Feb. 19, 1935. A. A. ALEXANDER 1,991,355

APPARATUS FOR STRIPING

Filed Sept. 8, 1933

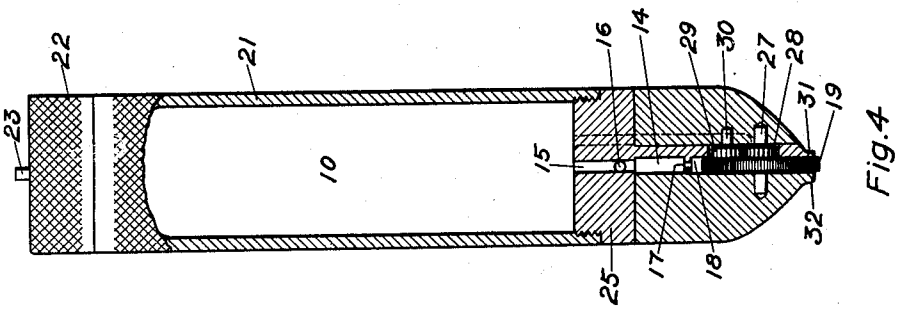


Fig.4

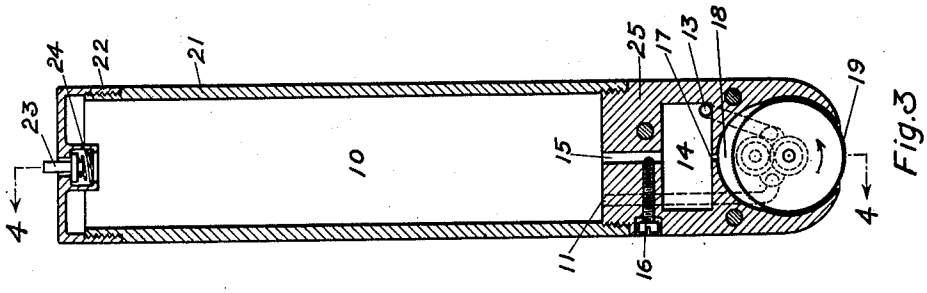


Fig.3

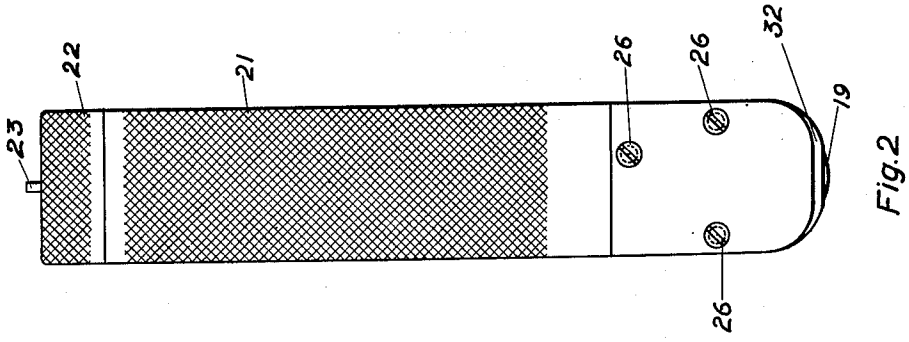


Fig.2

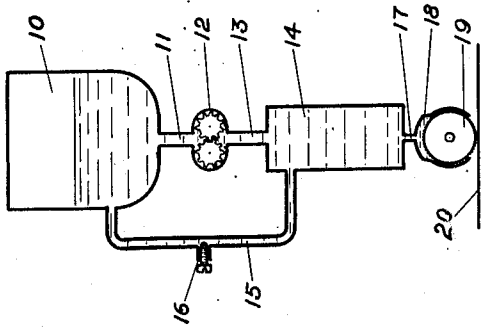


Fig.1

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Patented Feb. 19, 1935 1,991,355

UNITED STATES PATENT OFFICE

1,991,355

APPARATUS FOR STRIPING

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Application September 8, 1933, Serial No. 688,577

11 Claims. (Cl. 91—62.6)

This invention relates to improvements in method of an apparatus for striping.

An object of the invention is to provide a method for applying stripes of paint for decorative purposes and the like, for example the striping of automobile bodies whereby the striping may be performed by unskilled labor.

Another object of the invention is to provide a method of and apparatus for striping which may be embodied in a hand tool requiring no hose or other connection and which may be used as a brush.

A further object is to provide a method and apparatus for striping which enables pigment of varying viscosity and compressibility to be used while maintaining a stripe of uniform width.

Striping is now accomplished by the use of a relatively long and narrow brush which is dipped in suitable pigment and then applied to the work by hand. This requires a high degree of skill and in the case of long stripes the stripe is often of varying width, depending on the steadiness of the hand of the operator and the brush must be frequently removed from the work in order to replenish the paint. It requires a high degree of skill to round corners when striping by hand and the utilization of pigments such as "Duco" and the like is difficult because they quickly dry on the brush which must be constantly worked in order to remain in the proper condition to pull the stripe.

Various attempts have been made to use mechanical devices to produce stripes, feeding the pigment to the hand device by means of a flexible hose connection, or carrying a supply of paint in the hand device and feeding it to the stripe by suitable compressed air mechanism. Many of these devices proved unsatisfactory because the hose connection impedes the free use of the hand device and such devices have not proven satisfactory when using pigments of varying viscosity and compressibility as the air gun or spray effect causes bubbles, a varying of striping and a too rapid drying of the pigment while it is being applied to the work.

The method and apparatus herein disclosed eliminates the foregoing objections, attains the objects heretofore mentioned and has other objects that will more fully hereinafter appear.

The accompanying drawing is illustrative of the method and a preferred embodiment of the apparatus constituting the invention, but it must be understood that the details herein shown and described are not intended to be limitative of the invention except in so far as set forth in the accompanying claims.

Figure 1 is a diagram illustrating a method of striping herein disclosed;

Figure 2 is an exterior view of a complete apparatus for carrying out the method herein described;

Figure 3 is a vertical sectional view of the apparatus shown in Figure 2; and

Figure 4 is a vertical sectional view on the line 4—4 of the apparatus shown in Figure 3.

It will be assumed for the sake of illustration that a "Duco" pigment is to be used. Such pigments are highly elastic as compared with other paints and it has been found practically impossible to mechanically feed them to a stripe applying mechanism by applying pressure above the pigment, for it is extremely difficult to set any valve mechanism that will either control the air pressure on the pigment or control the discharge of the liquid pigment into the stripe applying mechanism.

In Figure 1 is disclosed a system of applying such elastic pigments that overcomes the foregoing difficulty, and the numeral 10 denotes a reservoir of pigment which is connected by a suitable passage 11 to an impeller or pump 12, the discharge of which passes via passage 13 into a chamber 14 which is connected via passage 15 to the reservoir 10. A valve of any suitable construction generally denoted by the numeral 16 is placed in the passage 15 in order to regulate the area of same.

The chamber 14 is connected via passage 17 with the stripe producing means which may be of any suitable character such as a housing 18 containing the knurled wheel 19 adapted to be pressed on and rolled over the surfaces 20 to be striped.

The reservoir 10 being filled with suitable pigment and the pump 12 being connected to the wheel 19 in any suitable manner so that the speed of the pump is determined by the passage of the wheel 19 over the work, the wheel 19 is run against the work a few strokes until the pump 12 has filled the chamber 14 and the passage 15; the reservoir 10, passage 11, pump 12, passage 13, chamber 14 and passage 15 constituting a circulatory system for the pigment.

The valve 16 is now adjusted in order to compensate for the elasticity of the pigment in the chamber 14, some of which pigment may then pass down the passage 17 into the housing 18 where it is taken up by the wheel 19 and applied as a stripe to the work 20. By suitably regu-

lating the valve 16 the supply of pigment to the wheel 19 is regulated, depending on the speed with which this wheel or applicator forming the stripe producing means is drawn over work, so that by a very simple setting which remains permanent for any given width of stripe (which width depends on the width of the wheel 19) proper operation is obtained.

It is obvious that instead of the pump 12, any suitable means may be employed to cause the pigment to circulate throughout the circulatory system in order to fill the expansion chamber 14 and that a pressure that will exist in this chamber at any one time depends on the speed of the means producing the circulation of the pigment, the setting of the valve 16 and the speed of the stripe producing means 19. It is therefore possible to substitute any pressure producing device at 12 or to apply compressed air on top of the pigment in the reservoir 10, provided that the means so employed is regulated by linear speed of the stripe producing means 19. Obviously, if the source of air pressure is used, then the device adapted to be held in the hand and hereinafter described, would be equipped with a flexible hose, and as this is objectionable as it interferes with the quick and ready handling of the tool, a preferred embodiment of the device in which the pump 12 is employed and which requires no hose, is hereinafter described. It will be understood, however, that the method disclosed in Figure 1 may be employed using any means for causing a circulation of the pigment to take place from chamber 10 to chamber 14 and tapping this circulatory system at a midpoint between the reservoir 10 and the chamber 14 and delivering pigment from said midpoint to stripe producing means.

The preferred embodiment of the device shown in Figures 2–4 inclusive will now be described. This comprises a hand tool which may be approximately 6'' long and 1¼'' in diameter. Such a tool is particularly adapted to stripe automobile bodies in production, and enables them to be striped using pigments of varying viscosity and of high compressibility, such as "Duco" pigments. The device is particularly adapted to be handled by unskilled labor, and its construction and operation are as follows.

A hollow casing 21 is provided at its upper end with a suitable cap 22 attached to the body in any suitable manner, as by threads as shown. In this cap may be mounted a suction valve 23 which has an upwardly projecting stem which may be pressed with the finger if desired to admit air to the interior of the hollow casing, for obviously, as pigment is withdrawn therefrom a valve will automatically open inwardly against the pressure of the spring 24 to admit air. The casing 21 may be secured in any suitable manner to the body 25 which may be made in two parts as shown, which are held together by screws 26. In this body is supported the striping wheel 19 which is fixed to the shaft 27 having its bearings in the body 25.

One of the impeller members 28 of the pump 12 is affixed to and revolves with the wheel 19 and its shaft, and this impeller engages a second impeller 29 of the pump having a shaft 30 having its bearing in the body 25.

The body 25 has a suitable cavity therein forming the housing for the impeller members just described and the intake passage 11 to the pump opening into the chamber or reservoir 10 in the hollow casing 21. The outlet or discharge from the pump 12 discharges into the chamber 14, which chamber connects via the passage 15 with the reservoir 10. The valve generally denoted by the numeral 16, Figures 3 and 4, may be of any suitable type and may comprise a screw as shown. By adjusting this screw, the area of the passage 15 may be varied.

The lower portion of the body 25 is formed with a crescent shaped housing 18 for the wheel 19, which housing is in communication with the chamber 14 via the passage 17. The end of the body 25 is provided with the thin lip 31 and the relatively thick lip 32 which may be brought against a roller or the like in order to steady the device when making a stripe. These lips do not quite enclose the wheel 19 which extends freely from the device as shown in the figures, so that the only part of the device that touches the surface to be striped is the wheel 19.

In operation, the chamber 10 is filled with suitable pigment, the wheel 19 revolved thereby actuating the pump 12 and filling the lower chamber 14 with pigment via the passages 11 and 13. As soon as the chamber 14 is filled, the pigment finds its way upward past the valve 16 and returns to chamber 10.

The valve 16 is adjusted in accordance with the work to be done and pigment passes via the passage 17 into the housing 18 and is picked up by the knurled wheel 19 and applied to the work in an even stripe and in a measured quantity in proportion to the linear speed at which the wheel is moved over the work to produce the stripe.

It will be observed that by interconnecting the stripe producing means such as the wheel 19 with the pigment feeding means such as the pump 12, that a smooth, even flow of pigment is obtained in exact proportion as needed. For example, when producing a long straight stripe the workman naturally moves the tool faster than when rounding a corner, and if the pigment were set to give the proper flow for producing a long stripe, too much pigment would be present when slowly turning the corner, which condition cannot occur with the device just described, as the regulation of the pigment depends on the speed of the wheel 19 and the flow thereof is automatically controlled by the actual stripe being produced.

What is claimed is:

1. In combination a pigment reservoir, a gear pump having its inlet directly connected thereto, a chamber having a passage in direct fluid communication with the outlet from said pump, a passage between said reservoir and chamber, a housing in fluid communication with said chamber, and rotary stripe producing means revolvably mounted in said housing below said chamber, one member of said pump being directly driven by said stripe producing means as the latter passes along a surface to be striped.

2. The combination as claimed in claim 1 wherein the passage between the reservoir and the chamber is provided with an adjustable needle valve whereby the cross section of the passage may be restricted and the flow of fluid circulating between the reservoir and the chamber may be controlled.

3. A striping tool comprising a hollow casing adapted to enclose pigment, a body secured to said casing having a chamber formed therein, a passage formed in said body between the interior of said casing and said chamber, a second passage formed in said body between and communicating with said casing and said chamber, a housing in said body in fluid communication

with said chamber, stripe applying means revolvably mounted in said housing, a port formed in said body communicating with said chamber and said housing, circulating means in one of said passages actuated by the movement of said stripe producing means, and manual means for restricting the other of said passages and thereby controlling the by-passing of pigment to said stripe applying means via said port.

4. The combination as claimed in claim 3 wherein the hollow casing is provided with a removable cap having an inlet valve therein, for allowing air to enter said casing as the supply of pigment is reduced.

5. The combination as claimed in claim 3 wherein one of the passages between the interior of the hollow casing and the chamber in the body is provided with a hand operated needle valve.

6. A striping tool comprising a hollow casing forming a handle, said casing being closed at one end by a body having a chamber formed therein in fluid communication with the interior of said casing via a duct formed in said body, a wheel housing formed in said body, a port formed in said body between and communicating with said housing and said chamber, a wheel mounted in said housing, the periphery of the wheel extending freely from said body, a gear pump having one member connected to said wheel and adapted to be actuated thereby, and ducts formed in said body connecting said pump to the interior of said casing and to the chamber in the body of the tool whereby a supply of liquid may be circulated in said tool between the hollow in said casing and said chamber and a portion of the liquid may be by-passed via said port to said wheel.

7. A striping tool comprising a pigment reservoir, an auxiliary reservoir, a gear pump adapted to move pigment from said first reservoir to said second reservoir, stripe producing means mounted at the end of said second reservoir in driving relation to one member of said pump and adapted to engage and apply a stripe to a surface when moved thereon, said means including a wheel and lips of unequal cross sectional thickness adjacent the sides of said wheel, and a by-pass between said reservoirs for returning pigment from the auxiliary reservoir to said first reservoir.

8. A hand tool for striping comprising a hollow handle forming a pigment reservoir, a body member secured to said handle and having formed therein a chamber, a passage formed in said body and communicating with both said reservoir and said chamber, a pump chamber formed in said body having an inlet port and a discharge port, a second passage formed in said body and communicating with said reservoir and said inlet port, a third passage formed in said body communicating with said discharge port and said first chamber, a pair of meshing gears operatively supported in said pump chamber to form a pump, an open ended wheel housing formed in said body, a free port formed in said body between said first chamber and said housing, a striping wheel mounted in said housing and having a portion thereof projecting from said open end, means adapted to drive one of said gears in definite relation to the movement of said wheel when the latter is moved over a surface to be striped, said pump with said passages, said chamber and said reservoir forming a circulating system for pigment, and means in said first passage for slightly restraining said circulation and causing some pigment to pass from said first chamber to said housing via said free port.

9. In a striping tool having a hollow handle forming a pigment reservoir, a body member secured to said handle and comprising walls defining therein, a chamber, a passage between said chamber and said reservoir, a pump chamber, a passage between said pump chamber and said first chamber, a passage between said reservoir and said pump chamber, an open ended housing adapted to partly embrace a striping wheel, and a free port between said first chamber and said housing.

10. The invention according to claim 9, in which a knurled striping wheel is operatively positioned in said housing, pigment is placed in said reservoir, a pair of gears is positioned in the pump chamber to form a gear pump, one of said gears being in driven relation to said wheel whereby when the latter is moved along a surface to be striped the pump causes pigment to circulate in a definite path from the reservoir to said first chamber and return via said passages, and a portion of the pigment passes to the wheel via said free port.

11. In a striping tool, the combination of a rotary striping element, a pigment supply reservoir therefor, a pigment supply chamber connected between said reservoir and said striping element, a pump connected between the reservoir and the supply chamber for transferring pigment from said reservoir to said chamber, and a by-pass connection between said reservoir and chamber for continuously recirculating to said reservoir a portion of the pigment delivered by said pump, whereby a uniform flow of pigment is produced at the rotary striping element.

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