While we have shown a preferred embodiment of our invention herein, it will be understood that this apparatus may be modified without departing from the scope of the appended claims.

What we claim is:

1. A hoisting mechanism comprising, a horizontally-disposed forwardly-opening U-shaped hoist frame member, a vertically-disposed inverted U-shaped hoist frame member connected at its base to the opposite sides of the horizontal hoist frame member intermediate the ends thereof, a hoist-supporting element secured to the upper portion of said vertical hoist frame member and projecting forwardly intermediate the sides thereof, a hoist detachably secured to and depending from said hoist-supporting element, hook means carried by said hoist, a portable hoist pan adapted to pass between the side members of said horizontally-disposed U-shaped hoist frame member, a centrally-located transverse hoisting bar on said hoisting pan, a bail on said hoisting bar adapted to be engaged by the hook

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means carried by the hoist, and a cable secured at one end to the front end of the hoist pan and at its other end to the closed end of the horizontally-disposed hoist frame member, said cable being of a length to tilt the hoist pan forwardly to dump its contents when said hoist pan has been elevated to a predetermined position.

2. The structure defined in claim 1 in further combination with a brace member secured to the closed end of said U-shaped horizontally-disposed hoist frame member and projecting upwardly and forwardly to the closed end of the vertically-disposed hoist frame member and terminating in said hoist-supporting element.

3. The structure defined in claim 1 in which the forward end of said hoist pan is provided at one end with a delivery spout.

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