June 27, 1933. R. Z. HOPKINS ET AL 1,915,419

STRIPING DEVICE

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Fig. 2

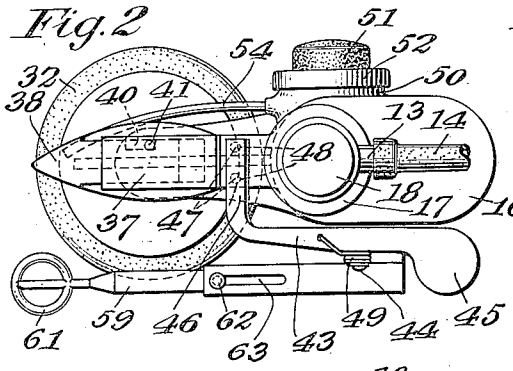


Fig. 3

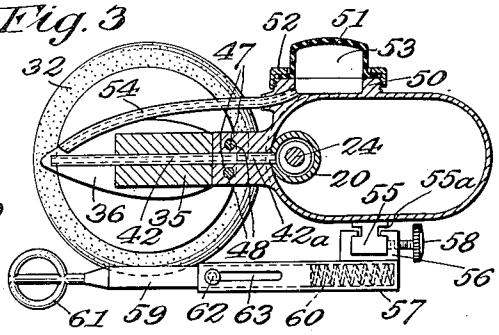


Fig. 1

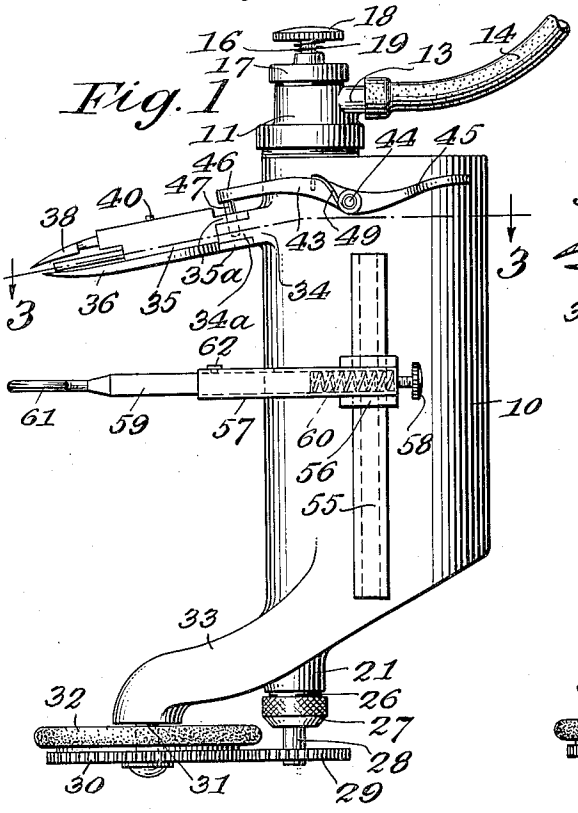


Fig. 4

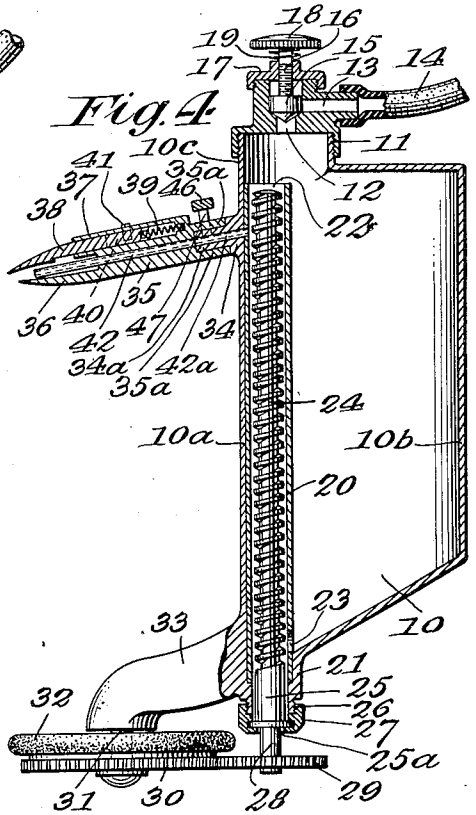


Fig. 5

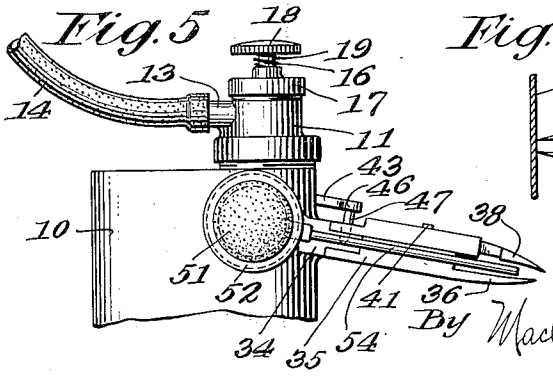


Fig. 6

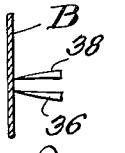


Fig. 7

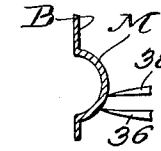
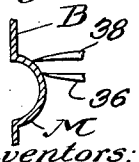


Fig. 8



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STRIPING DEVICE

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Fig. 9

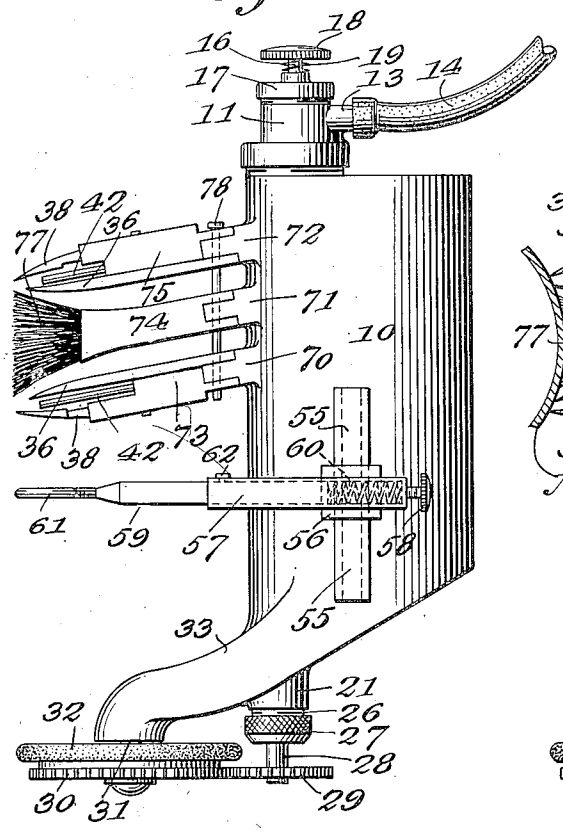


Fig. 10

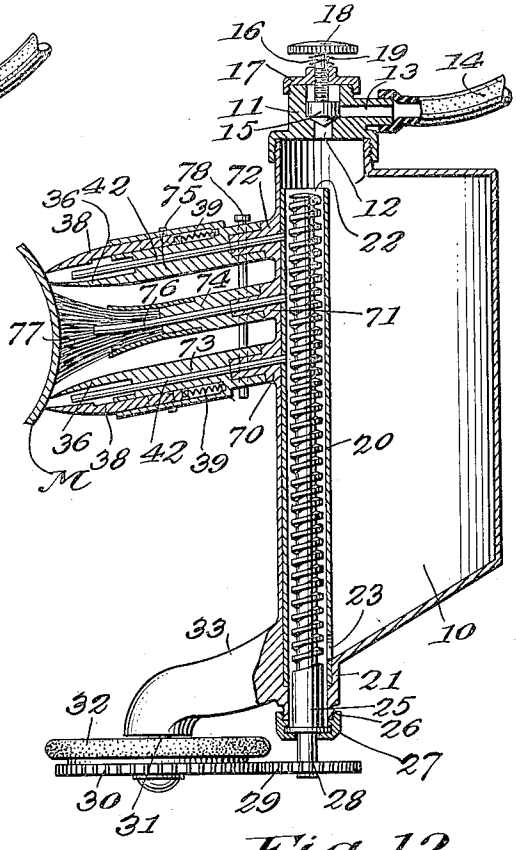


Fig. 11

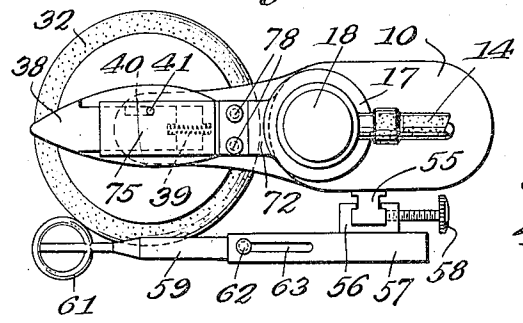


Fig. 12

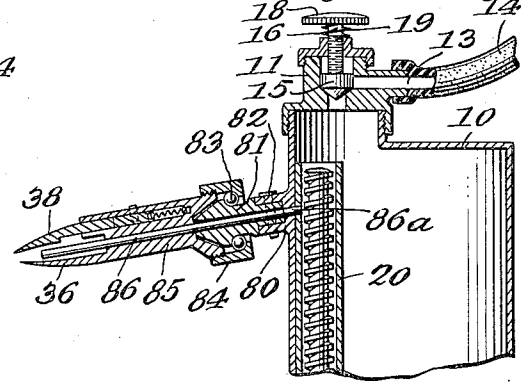
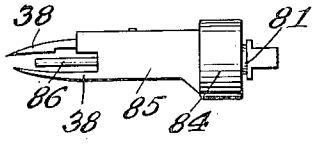


Fig. 13



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Patented June 27, 1933

1,915,419

UNITED STATES PATENT OFFICE

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STRIPING DEVICE

Application filed April 2, 1929. Serial No. 351,989.

This invention relates to striping devices adapted especially for the purpose of applying paint or lacquer stripes to automobile bodies. Devices embodying the present invention are so constructed as to enable narrow, wide or a plurality of stripes to be applied rapidly and easily on body panels, such as along or adjacent the belt line or other moldings or beads, and around the window reveals. Heretofore considerable difficulty has been experienced in carrying out properly and efficiently the work of body striping so as to provide uniform and even stripes of the exact width required owing to variations in contours of body surfaces, irregularities, curves and corners. Even very slight irregularities in surfaces against which the applicator contacts, affect materially the results obtained. To accomplish this work properly the striping must be accurately performed, and even when doing this mechanically by employing striping tools this has proved difficult where under conditions of large scale production it is desired to utilize unskilled labor.

An object of the invention is to provide a portable striping device which will be simple and compact in construction and may be easily handled and guided over the body; in which the device may be used continuously without necessitating frequent refilling of the reservoir; in which the applicator may be constructed so as to yield in such a way as to accommodate automatically variations in contour of surfaces or if desired to take care of curves or corners; in which improved means may be provided for force feeding paint from the reservoir to the applicator; and in which means may be provided for eliminating blots at junction points of two stripes and for removing excess paint at any point in the stripe.

This application is a further modification of the inventions shown and described in our copending applications Serial No. 274,293 filed May 1, 1928; Serial No. 289,811 filed July 2, 1928; and Serial No. 272,072 filed April 23, 1928.

Other objects of this invention will appear in the following description and appended claims, reference being had to the accompanying drawings forming a part of this specification wherein like reference characters designate corresponding parts in the several views.

Fig. 1 is a side elevation illustrating a striping device embodying the invention.

Fig. 2 is a plan view thereof.

Fig. 3 is a sectional view taken substantially on line 3—3, Fig. 1, in the direction of the arrows.

Fig. 4 is in part a vertical section of the construction shown in Fig. 1.

Fig. 5 is a fragmentary upper side view taken from the opposite side of the device than in Fig. 1.

Figs. 6, 7 and 8 are detail views illustrating the manner in which the pin nibs are adapted to conform to various contours.

Fig. 9 is a side elevation of a somewhat modified device embodying the invention.

Fig. 10 is in part a vertical section of the construction shown in Fig. 9.

Fig. 11 is a plan view of the construction shown in Fig. 9.

Fig. 12 is a fragmentary vertical section illustrating the striping device above shown having an applicator of modified construction.

Fig. 13 is a detail side view of the applicator shown in Fig. 12.

Before explaining in detail the present invention, it is to be understood that the invention is not limited in its application to the details of construction and arrangement of parts illustrated in the accompanying drawings, since the invention is capable of other embodiments and of being practiced or carried out in various ways. Also it is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation, and it is not intended to limit the invention beyond the terms of the several claims hereto appended as considered in view of the prior art and the requirements thereof.

Referring to Figs. 1 to 8 inclusive the striping device in this form of the invention comprises preferably a hollow supporting body forming a reservoir 10 for containing

the striping fluid, such as lacquer or paint. This reservoir or container body is in the present instance constructed to provide an inner straight wall 10*a* and an outer offset wall 10*b* and the upper end of the container is provided with a projecting nipple 10*c* which is exteriorly threaded for the attachment of a valve support or housing 11 forming a removable cover. This valve support is provided with a central vertical passage or port 12 communicating with a lateral passage or duct 13 which in turn communicates with a removable flexible tube 14 for supplying and feeding paint from a source of supply into the reservoir 10. The passage 12 is counterbored to provide a cylindrical chamber within which is located a valve 15 having a lower conical portion adapted to be seated on a correspondingly shaped valve seat machined at the upper end of the passage 12. The valve 15 is carried by a valve stem 16 having threads which cooperate with a tapped hole in a cap 17 adapted to be screwed on to the upper end of the member 11. The valve stem 16 carries a knurled head 18 and a compression spring 19 is located between this head and the cap 17. By turning the head 18 the position of the valve 15 may be adjusted to control the feed of paint from the tube 14 into the reservoir. This feed is preferably by gravity from a suitable supply tank and the flexible tube 14 is in practice long enough to permit the operator to move within the required range at the assembly line so as to stripe the bodies as they travel along the assembly line.

Extending through the interior of the reservoir or container 10 is a metal tube 20, this tube extending preferably parallel to the wall 10*a* and closely adjacent thereto. The lower end of the container body 10 is reduced and formed with a cylindrical extension 21 within which is fixed the lower end of the tube 20. This tube preferably extends to a point adjacent the top of the container body and in the present instance is open to provide a port 22. The tube 20 at its lower end is also provided with a port 23 permitting the flow of paint or fluid from the reservoir into the tube 20.

Within the tube 20 is located a screw or worm conveyor 24 which preferably extends substantially the length of the tube and terminates at a point adjacent the upper end thereof near the port 22. The lower end 25 of this screw or worm is cylindrical and is machined to provide an annular key 25*a* housed within an undercut annular groove in a bearing cap 27. This cap 27 is tapped and is adapted to be screwed on to the threaded end 26 of the extension 21. In this manner the screw conveyor 24 has a bearing within the cap 27 and is supported thereby to rotate within the tube 20. By unscrewing the cap 27 the conveyor may be withdrawn from the tube. The lower end 25 of the screw is turned down to provide a projecting spindle 28 upon which is fixed a small gear 29. This gear is in mesh with a large gear 30 secured in place upon a stud shaft 31 which in turn carries a rotatable friction roller 32. This roller may comprise a disk having a peripheral rubber tire. The shaft 31 is journalled in a projecting bracket 33 extending from the reservoir body. It will be seen that the roller 32 will drive the screw conveyor 24 through the gearing 29 and 30 when it is held against the body panel and when the device is moved along the panel.

Intermediate the ends of the tube 20 and preferably adjacent the upper end of the container body 10, the latter is provided with a projecting boss 34 which is machined at opposite faces to provide seats for the bifurcated ends 35*a* of an applicator body 35. This body 35 may be an integral piece having a projecting nib 36 forming a part of the applicator. This nib may be hinged to the body as in my above applications. The body 35 at its upper side is provided with an enlargement 37 having a longitudinal hole and forming a socket to receive the rearwardly extending shank of an adjustable applicator nib 38. The shank of this nib 38 is therefore slidable longitudinally within the socket 37 against the action of a compression spring 39. The movement of this pen nib is guided and controlled by means of a pin 41 carried by the socket member, which projects through a slot 40 in the shank of the nib, see Figs. 2 and 4. The applicator body 35 and the boss 34 are drilled centrally to provide alined holes through which extend tubes 42 and 42*a* forming a conduit for feeding paint from the conveyor tube 20 to a point adjacent the working ends of the nibs 36 and 38.

It will be seen that the pen is readily detachable for the purpose of cleaning or replacing the same, the forked ends 35*a* being releasably held in position on the seat 34*a* by means of a device which may be readily operated by the operator. A lever 43 is pivoted to a stud 44 carried by the reservoir body, this lever having a projecting thumb piece 45 which may be pressed downwardly to swing the forward end of the lever upwardly against the action of a spring 49. The lever at its forward end is offset to provide a portion 46 which extends across the upper side of the boss 34. This offset portion 46 carries a pair of downwardly projecting pins 47 adapted to extend into a pair of holes 48 at opposite sides of the tube 42*a*. The spring 49 acting upon the forward end of the lever 43 normally holds the pins 47 within the holes 48 so as to lock the applicator body 35 to the boss 34.

Extending from the opposite side of the reservoir body is a chambered boss 50 which is threaded to receive a collar 52 and between

the latter and the face of the boss 50 is clamped the edge of a flexible cap 51. This cap is preferably of collapsible material such as rubber and forms an air chamber 53 which communicates with a tube 54 extending forwardly and terminating at a point adjacent the working ends of the nibs 36 and 38. The chamber 53 forms a suction chamber when the cap 51 is collapsed and by releasing the cap the suction in the tube 54 is sufficient to draw into tube end of the tube excess paint at the ends of the nibs of the applicator.

The reservoir body may be provided at one side thereof with a guide support 55 secured in any suitable manner to the wall of the body. As illustrated in Fig. 3, the guide supporting member 55 may be provided at opposite sides with longitudinal grooves 55*a* into which project tongues formed on a sleeve 56 slidable longitudinally of the guide support 55. The sleeve 56 is clamped in adjusted position by means of a set screw 58. A guide bar 57 is carried by the sleeve 56 and is drilled longitudinally to form a socket slidably receiving the shank 59 of a guide 61. The shank slides within the socket 57 against the action of a compression spring 60, and the parts are connected together by means of a pin and slot connection 62 and 63.

Referring now to Figs. 9, 10 and 11, it will be seen that the device in this embodiment of the invention is especially adapted for the purpose of applying a relatively wide composite stripe of the body. In this instance the reservoir body 10 at the front face thereof is formed with three alined projecting bosses 70, 71 and 72 which may be similar in construction to the boss 34 and in like manner are adapted to releasably support the bifurcated rear ends of three applicators 73, 74 and 75. The applicators 73 and 75 are in this instance substantially identical with the applicator 35 above described and a further description thereof is not deemed necessary. The intermediate applicator 74 in the present instance comprises a brush body which is drilled longitudinally to provide a hole in alinement with a hole drilled centrally through the boss 71 and communicating with the interior of the tube 20. Extending through the hole in the applicator 74, is a feed tube 76 which extends centrally into the body of bristles 77.

In this embodiment of the invention the applicators 73, 74 and 75 are also readily detachable for the purpose of cleaning or replacing the same. The forked ends are releasably held in position on the reduced ends or seats of the bosses 70, 71 and 72 by a pair of pins 78. Each pin projects through alined holes drilled through the forked ends of the applicators and also through the reduced ends of the bosses. The pins when in locking position as shown in Figs. 9 and 11 straddle opposite sides of the feed tubes 42 and 76.

The striping device shown in Figs. 9, 10 and 11 is especially adapted for the purpose of applying a relatively wide composite stripe to a curved body such as a convex molding M. The brush 77 which preferably travels somewhat in advance of the upper and lower applicators or pens, as in our above application Serial No. 274,293, forms an intermediate relatively wide stripe. Owing to the yielding nib 38 each of the pens 73 and 75 will conform substantially to the contour of the molding as shown in Figs. 7 to 10 inclusive and these pens will form a narrow marginal stripe along each edge of the central stripe produced by the brush 77. Preferably the fine marginal lines produced by the applicators 73 and 75 will be contiguous with or slightly overlapped by the stripe line formed by the applicator 77, as in our last mentioned application. Thus, the wide stripe is formed by producing in succession a marginal stripe along each edge thereof and an intermediate stripe to fill the space between the marginal stripes. The resulting convex stripe will have an even and uniform margin and will be accurately formed in accordance with the convexity of the surface.

A further detailed description of the device shown in Figs. 9, 10 and 11 is not considered necessary since the construction is otherwise substantially the same as above described in connection with the device shown in Figs. 1 to 5 inclusive.

Referring now to Figs. 12 and 13, the reservoir body in this instance may be formed with a boss 80 machined to provide forked projections adapted to fit over the projecting shouldered end of a fixed pen supporting or bearing member 81, these parts being detachably held together by means of pins 82 projecting through alined holes in the parts. The bearing member 81 is provided with an annular groove to receive ball bearings 83 housed by a ring 84 secured to an applicator body 85 by means of screw threads. This body 85 has substantially the same construction as the applicator body 35 above described, being provided with a stationary nib 36 and a yielding nib 37. The parts 80, 81 and 85 are drilled to provide alined centrally located holes through which extend feed tubes 86 and 86*a* communicating with the interior of the conveyor tube 20. From this construction, it will be seen that the applicator body 85 together with the pen nibs are free to turn or rotate by virtue of the ball bearings 83. In this way the pen will automatically turn or rotate freely about its longitudinal axis when the device is moved over the body so as to conform to curves or corners.

From the foregoing many advantages of the present invention will be immedately apparent. The construction of the device with

the work wheel 32 carried by the offset arm 3 provides a substantial space between it and the applicator for clearing obstructions such as hinges. The gears 29, 30 not only prevents binding of the screw conveyor but also enables the conveyor to be driven at any predetermined speed to give the proper feed of paint in proportion to the speed of travel of the device over the body. These gears are readily removable so as to permit instant substitution of gears of different diameters or ratio so as to change the ratio of feed. This is important on account of variations in width of stripes requiring a greater or less proportionate feed. For example, when a wider stripe is to be made the gear ratio can be changed to increase the feed ratio of the propeller and hence increase the amount of paint delivered at the applicator point.

Moreover, it will be readily seen from the foregoing, referring especially to Figs. 6, 7 and 8 that the applicator nibs will automatically conform to the contour of the surface upon which the stripe is produced. A further advantage of the invention resides in the suction chamber 53. In practice, just before the workman commences the stripe he will apply his finger to the cap 51 and collapse it to force air out of the chamber 53 and tube 54. While forming the stripe he will retain his finger in such position keeping the cap 51 collapsed. At the end of the stripe line, or at a junction with another stripe still wet, or at any point desired, he can remove excess paint by releasing the pressure of his finger on cap 51 thereby drawing the paint into the tube 54 by suction.

We claim:

1. In a striping device, in combination, an applicator comprising a pair of nibs, a suction conduit terminating between the working ends of said nibs, a conduit for feeding fluid from the reservoir to said nibs, and a collapsible device for inducing suction in said suction conduit.

2. In a striping device, in combination, an applicator, a suction conduit terminating within the working end of said applicator, a fluid conduit from said reservoir terminating within the working end of said applicator, and a chambered member having a collapsible wall for inducing suction in said suction conduit.

3. In a striping device, in combination, a reservoir for striping fluid, an applicator communicating with the reservoir and comprising a pair of nibs, a guide for one of said nibs to permit endwise slidable movement thereof, a spring engaging the end of said slidable nib, a suction conduit terminating between the working ends of said nibs, a conduit for feeding fluid from the reservoir to said nibs, and a collapsible device for inducing suction in said suction conduit.

4. In a striping device, in combination, a reservoir for striping fluid, an applicator communicating with the reservoir and comprising a pair of nibs, guide means for one of said nibs to permit endwise slidable movement thereof, a spring engaging the end of said slidable nib, a guide carried by said device for guiding the applicator in use, a suction conduit terminating between the working ends of said nibs, a conduit for feeding fluid from the reservoir to said nibs, and a collapsible device for inducing suction in said suction conduit.

In testimony whereof we affix our signatures.

RALPH Z. HOPKINS.
EARL F. SEGER.