

Aug. 29, 1939.

A. O. BROOKE

2,170,792

POLISHING MACHINE

Filed Feb. 18, 1938

2 Sheets-Sheet 1

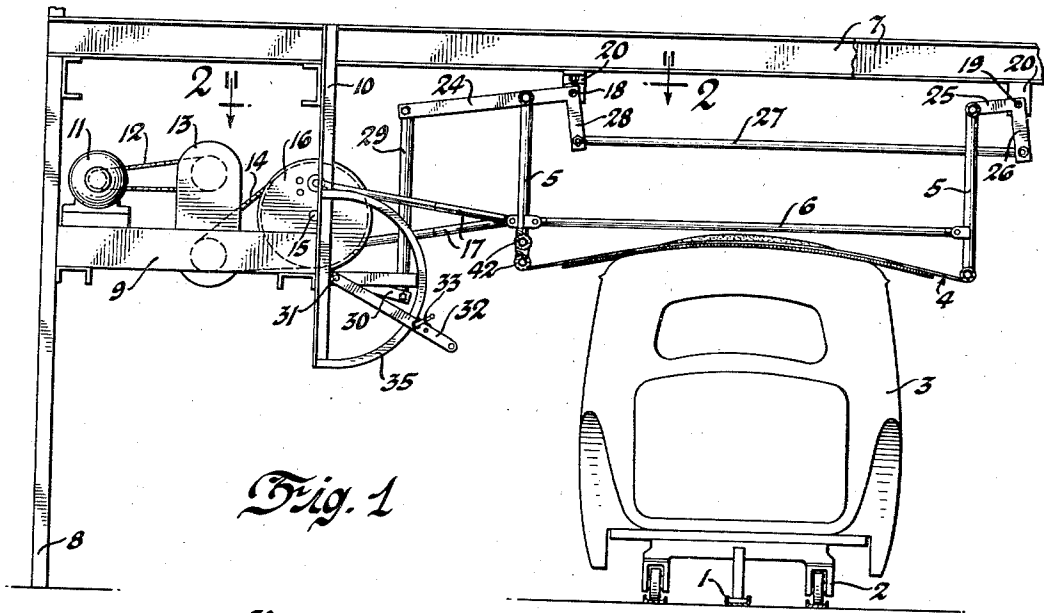


Fig. 1

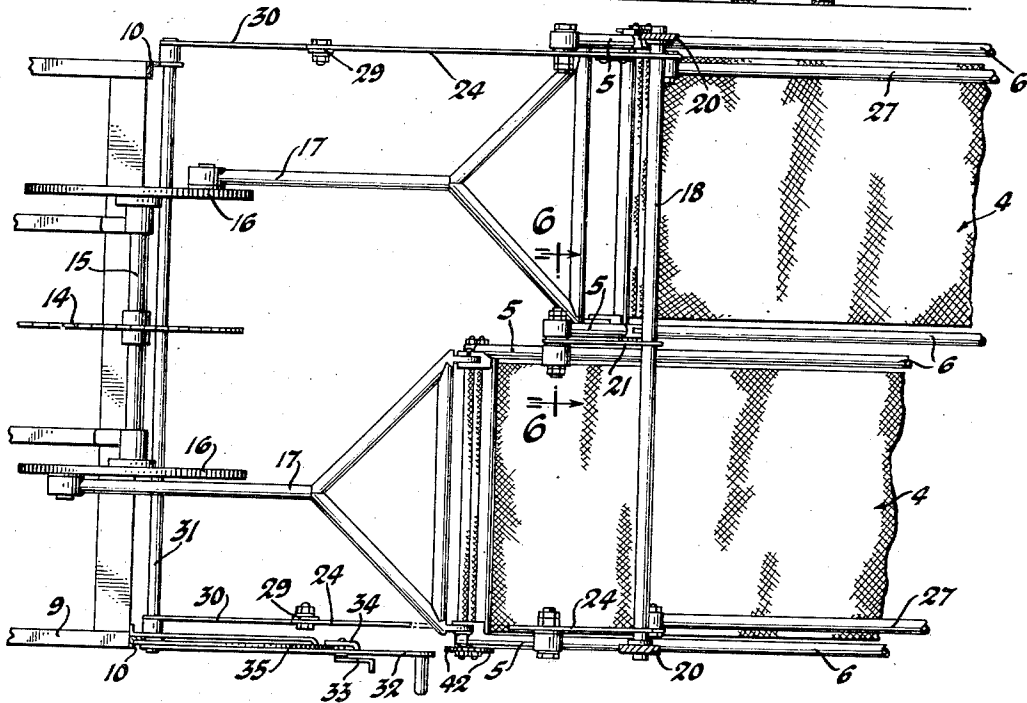


Fig. 2

Inventor
Arthur O. Brooke
By
Blackman, Spencer & Hill
Attorneys

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2 Sheets-Sheet 2

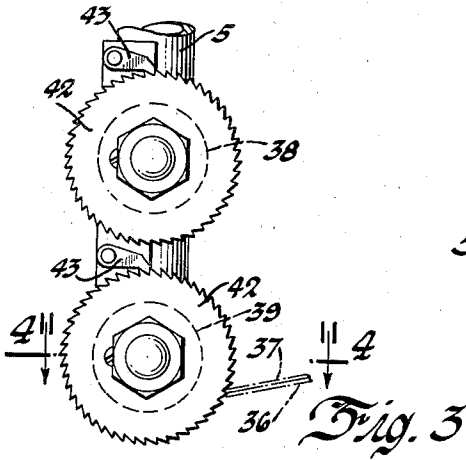


Fig. 3

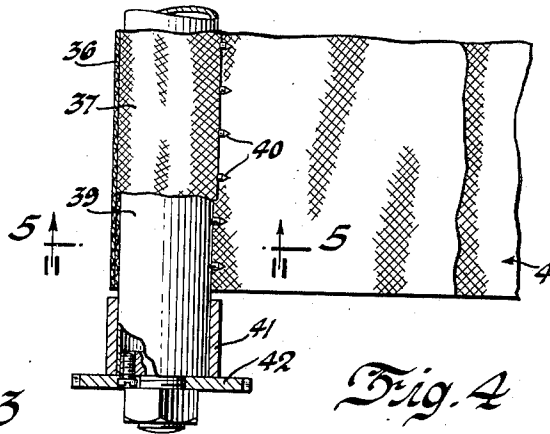


Fig. 4

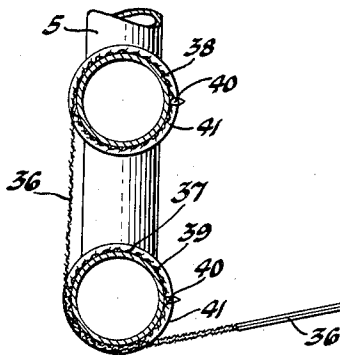


Fig. 5

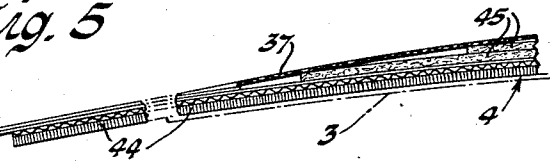
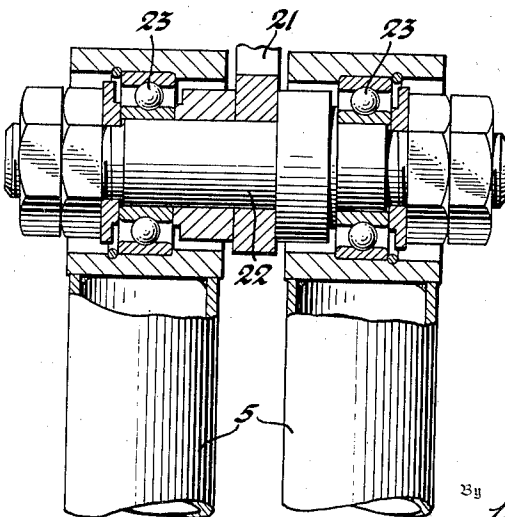


Fig. 6



Inventor
Arthur O. Brooke
By
Blackman, Spencer & Hill
Attorneys

UNITED STATES PATENT OFFICE

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POLISHING MACHINE

Arthur O. Brooke, Compton, Calif., assignor to
General Motors Corporation, Detroit, Mich., a
corporation of Delaware

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4 Claims. (Cl. 51—62)

This invention relates to the finishing of surfaces and more particularly to the production of a smooth and polished painted surface on a panel of metal or the like.

5 In automobile body shops the practice is to assemble the body panels and then paint the assembly prior to the installation of windows, upholstery and trim. For a good job the operations include cleaning, sanding, painting and polishing
10 with some sanding between applications of the several paint coats. In modern paint plants these operations are performed at succeeding stations as the bodies travel along a conveyor line. Metal roofs present a much larger area of unbroken
15 surface to be finished than do the vertical walls containing doors and window openings and furthermore are less convenient to reach and work upon. To lessen the burden for the workman it is here proposed to provide a mechanical arrangement for the roof sanding and polishing operations which can be controlled by the workman
20 from beside the conveyor line with a saving of manual effort.

Among the objects of the invention is the provision of a machine incorporating a flexible finishing member or band to engage and conform to the roof surface and mechanism to reciprocate the flexible finishing band back and forth across the roof during body travel on the conveyor system.
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Other objects are to provide for adjustment of the finishing band relative to the surface of the work and for tensioning the flexible strip for uniform working pressure throughout its length.

35 Additional objects will become apparent from the following specification having reference to the accompanying drawings wherein Figure 1 is an elevation showing the assembly of a finishing machine to operate upon the roof of an automobile body; Figure 2 is an enlarged view of a portion of the machine as viewed from line 2—2 of Figure 1; Figure 3 shows the ratchet mechanism for tensioning the finishing strip; Figure 4 is a view taken on line 4—4 of Figure 3; Figure 5 is
40 a section taken on line 5—5 of Figure 4 and Figure 6 is a detail section taken on line 6—6 of Figure 2.

In the drawings the reference numeral 1 indicates a traveling chain forming a part of the conveyor system and to which are connected at spaced intervals a number of wheeled trucks or carriages as shown at 2, each supporting an automobile body 3. As will be readily understood the body is carried past the several work performing
55 stations and for any or all of the wet sanding,

dry sanding and polishing operations on the roof, a reciprocating belt machine substantially as shown in Figure 1 may be employed. Inasmuch as conventional roof contour is curved both longitudinally and transversely the surface finishing member should be a strip of flexible material carrying either an abrasive or polishing medium to conform to the shape of the work and it should be adjustable for height because of variations in different body models.
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One or more of such finishing strips 4 can be employed and for practical purposes a pair of strips may be arranged side by side and each is reciprocable in a direction transverse to the direction of body travel but in opposite phase to each other. In other words, as one strip moves to the right the other moves to the left so as to counteract each other and minimize the likelihood of tipping or displacing the body being operated upon. These strips are supported in the path of the work by having their opposite ends secured to swinging frames 5—5, a pair of such frames being provided for each strip and the frames of each pair being connected together for unison action by tie rods 6—6. The swinging frame assemblies are located on opposite sides of the conveyor line and are pivotally mounted at their upper ends on suitable overhead structure which in the drawings includes transverse beams 7 straddling the conveyor and being mounted on posts 8 or the like.
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A platform 9 fastened between the posts 8 at one side and the straps 10 dependent from the overhead beams 7, mounts the driving mechanism, such as an electric motor 11 having a chain drive 12 with the gear reduction box 13 from which a chain drive 14 transmits power to the shaft 15. On opposite ends of the shaft 15 are located a pair of cranks 16 connected by rods 17 with the respective frame assemblies. It will be noted from Figure 2 that the eccentric crank arrangement is such that when one set of frame assemblies is at one limit of its reciprocation the other set is at the opposite limit of its travel and that from the common drive the two finishing strips 4—4 are reciprocated counterwise to each other.
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For pivotally supporting the swinging frame assemblies in a manner to permit raising or lowering of the finishing strips 4—4 without interference to the drives from the cranks 16 a series of interconnected levers are used. For this purpose a pair of rockshafts 18 and 19 are mounted in brackets 20 on the underside of the beams 7 and to the shafts are keyed lever arms pivotally supporting the adjacent frames on common axes.
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One of these arms is shown at 21 intermediate opposite ends of the rockshaft 18 and as seen in the detail view Figure 6 it carries a pivot pin or shaft 22 projecting on both sides and carrying anti-friction bearings 23 for the adjacent legs of neighboring frame assemblies. Similar joints mount the other legs of the frame assemblies on the same axis to the arms 24 of bell crank levers near opposite ends of the rockshaft 18. The rockshaft 19 has corresponding lever arm mountings for the frame assemblies on the other side of the machine with the arm 25 of one of the end bell cranks being shown in Figure 1. Its other arm 26 is joined by the connecting rod 27 to the arm 28 of the bell crank mounted on the rockshaft 18 so that the shafts 18 and 19 rock together to shift the position of the several frame assemblies.

In order that adjustment of the height may be controlled by the workman the two bell crank arms 24 are projected for connection through links 29 with lever arms 30 at opposite ends of the rockshaft 31 having bearings in the straps 10 and an operating lever or handle 32. Thus the lever 32 may be swung to change the height of the finishing strips and provision is made to lock it in adjusted position by means of a hand screw 33 threaded into an L-shaped clamp plate 34 fulcruming at one end on the lever and engaging at its other end with a segment or half circle 35 mounted on the strap 10 so that its center is at the axis of shaft 31.

Coming now to the flexible finishing strips 4, each of these may comprise a length of canvas belting secured at opposite ends to the lower portions of the swinging frame assemblies. Preferably the canvas backing is made in two layers 36 and 37 (see Figure 5). Each of these layers at the left end of Figure 1 is wrapped around a winding drum carried between the spaced legs of the frame assembly for individual adjustment of the tension thereof. The opposite ends may similarly engage winding drums but for ordinary purposes satisfactory results will be obtained by simply providing a non-rotatable tube extending between the lower ends of the frame assembly at one side and having a series of spikes or tongues to bite into the canvas wrapped around the tube. The winding rolls as best seen in Figures 3, 4 and 5 include an upper tube 38 to receive the canvas layer 36 and a lower tube 39 to receive the canvas strip 37. Each has pointed pins or spikes 40 to extend through the canvas for secure anchorage and is rotatable in bearings 41 carried by the legs of the swinging frame. To hold the tubes in adjusted position a ratchet mechanism has been adopted and this consists of a toothed wheel 42 pinned to the tube and a pivoted pawl 43 engaging the teeth of the ratchet wheel.

Covering the exposed face on the underside of the lowermost strip 36 throughout its intermediate portion is the finishing material which may be either a sheet of abrasive or a soft polishing material such as long tufted carpeting 44. It is of sufficient extent to engage the entire width of the work surface between opposite limits of recip-

rocation. Interposed between the flexible layers 36 and 37 in the region of the central working portion is a cushion spacer or pad in the nature of a number of felt layers 45. The felt layers are successively cut back so that the space between the canvas strips 36 and 37 is greatest in the middle of their length. By reason of this pad a uniform working pressure is had throughout the width of the roof panel through proper control of the relative tensioning of the upper and lower strips to impart desired shape to the flexible finishing member.

From the above description it will be seen that the roof surface will be operated upon during body travel with a conservation of space, energy and cost and with greater uniformity than can be obtained by handwork. The principles of the invention obviously may be incorporated in a machine for finishing other than roof panels of automobile bodies and the structure specifically described is capable of modification without departing from the invention set forth in the accompanying claims.

I claim:

1. In combination, a conveyor carrying work to be operated upon, a flexible finishing strip suspended from its opposite ends including a pair of superposed tensionable layers of flexible material, work engaging material on the exposed face of one of said layers, and a cushion pad interposed between and spacing said layers in a region intermediate the ends thereof, means for independently adjusting the tension of said strip layers, and operating mechanism for reciprocating said strip.

2. Surface finishing mechanism including a pair of superposed tensionable flexible strips, a covering of surface finishing material on the exposed face of one of said strips, a cushion pad spacing said strips from each other in a region intermediate their ends, spaced supports engaging the opposite ends of said strips and means associated with said supports for independently adjusting the tension on the strips and thereby through said pad controlling strip contour.

3. Surface finishing mechanism including a flexible work engaging strip, adapted to be suspended from its opposite ends only, a pair of swinging strip suspension members spaced apart and connected with the opposite ends of said strip for the reciprocation thereof across the work surface, a pair of bell crank levers pivotally mounting said suspension members and means to rock said bell crank levers in unison to move said suspension members and strip to or from the work surface.

4. Surface finishing mechanism including a flexible work engaging strip, adapted to be suspended from its opposite ends only, a pair of swinging strip suspension members spaced apart and connected with the opposite ends of said strip for the reciprocation thereof across the work surface, and adjustable mounting means for said suspension members whereby they may be moved in a direction normal to the work surface.

ARTHUR O. BROOKE.