

May 16, 1939.

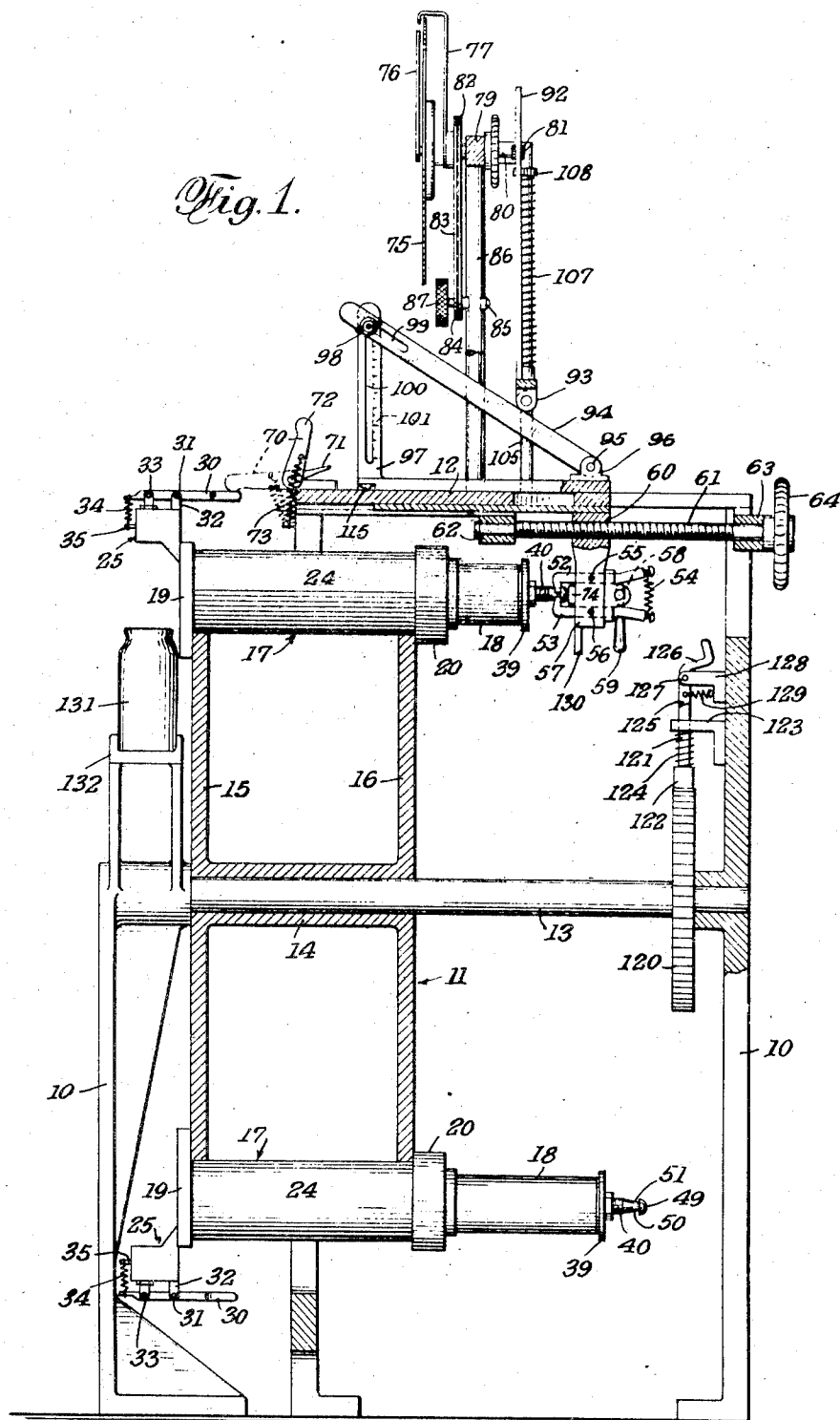
N. GRUBELIC

2,158,774

PAINT DISPENSING MACHINE

Filed Oct. 15, 1937

4 Sheets-Sheet 1



INVENTOR
Nicholas Grubelic

BY
Harry Jacobson
ATTORNEY

May 16, 1939.

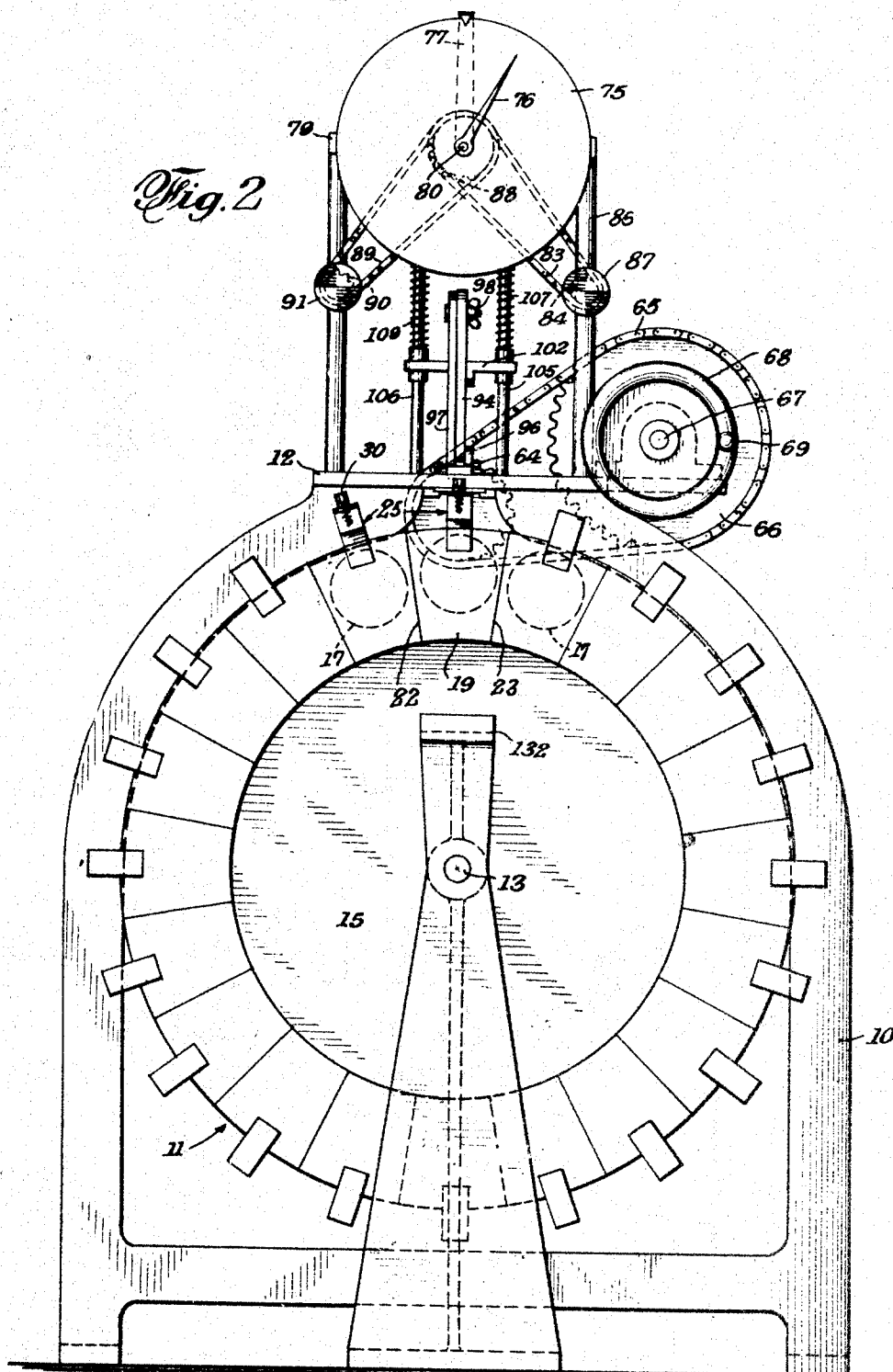
N. GRUBELIC

2,158,774

PAINT DISPENSING MACHINE

Filed Oct. 15, 1937

4 Sheets-Sheet 2



INVENTOR
Nicholas Grubelic

BY
Harry Jacobson
ATTORNEY

May 16, 1939.

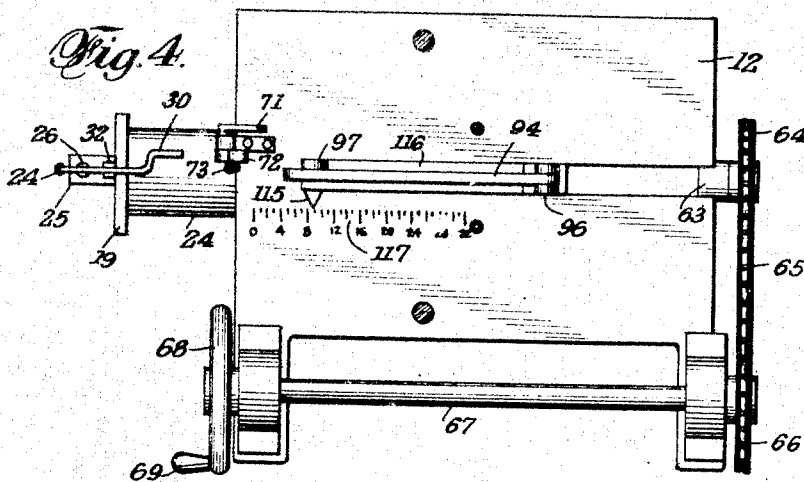
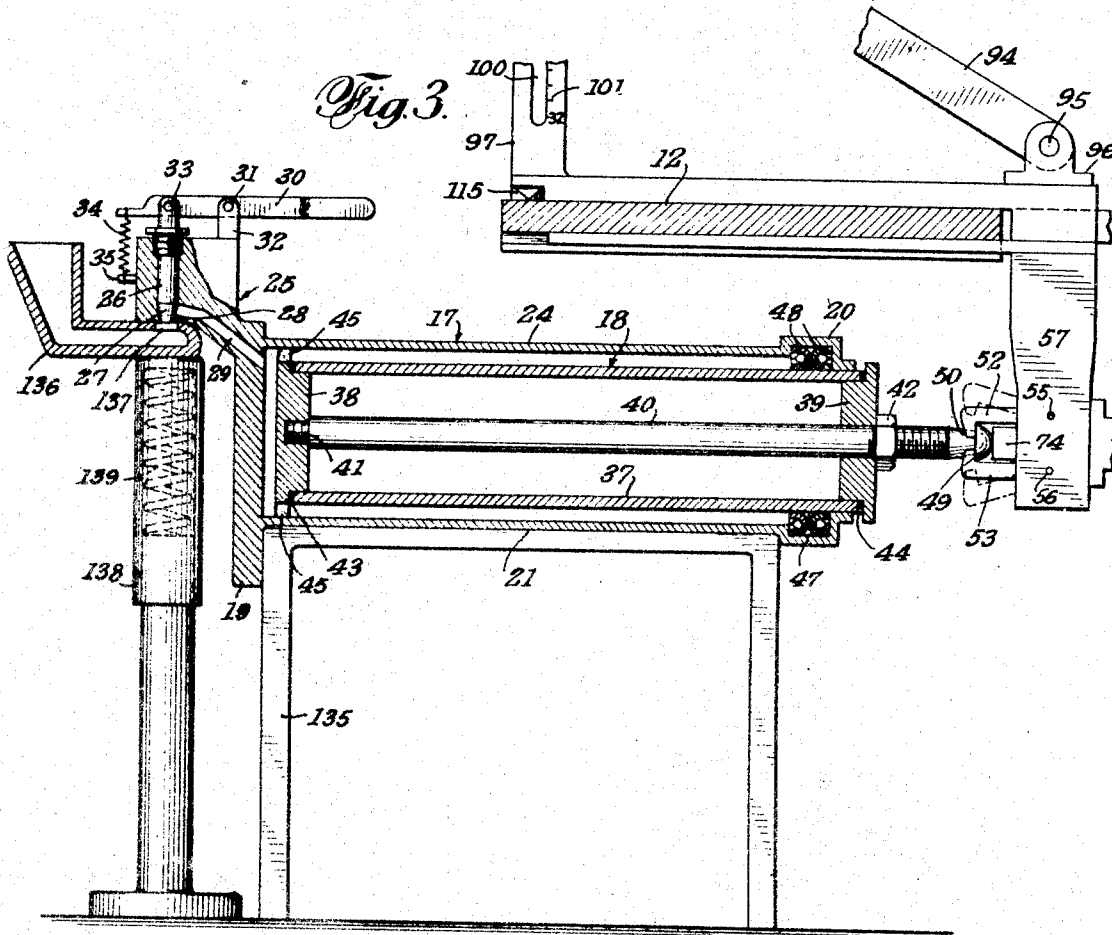
N. GRUBELIC

2,158,774

PAINT DISPENSING MACHINE

Filed Oct. 15, 1937

4 Sheets-Sheet 3



INVENTOR
Nicholas Grubelic
BY
Harry Jacobson
ATTORNEY

May 16, 1939.

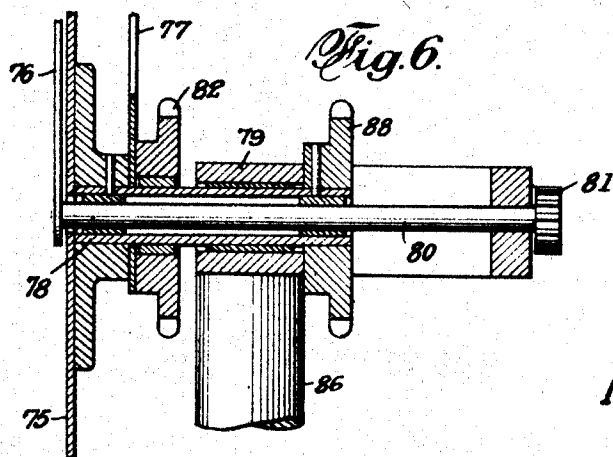
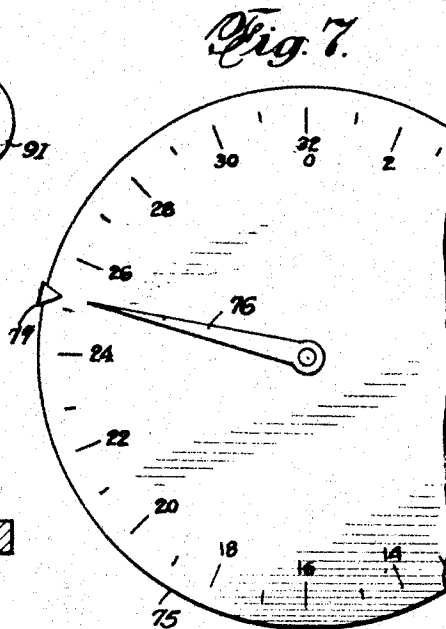
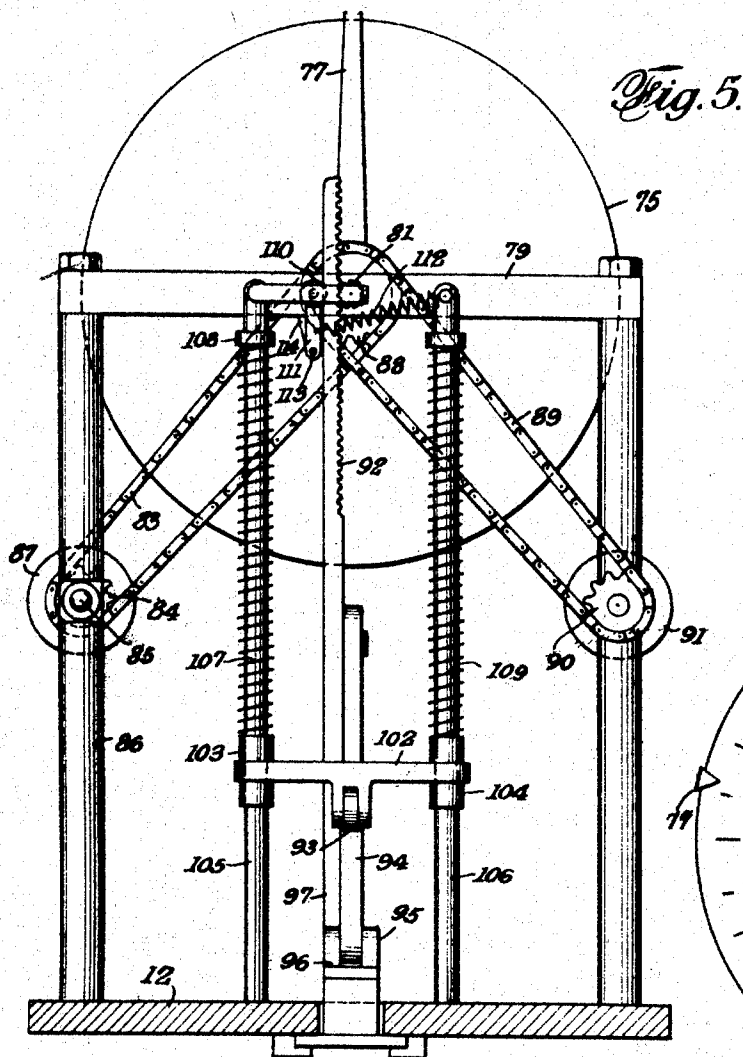
N. GRUBELIC

2,158,774

PAINT DISPENSING MACHINE

Filed Oct. 15, 1937

4 Sheets-Sheet 4



INVENTOR
Nicholas Grubelic
BY *Harry Jackson*
ATTORNEY

UNITED STATES PATENT OFFICE

2,158,774

PAINT DISPENSING MACHINE

Nicholas Grubelic, Great Neck, N. Y.

Application October 15, 1937, Serial No. 169,093

23 Claims. (Cl. 221—96)

This invention relates to machines for dispensing and mixing paints and is an improvement over my prior copending application for Device for dispensing and mixing paint and the like, Serial No. 11,893, filed March 19, 1935.

At the present time, paints for use in shops where re-painting and re-touching is done are mixed from several different containers with the aid of mixing utensils and in accordance with predetermined formulae.

The paint manufacturer at the present time provides standard colors in quart containers. When it is desired to attain a quantity of mixed paint, a formula is consulted and with the aid of the mentioned utensils, two, three or more of the standard colors are mixed to attain the desired blend.

As can readily be understood, the opened containers of standard paint being exposed to atmosphere, a certain amount of evaporation occurs, and thereafter, paint in such a used container would be more heavily pigmented per fluid ounce. This prevents successfully using the same formula at a later time for matching the original paint, only the experience of the person doing the mixing serving to untimately and after great effort, attain an approximate match.

Further, the formulae supplied are for the purpose of attaining a mixture of one quart, but should, for instance, ten or twelve ounces or more or less of mixed paint be desired, the mathematical calculation involved would ordinarily be too difficult for the person doing the mixing and the mentioned utensils could not be employed with the same facility.

The present invention therefore contemplates the provision of simple and efficient means whereby any desired quantity of mixed paint may be obtained by dispensing from each of a number of previously filled or partly filled containers of standard paint which containers and the mechanism therein are so designed that no air is contained therein, the exact amount of such paint required in accordance with the ratios given by the manufacturer's formula for the standard quantity, for example, one quart.

My invention further contemplates the provision of means for dispensing from the standard color paint containers supplied with the machine, any required quantity of the paint contained therein up to the capacity of the container and independently of the filling operation for filling or partly filling the container, and the

provision of means for insuring the complete absence of air from the interior of the container, whereby the dispensing means is certain to discharge paint only with consequent accuracy of control of the volume discharged.

My invention further contemplates the provision of means for determining accurately, the amount of paint to be dispensed and dispensed from any selected container whereby the operator is relieved from the necessity for any mental calculations and need merely follow in operating the machine the formula for the standard quantity of paint supplied by the paint manufacturer.

My invention further contemplates the provision of a series of paint containers used in connection with the machine and detachably connectable thereto to form part thereof and of discharge means within the container operatively connectable to the machine for operating the same, said discharge means forming part of the machine when the container is arranged in its operative position for the discharge of paint therefrom, and said discharge means serving also as a filling means for the container, only the discharge means within the container being in contact with the paint, while the mechanism for operating the discharge means as well as the indicating means never contact with the paint, so that contamination of the mixed paint with leftover paint of the parts are eliminated.

My invention further contemplates the provision of simple and efficient indicating means operated by the movement of the discharge means to indicate the same quantities of standard paint in the formula, on the adjustment thereof for the different amounts of movement of the discharge means as when the total quantity of mixed paint desired is changed.

The various objects of the invention will be clear from the description which follows and from the drawings, in which,

Fig. 1 is a partial side elevation and partial section of my new machine.

Fig. 2 is a front elevation thereof.

Fig. 3 is a fragmentary combined side elevation and vertical section of the lower portion of a slightly modified form of the machine wherein the drum carrying a plurality of containers is replaced by a support for the use of a single container at a time.

Fig. 4 is a top plan view of a portion of the operating mechanism for the discharge means and of the valve control means for the container.

Fig. 5 is a rear elevational view of the indi-

ating means and of the mechanism for operating and controlling the same.

Fig. 6 is a fragmentary vertical section of the indicating means and of part of the operating means therefor.

Fig. 7 is a fragmentary front elevation of the indicating dial.

In the practical embodiment of my invention which I have shown by way of example, my new machine consists in brief of a series of containers, each for a paint of standard color, each of the containers being adapted to be arranged in the machine for discharge of paint therefrom by cooperating mechanism contained within the container and carried by the machine together with devices for indicating and regulating the amount of the movement of the discharge means so that when the standard color paint from all the various selected containers has been discharged by means of the machine, the total quantity of mixed paint is the desired total quantity, and the proportion of the standard color paints in the total quantity thus dispensed, is in accordance with the manufacturer's formula.

In that form of my invention which I have illustrated, the frame 10 supports the container drum indicated generally by the numeral 11, as well as the frame table 12 carrying the indicating means, and also supports the operating mechanism for actuating the container discharge means. Suitably supported in the frame 10, is the drum shaft 13 on which is mounted the container supporting drum 11. Said drum is provided with a hub 14 secured to the shaft 13 and with a pair of spaced parallel disc-like flanges 15 and 16. Supported by said flanges is a series of containers 17 each designed to contain a paint of standard color and each provided with a suitable discharge means including the piston 18 mounted for reciprocatory movement therein. Said discharge means will be described more fully hereinafter. The drum when rotated, serves to agitate the paint in the containers, whereby the paint is always in condition for mixing. If, however, the machine has been idle for a considerable period, a few turns of the drum is usually sufficient to thoroughly agitate the paint into condition for mixing.

Each of the containers 17 is preferably provided with an end flange 19 and with a projecting part as 20 providing a recess as 21 therebetween for the reception of the peripheral portions of the flanges 15 and 16 so that the containers may be arranged in the positions shown in Figs. 1 and 2 on the drum. To insure the maintenance of the series of containers on the drum, the end flanges 19 of the containers are provided with radial edges as 22, 23 (Fig. 2) which abut against the corresponding edges of the adjacent containers whereby the containers are held to the drum. Each of the containers may be removed from the drum, when desired, by outward radial movement thereof.

It will be understood from the above description of the drum, that said drum may be rotated with its shaft 13 to carry any selected container into the uppermost position thereof to connect the thus selected container to the remaining discharge mechanism of the machine for operating the piston 18 and thus to discharge paint from the container.

Each of the standard color paint containers will now be described. The container comprises a cylinder as 24 provided with an enlarged inner end portion 20 and the end flange 19 previously

described. The flange or head 19 carries the valve member 25 in which is mounted the valve rod 26 for reciprocatory movement therein. Said valve rod is preferably tapered at its lower end 27 to seat on the valve opening 28 in the member 25, said valve opening communicating with the opening 29 extending to the interior of the cylinder 24, both of said openings being preferably above the level of the top of the container cylinder to insure the complete absence of air from the interior of the container. The end of the valve rod is coplanar or flush with the bottom of the member 25, and the conical part 27 is long enough to seal both of the openings 28 and 29 to insure contact with the walls surrounding said openings and thereby preventing any possibility of drying of paint on said walls and consequent sticking of the valve rod, or other disadvantageous effects, such as leakage. For operating the rod 26, the valve operating lever 30 is pivoted as at 31 to a suitable extension 32 projecting from the valve member 25 and is also pivotally connected as at 33 to the outer end of the valve rod 26. A spring 34 connected to the lever 30 and to a fixed pin as 35, urges said lever normally in the valve closing direction. Means later to be described, are provided for opening the valve when paint is to be discharged from a selected container 17 or when the container is to be filled. In the interior of the cylinder 24 is mounted the hollow piston 18 comprising a hollow cylindrical portion 37, the front head 38 and the rear head 39. The bolt 40 passes through the head 39 and through the interior of the cylinder 37 and at its front end 41 is suitably secured, as by screw threads or the like, through the front head 38. The nut 42, arranged at a threaded part of the bolt 40, serves to secure the heads and the cylinder together. Preferably, suitable gaskets as 43 and 44 are provided between the heads 38 and 39 respectively and the end of the cylindrical member 37 to prevent leakage of the paint contained in the container into the interior of the piston. The cylinder 37 is of substantially less diameter than the interior of the cylindrical container part 24 whereby said cylinder 37 does not contact with the wall of the paint container except that a series of projecting lugs 45 are provided on the head 38, which lugs engage the inner surface of the container cylinder 24 and serve to guide the piston in its reciprocatory movement. Arranged in the recess 47 of the enlarged part 20 of the container are suitable packing members 48 of the resilient ring type which are preferably urged to expand to form an air-proof and paint-proof seal between the cylinder 24 and the front end of the recess 47. The bolt 40 extends sufficiently beyond the nut 42 to provide a gripping head as 49 adapted to be engaged by the cooperating paint discharge means of the machine which operates to move the piston the required distance to discharge the requisite amount of paint from the container. A suitable notch as 50 is provided forwardly of the head for the reception of the gripping jaws 52, 53 (Figs. 1 and 3) when the container is to be filled. It will be understood that when the piston 18 is moved forwardly, the paint in front of the piston and between the piston and the cylindrical container part 24 up to the packing 48 is discharged through the openings 29 and 28 if the valve rod 26 has previously been lifted. Means later to be described are therefore provided for moving said piston forwardly when the selected container is in its uppermost position. It will also be under-

stood that that portion of the piston 18 in front of the packing 48 is completely surrounded with paint at all times and that there never is any air in front of the piston or around it so that the paint on the inner walls of the container and around the piston can never dry and thereby cause the piston to stick. Similarly, the opening 37 is also filled with paint so that the walls of said opening cannot become coated with dry paint with the difficulties resulting therefrom.

The means for operating the piston to fill any selected container with its proper standard-color paint, will now be described. Said means includes the jaws 52 and 53, previously mentioned, which jaws are normally pulled together by a suitable spring 54 (Fig. 1). The jaws are furthermore pivoted as at 55, 56 respectively to the slide member 57 and may be held in their piston-gripping positions by means of a cam-like spreader 58 pivoted to an extension of the slide 57 and operated by a suitable handle as 59. When the handle is in position to interpose the widest part of the cam member between the jaws 52, 53, said jaws have spread apart at their outer ends and forced together at their inner ends to enter the notches 50, 51 respectively and thereby to grip the piston forwardly of the gripping head 49. When the handle 59 is turned through a quarter turn, the narrow part of the spreader 58 is interposed between the jaws whereby the spring 54 pulls the outer ends of the jaws together and separates the inner ends thereof sufficiently to remove them from the notches and thereby to release the piston. For operating the slide block 57, a threaded opening 60 is made therein through which passes the lead screw 61 which is in threaded engagement with the threads of the opening 60. The inner end of the lead screw is unthreaded and is revolvably mounted in the fixed bearing block 62 while the outer or rear end thereof is supported in the fixed block 63 and carries the sprocket wheel 64. A suitable sprocket chain 65 connects the wheel 64 to a preferably larger sprocket wheel 66 mounted on the shaft 67 (Fig. 2). Said shaft 67 is supported in suitable bearings mounted on the table 12 or in an adjacent part of the frame and carries and is fixed to the hand wheel 68 provided with the handle 69. It will be understood that by manually rotating the hand wheel 68 in the proper direction, consequent rotation of the shaft 67 is transmitted through the sprocket wheels and chain to the lead screw 61 which is consequently rotated and which advances the slide 57 forwardly or rearwardly depending upon the direction of the rotation of the hand wheel. On such movement of the slide 57, the stop 74 engages the gripping head 49 of the piston, and moves the piston forwardly within the container, it being understood that the container is prevented from movement by the drum 11.

Prior, however, to the movement of the piston by the means just described, it is advisable that the valve rod 26 be lifted to open the valve for the discharge of material therefrom. This is done by the pressing of the rear end of the lever 30 by suitable means, as for example, by means of the crank 70 suitably pivoted to the table 12 and having a handle portion 71 and a lever operating portion 72. The spring 73 connected to the portion 72 and to a fixed part of the machine, serves to maintain the crank either in the position shown in Fig. 1 in which the valve lever 30 is released, or in the valve opening position shown by dash-dot lines shown in Fig. 1 since the spring

moves from one side of the pivot to the other during the movement of the crank from its valve opening position to the full line position of Fig. 1.

Suitable means are provided for indicating accurately the amount of paint discharged from the container as it is being discharged in terms of the amount of such paint in a unit quantity, for example, one quart of the mixed paint of the color desired. In other words, the indicating means indicates the amount of standard color paint in the formula for a unit quantity, say a quart of mixed color paint, so that the operator need not perform any computation to dispense the lesser quantity of standard color paint than that given in the formula. Said indicating means is operatively connected to the hand wheel 68 and to the slide 57 and consequently, depends for its indicating function on the rotation of said hand wheel in the paint discharging direction. Means are also provided for varying the indication of said indicating means dependent on the total quantity of mixed color paint desired, which total quantity is the sum of the dispensed quantities of selected standard color paints from the various containers. As shown, the indicating means comprises the dial 75 and the pointer 76 moving over the dial on the rotation of the hand wheel. In those cases where the manufacturer's formula for the mixed paint is given in relation to a quart of such paint and in fractions of a part or ounces of standard color paint, the dial 75 is graduated to indicate ounces and fractions thereof from zero to thirty-two. The presettable pointer, which I shall term the stop pointer, is also movable relatively to the dial and manually settable to any desired point thereof indicating the number of ounces of the selected standard color paint in the formula. The hand wheel 68 consequently is rotated in the proper direction to move the pointer 76 until it reaches the stop pointer 77 which has been previously set in its proper position, whereby the operator is apprised that the correct quantity of standard color paint has been discharged from the selected container and can accurately stop rotating the hand wheel. The dial 75 (Fig. 6) is fixed to the sleeve 78 which is supported in a suitable bearing in the member 79 forming part of the frame 10 or projecting therefrom. The stop pointer 77 is loosely mounted on the sleeve 78 and may be manually set into any desired position. Passing through the sleeve 78 is the pointer shaft 80 to the forward end of which is secured the pointer 76 and with the rear end of which is provided the pinion 81. For manipulating the stop pointer 77, a suitable sprocket wheel as 82 is secured to the rear face thereof, said wheel being operated by the sprocket chain 83 passing around the sprocket wheel 84 on the shaft 85, which shaft is mounted in the frame member 86. A suitable hand wheel 87 on the shaft 85 rotates said shaft to manually set the stop pointer 77 on the dial 75 to the quantity of standard paint given by the manufacturer's formula. Similarly, the sprocket wheel 88 is secured to the sleeve 78 and through the chain 89 and the sprocket wheel 90 may be rotated as by means of the hand wheel 91 to rotate the dial 75 when desired and thereby to carry the zero point thereof to the point indicated by the stop pointer 77.

Meshing with the pinion 81 is the vertical rack 92 carrying at its lower end a roller 93 resting on the pivoted bar 94. The inclination of said bar 94 controls the amount of vertical movement of the rack 92 in response to a predetermined rota-

tion of the hand wheel 68 since said bar is carried by and moves with the slide 57, and said inclination may be varied dependent on the total quantity of mixed paint desired since the bar 94 is pivoted as at 95 to a suitable bracket 96 projecting from the slide 57 and at its front end is secured adjustably to the upright scale 97 upstanding from the front portion of the slide 57. The winged bolt 98 passes through the slot 99 of the bar 94 and also through the slot 100 of the scale member 97, whereby, when the bolt is loosened, the front end of the control bar 94 may be raised or lowered and said bar may be set at the proper point to control the amount of movement of the pointer 76 relatively to the amount of movement of the hand wheel 68. A scale 101 indicating the total quantities of mixed paint desired is arranged on the scale member 97 whereby the front end of the bar 94 may be secured by the bolt 98 in accordance with the scale 101 to indicate the total desired quantity of mixed paint.

To insure engagement of the roller 93 with the upper surface of the control bar 94, a cross arm as 102 carries said roller and the rack 92 and is provided with sleeves 103, 104 sliding respectively on the upright rods 105, 106. A spring 107 on the rod 105 is interposed between the upper end of the sleeve 103 and a suitable collar 108 on said rod and urges the cross arm 102 and the roller 93 into firm engagement with the upper surface of the bar 94. A similar spring 109 on the rod 106 also aids in holding the roller 93 on the bar. To insure the engagement of the rack 92 with the pinion 81, a roller 110 on the arm 111 is urged by the spring 112 against the rack in a direction to maintain said rack teeth in engagement with the pinion teeth. Said arm 111 is pivoted at its lower end as at 113 to a suitable lug at 114 projecting from the frame member 79.

As shown in Fig. 4, a pointer member 115 is provided on the extension 116 of the slide member 57. Said pointer cooperates with a scale 117 on the table 12 to indicate the amount of paint in ounces remaining in the container 17 so that the operator may be informed as to whether there is or there is not sufficient paint in the container to perform the dispensing operation. The pointer 115 is set at its proper place on the scale 117 when the stop 74 contacts with the rear end of the piston.

It will be understood that during operation of the machine when the drum 11 is provided thereon, more paint may be dispensed from one container than from another and therefore, the pistons 18 will project varying distances rearwardly out of the container cylinders 24.

It will also be understood that the slide member 57 may be at or near the forward end of its movement if it has been last used to dispense paint from a nearly empty container. Under these circumstances, it is desirable to insure that the drum 11 cannot be rotated until the slide 57 has first been moved rearwardly out of the path of the piston. For this purpose I have provided a toothed wheel 120 on the shaft 13 (Fig. 1) and a stop member 121 provided with a projection 122 adapted to enter between the teeth of the wheel 120 and thereby to prevent rotation of said wheel and of the shaft and of the drum 11 carried thereby until the projection 122 is removed from between the teeth. The stop member 120 is slidably carried in the bracket 123 and is normally urged downwardly by the spring 124 carried by the rod and interposed between the members 122 and 123. Normally engaging the upper end of the

rod 121 is the lower end 125 of the stop lever 126 which is pivoted as at 127 to the bracket 128. The spring 129 connected at one end to the lever 126 and at its other end to the bracket 128 normally maintains said lever 126 in its operative position wherein the stop rod 121 is depressed and its lower portion 122 is inserted between the teeth of the wheel 120. When, however, the hand wheel 68 is rotated in the proper direction to carry the slide 57 rearwardly, a suitable stop 130 projecting from the lower end of said slide engages the upper end of the stop lever 126 and to swing said lever in a counterclockwise direction as viewed in Fig. 1 against the action of the spring 129 to remove the end 125 of the lever from the stop rod 121. The rod 121 is thereby freed for upward movement so that when the drum 11 is rotated, the projection 122 may be raised by the action of the teeth of the wheel 120 out of the space between said teeth to slip over the teeth against the action of the spring 124 and to permit the selection of the proper container 17 for positioning said container in its uppermost or dispensing position.

In operation, the receptacle 131 is arranged on the stand 132 projecting from the frame and the drum 11 is rotated to carry a selected container containing the standard color paint into its uppermost position wherein the valve opening 28 is directly above the receptacle, it being understood that the slide 57 has first been moved rearwardly to release the stop rod 121 for proper rotation of the drum. To best describe the operation of the machine, an example of one manner of the use thereof will be given. It being desired to obtain for example a total quantity of eight ounces of a certain grey, the formula for this color is consulted and it is found to be as follows:

	Ounces
White.....	25 1/4
Black.....	6 1/8
Dark green.....	1 1/8

To attain the required total quantity of eight ounces of the mixed color of the desired grey, the operator first loosens the bolt 98 and sets the bar 94 so that its front end is at the point on the scale 101 indicating eight ounces. The drum 11 is then rotated to bring that container carrying the standard color white to its uppermost position for dispensing paint therein into the receptacle 131. The hand wheel 68 is then rotated to carry the slide 57 forwardly until the stop 74 is in contact with the rear end of the piston of the selected container. The indicating and dispensing operation may now proceed as follows.

The proper hand wheel is rotated to carry the zero point of the dial 75 to the pointer 76 wherever said pointer happens to be. The pointer 77 is now rotated by its hand wheel to set it to the amount given by the formula for the standard color to be dispensed, namely, 25 1/4 for white as shown in Fig. 7. The crank 70 is now rotated to carry its lever operating portion 72 down against the lever 30 and thereby to open the valve opening 28. The operator then rotates the hand wheel 68 until the pointer 76 coincides with the stop pointer 77 at which time rotation of the hand wheel is stopped and the exact required amount of paint has been dispensed.

The above described operation is repeated in connection with black and with green by rotating the hand wheel 68 in the opposite direction to carry the slide 57 back into position to unlock the stop 122 to permit rotation of the drum, operating the crank 70 to release the lever 30 of the white container and to close its valve, then

rotating the drum to bring the next container, namely, black, uppermost. No new setting of the bar 94 is required, but the hand wheel 68 is rotated to bring the stop 74 against the rear end of the piston regardless of the accompanying movement of the pointer 76. The dial 75 is now brought with its zero point to the stop pointer 76 (which is the same position as the pointer 76) whereafter said stop pointer is moved to indicate $\frac{1}{16}$ on the dial. The valve of the black container now being opened, the hand wheel 68 is rotated in the proper direction to carry the pointer 76 from the zero position of the dial to the stop pointer 77. The same operation is repeated with the dark green container by setting the dial with its zero point at the stop pointer 77 and the last position of the pointer 76 and then setting the stop pointer to the new position $\frac{1}{16}$ on the dial and discharging the required amount of paint from the green container. The result of these operations will be a total quantity of eight ounces of grey paint of the exact desired color, the various ingredients in the total of eight ounces being in the ratio which $25\frac{1}{4}$, $6\frac{1}{2}$ and $\frac{1}{16}$ bear respectively to 32 ounces, the total unit quantity given by the formula.

Should any other total quantity of mixed paint be required, such total quantity is indicated and controlled by the bar 94, the left end of which is set to indicate the set total quantity on the scale 101.

It will be understood from the above description that the operator of the machine is definitely and accurately apprised of exactly how much movement of the hand wheel 68 is necessary to discharge the exact required amount of paint from the selected container. It will further be seen that the movement of the piston of the container by the operating means above described in detail, causes the discharge of exactly the right quantity of the selected paint since there is no air whatever within the container, the entire space in front of the forward piston head and around the piston being completely filled with paint making it impossible for air to enter within the container. It will also be seen that by floating the piston within the container cylinder, there is no opportunity for the paint to dry and become sticky and thereby to cause the piston to stick.

In that form of the invention shown in Fig. 3, the drum 11 is eliminated and in place thereof is provided the support 135 for an individual container. The means for preventing rotation of the drum is therefore also eliminated, and the slide member 57 need merely be set into position to engage the rear end of the piston when it is desired, to discharge paint from the container.

My new machine is also used preferably to fill the containers after all or part of the paint therein has been dispensed as indicated by the scale 117. For this purpose, I prefer to use the filling funnel 136 (Fig. 3) which is provided with an opening 137 adapted to be arranged in registration with the valve opening 28. The funnel is held in its proper filling position by means of the hollow spring-pressed member 138 set over the stand 132 and pressed by the spring 139 against the under face of the funnel to prevent any leakage between the funnel and the valve member 25. The lever 30 having been depressed to open the valve, paint is poured into the open end of the funnel and the hand wheel 68 rotated after the handle 59 has been operated to lock the jaws 52 and 53 in the notch 50, to carry the piston rearwardly and thereby to draw the paint from the funnel through the

valve opening into the interior of the container cylinder and in front of and around the piston. By keeping the funnel 136 filled with paint, it becomes impossible for any air to enter in front of the cylinder. If, for any reason, air should enter the valve, such air is largely confined to the openings 28 and 29, which are above the level of the piston. If air is present, this can easily be ascertained and the air discharged by a forward movement of the piston. If such movement discharges paint only, then no air is present. If paint is not then discharged, forward movement of the piston is continued until paint is discharged, thereby insuring the discharge of all the air.

It will be seen from the above that I have provided means whereby an exact predetermined amount of paint may be discharged from selected containers of such paint, each container being provided with part of a paint discharge means cooperating with other parts on the machine and that the operator is apprised by suitable indicating means, when to stop operation of the machine in order that the required amount of paint is discharged from the container.

It will further be seen that I have provided a comparatively simple mechanism, which while adjustable to various conditions, is simple and efficient to produce the results required.

While I have shown and described certain specific embodiments of my invention, I do not wish to be understood as limiting myself thereto, but intend to claim the invention as broadly as may be permitted by the state of the prior art and the scope of the appended claims.

I claim:

1. In a machine for proportioning standard-color paints to produce a predetermined total quantity of paint of a mixed color, said quantity being different from that given by a formula for the mixed color paint, a container for standard-color paint provided with a discharge opening adapted also for use as an inlet opening, a piston within the container, means for supporting the container in position for movement of the piston therein, means for moving the piston in one direction to discharge paint from the container and in the other direction when paint is supplied to the container opening to draw said paint into the container, means spaced from the container and out of contact at all times with said paint for measuring and indicating the discharge movement of the piston in said one direction including a movable pointer and a scale, means for operatively connecting the piston moving means with said measuring and indicating means, and means for adjusting the connecting means for varying the movement of said pointer relatively to the discharge movement of the piston in said one direction in accordance with the differences in the total quantities of mixed paint desired.

2. In a machine for proportioning standard-color paints to produce a predetermined total quantity of paint of a mixed color, said quantity being different from that given by a formula for the mixed color paint, means for discharging standard-color paint including a reciprocatory slide, an indicating pointer operatively connected to said slide, and means interposed between the pointer and the slide for varying the amount of movement of the pointer for a selected amount of movement of the slide.

3. In a machine for proportioning standard-color paints to produce a predetermined total

quantity of paint of a mixed color, said quantity being different from that given by a formula for the mixed color paint, means for discharging standard-color paint including a slide, an indicating pointer, and adjustable means for operatively connecting the pointer to the slide to vary the relative movement of said pointer and the slide, said adjustable means including an arm pivotally carried by the slide and movable therewith, means for adjustably fixing said arm in various angular positions relatively to the direction of movement of the slide, and a member movable on said arm and in the angular direction thereof.

4. In a machine for proportioning standard-color paints to produce a predetermined quantity of paint of a mixed color, said quantity being different from that given by a formula for said mixed color paint, means for discharging standard-color paint including a container for such paint, a floating piston in the container and means for moving the piston, means for indicating the position of said piston in the container at the required limit of its proper discharging movement including a first indicator movable into position for indicating the amount of standard-color paint in the formula and stationary in said position, a second indicator movable with said piston into coincidence with said first indicator, and means for varying the amount of movement of said second indicator relatively to the amount of discharge movement of the piston to discharge different quantities of paint in the correct properties given by said formula and in accordance with the desired total quantity of mixed color paint.

5. In a machine for proportioning standard-color paints to form a predetermined quantity of paint of a predetermined color other than standard, mechanism for delivering a quantity of paint of a standard color including a valved container, a piston within the container and means for moving said piston in a paint discharging direction from any intermediate position thereof in the container, adjustable indicating means adapted to be set in stationary position in advance of the operation of the piston moving means to indicate said predetermined quantity, and additional indicating means controlled in its movement by the setting of the adjustable indicating means for indicating the amount of standard-color paint delivered and to be delivered in terms of the product obtained by multiplying the actual amount delivered and to be delivered respectively by a fraction whose denominator is said predetermined quantity and whose numerator is the total quantity of mixed paint in a formula for said mixed paint.

6. In a machine for proportioning standard-color paints to produce a predetermined total quantity of paint of a mixed color, said quantity being different from that given by a formula for said mixed color paint, a combined reciprocatory pump and container for paint of a standard color, means detachably connectable to and detachable from the pump for operating the pump, said means being normally independent of the pump except when connected thereto, indicating means for indicating said predetermined quantity of mixed color paint and for also indicating the quantity of standard-color paint in said formula, and means for operatively connecting the pump-operating means and the indicating means to indicate the quantity of standard-color paint discharged by the pump during the operation of

the pump and thereby apprising the operator of the machine when the required amount of standard color paint is delivered, said amount being equal to the product of the indicated amount of said standard paint indicated by the indicating means and the fraction whose numerator is the total predetermined quantity of mixed color paint indicating by the indicating means and whose denominator is the total quantity of mixed color paint given by said formula.

7. In a machine for delivering from different containers of standard-color paints a total predetermined quantity of mixed color paint different in color from any of its standard-color ingredients and in accordance with a formula for a given quantity of said mixed color paint, a piston in each of said containers, a valve for each of the containers provided with an opening at a higher level than the uppermost point of the interior of the container, means connectable to and disconnectable from the piston to reciprocate the piston, indicating means for indicating said predetermined quantity and the quantity of standard color paint in said formula, and adjustable means for operatively connecting the piston-operating means and the indicating means to indicate the required limit of operation of said piston-operating means in the paint discharging direction to effect discharge through said valve of that amount of standard-color paint equal to the product of the quantity of standard-color paint in said formula and a fraction whose numerator is the total predetermined quantity of mixed color paint desired and whose denominator is the total amount of mixed paint in said formula.

8. In a machine for delivering from different containers of standard-color paints a total predetermined quantity of mixed color paint different in color from any of its standard color ingredients and in accordance with a formula for a total quantity of said mixed color paint, a piston for each of said containers, said piston being operable in a given direction only and during part of a given stroke to effect discharge of standard-color paint from the selected container within which it is mounted, indicating means operatively connected to the piston to indicate the limit of the required discharge movement of the piston in terms of the amount of standard color paint in said formula, and control means for the indicating means to vary the amount of relative movement of the piston and the indicating means in accordance with differences in the total predetermined quantity of mixed paint desired.

9. In a machine for delivering from different containers of standard-color paints a total predetermined quantity of mixed color paint different in color from any of its standard-color ingredients and in accordance with a formula for a quantity of said mixed color paint, a container for each standard-color paint, a piston in each container, a combined discharge and inlet valve for each container, said valve having a combined discharge and inlet opening arranged at a higher level than any part of the interior of the container, means for moving the piston in a paint discharging direction from any position thereof remote from that end thereof nearest the valve, said means including a manually rotatable handle, and mechanism for operatively connecting and disconnecting the handle to and from the piston, means operatively connected to and movable by the handle for indicating the amount of angular rotation of the handle in

terms of the amount of a standard-color ingredient in the formula, and means for varying the amount of the movement of said indicating means relatively to the corresponding movement of the handle in accordance with differences in said total predetermined quantity of mixed color paint desired.

10. In a machine for proportioning paint of a number of standard colors to produce a predetermined quantity of mixed paint in which the standard colors are proportioned according to the proportions thereof in a formula for a different quantity of mixed paint, a container for standard-color paint, a piston in said container, a member projecting from the piston outside of the container, means connectable to and disconnectable from the projecting member for operating the piston including a revoluble member, means adjustable to indicate the predetermined quantity of mixed paint desired, and means operated by the piston-operating means for indicating the amount of standard-color paint discharged, the indication of said last-mentioned means being controlled by the adjustable indicating means.

11. In a machine for proportioning paint of a number of standard colors to produce a predetermined quantity of mixed paint in which the standard colors are proportioned according to the proportions thereof in a formula for a different quantity of mixed paint, means for retaining a quantity of standard-color paint against the access of air thereto and against drying including a piston, means for operating said piston, means for indicating when the operation of the piston is to be discontinued and means for controlling the operation of the indicating means including a pivoted pointer arm carried by and movable with the piston-operating means, and indicating said predetermined quantity of mixed paint, a stationary scale for said arm and mechanism controlled by said arm and moved thereby for actuating said indicating means.

12. In a machine for proportioning paint of a number of standard colors to produce a predetermined quantity of mixed paint in which the standard colors are proportioned according to the proportions thereof in a formula for a different quantity of mixed paint, a container for standard-color paint, a piston for the container, means for operating the piston to discharge paint from the container including a slide, a revoluble lead screw in threaded engagement with the slide and a hand wheel operatively connected to the lead screw, means for indicating the required limit of the discharge movement of the piston, a second means operated by the piston-operating means for indicating the amount of paint discharged from the container, and means carried by the slide for indicating the total predetermined quantity of mixed paint desired and for also controlling the operation of the second indicating means.

13. In a machine for proportioning standard-color paints to produce a predetermined quantity of mixed paint, a slide for operating the piston of a container of standard-color paint progressively in a given direction to discharge said standard-color paint from the container, means for indicating the amount of paint discharged at each operation of said piston, and means carried by the slide for controlling the operation of said indicating means and for also indicating said predetermined quantity.

14. In a machine for proportioning standard-

color paints to produce a predetermined quantity of mixed paint, means for operating the piston of a container of standard-color paint including a slide connectable to the piston and movable in one direction to cause discharge of paint and in the other direction to draw paint into the container, a pivoted indicator arm for said predetermined quantity, said arm being adjustable to various angles in a vertical plane and being carried by the slide, and indicating means for indicating the amount of paint discharged including a roller in contact with the arm and movable substantially vertically only on horizontal movement of the slide.

15. In a machine of the character described, a removable container for paint of a standard color, a piston within and projecting from said container, means for preventing the entrance of air in front of the piston, means for supporting said piston in spaced relation to the inner walls of the container, means for reciprocating said piston, indicating means for indicating the amount of standard paint to be discharged from the container in accordance with a formula for a unit quantity of mixed paint of a desired color of which said standard color forms an ingredient, means operatively connecting the piston-reciprocating means with the indicating means, and adjusting means interposed between the reciprocating means and the indicating means for varying the amount of movement of the indicating means during a predetermined movement of the piston-reciprocating means.

16. In a machine for proportioning standard-color paints to produce a predetermined total quantity of paint of a mixed color, said quantity being different from that given by a formula for the mixed color paint, means for discharging standard-color paint including a slide, movable indicating means operatively connected to said slide, and means interposed between the indicating means and the slide for varying the amount of movement of the indicating means for a selected amount of movement of the slide.

17. In a machine for proportioning standard-color paints to produce a predetermined total quantity of paint of a mixed color, said quantity being different from that given by a formula for the mixed color paint, means for discharging standard-color paint including a slide, movable indicating means, and adjustable connecting means between the indicating means and the slide to vary relative movement of the slide and the indicating means.

18. In a machine for proportioning standard-color paints to produce a predetermined total quantity of paint of a mixed color, said quantity being different from that given by a formula for said mixed color paint, a plurality of combined pumps and containers for paints of different standard colors, a support for said combined pumps and containers revoluble about a horizontal axis to agitate the paints in said combined pumps and containers on the rotation of the support, means detachably connectable to and detachable from a selected pump for operating the pump, said means being normally independent of the pump except when connected thereto, indicating means for indicating said predetermined quantity of mixed color paint and for also indicating the quantity of standard-color paint in said formula, and means for operatively connecting the pump-operating means and the indicating means to indicate the quantity of standard-color paint discharged by the

pump during the operation of the pump and thereby apprising the operator of the machine when the required amount of standard color paint is delivered.

19. In a machine for proportioning standard-color paints to produce a predetermined total quantity of mixed color paints, a plurality of containers each for a different paint of a standard color and each provided with a discharge opening, and a revoluble support for the containers including a substantially horizontal shaft, the contents of said containers being agitated on the rotation of the shaft, and means for indicating the amount of standard-color paint discharged from a selected container.

20. In a machine for proportioning standard-color paints to produce mixed color paints, a plurality of containers for standard-color paint, a piston for each container, means for progressively moving the piston of a selected container in a given direction for each of the mixed color paints produced by the machine, means for indicating the total quantity of the mixed color paint required, means for indicating the quantity of standard-color paint discharged from the container at each operation of the piston, and means for controlling the indication of said last-mentioned indicating means relatively to the movement of the piston.

21. In a machine for proportioning standard-color paints to produce a predetermined quantity of paint of a mixed color, said quantity being different from that given by a formula for said mixed color paint, means for discharging standard-color paint including a container for such paint, a piston in the container and means for moving the piston progressively in a given direction for each discharge operation of said piston, means for indicating the position of said piston in the container at the required limit of its proper discharging movement including an indicator to indicate the amount of standard-color paint in the formula, and means for varying the amount of movement of said indicator relatively to the amount of discharge movement of the piston in accordance with variations in said predetermined quantity.

22. In a machine for proportioning standard-color paints to produce paint of a mixed color, means for discharging standard-color paint including a container for such paint, a piston in the container, means for moving the piston progressively in a given direction at each operation of the piston thereby to exclude air from the container and to maintain the viscosity of the paint therein constant, and means for indicating the discharge movement of said piston in the container.

23. In a machine for proportioning standard-color paints to form paint of a predetermined color other than standard, mechanism for delivering a quantity of paint of a standard color including a container, a piston within the container and means for moving said piston progressively in a given paint-discharging direction from any intermediate position thereof in the container thereby to exclude air from the contained and to maintain the viscosity of the paint therein constant.

24. In a machine for delivering from different containers of standard-color paints a total pre-

determined quantity of mixed color paint different in color from any of its standard-color ingredients and in accordance with a formula for a given quantity of said mixed color paint, means for rotating said containers about a horizontal axis to agitate the paint therein, a piston in each of the containers, means connectable to and disconnectable from the piston to move the piston, means for indicating said predetermined quantity and the quantity of standard-color paint in said formula, and adjustable means for operatively connecting the piston-operating means and the indicating means to indicate the required limit of operation of said piston-operating means in the paint-discharging direction.

25. In a machine for proportioning standard-color paints to produce a mixed color paint, a plurality of containers for standard-color paints, means for revolubly supporting said containers to agitate the paints therein on the rotation of said means, a piston for each container, means for progressively moving the piston of a selected container in a given direction for each of the mixed color paints produced by the machine to exclude air from the container and to maintain the viscosity of the paint therein, and means for indicating the total quantity of mixed color paint required and for also indicating the quantity of standard-color paint discharged from the selected container at each operation of the piston thereof.

26. In a machine of the character described, a plurality of containers each for a standard-color paint, means for supporting said containers for rotation about a given axis to agitate the paint in said containers, means for progressively discharging paint from the containers to exclude air therefrom and to maintain constant the viscosity of the paint therein, means for indicating the quantity of paint discharged from each selected container and means for indicating the total quantity of paint discharged from a given series of selected containers.

27. In a machine of the character described, a removable container for paint of a standard color, a piston within said container, means for moving said piston progressively in a given direction to discharge paint from the container, and thereby to prevent the entrance of air into the container and to maintain constant the viscosity of the paint therein, a first indicating means for indicating the amount of standard paint to be discharged from the container and a second indicating means for indicating the total amount of paint to be discharged from a given series of selected containers, said last-mentioned indicating means controlling said first-mentioned indicating means.

28. In a machine of the character described, a plurality of containers each for paint of a different standard color, means for discharging paint from a given series of selected containers in succession, a first means for indicating the amount of paint discharged from each selected container, a second means for indicating the total amount of paint discharged from said series of containers, and means interposed between said first and said second indicating means for controlling the first indicating means.