

May 26, 1964

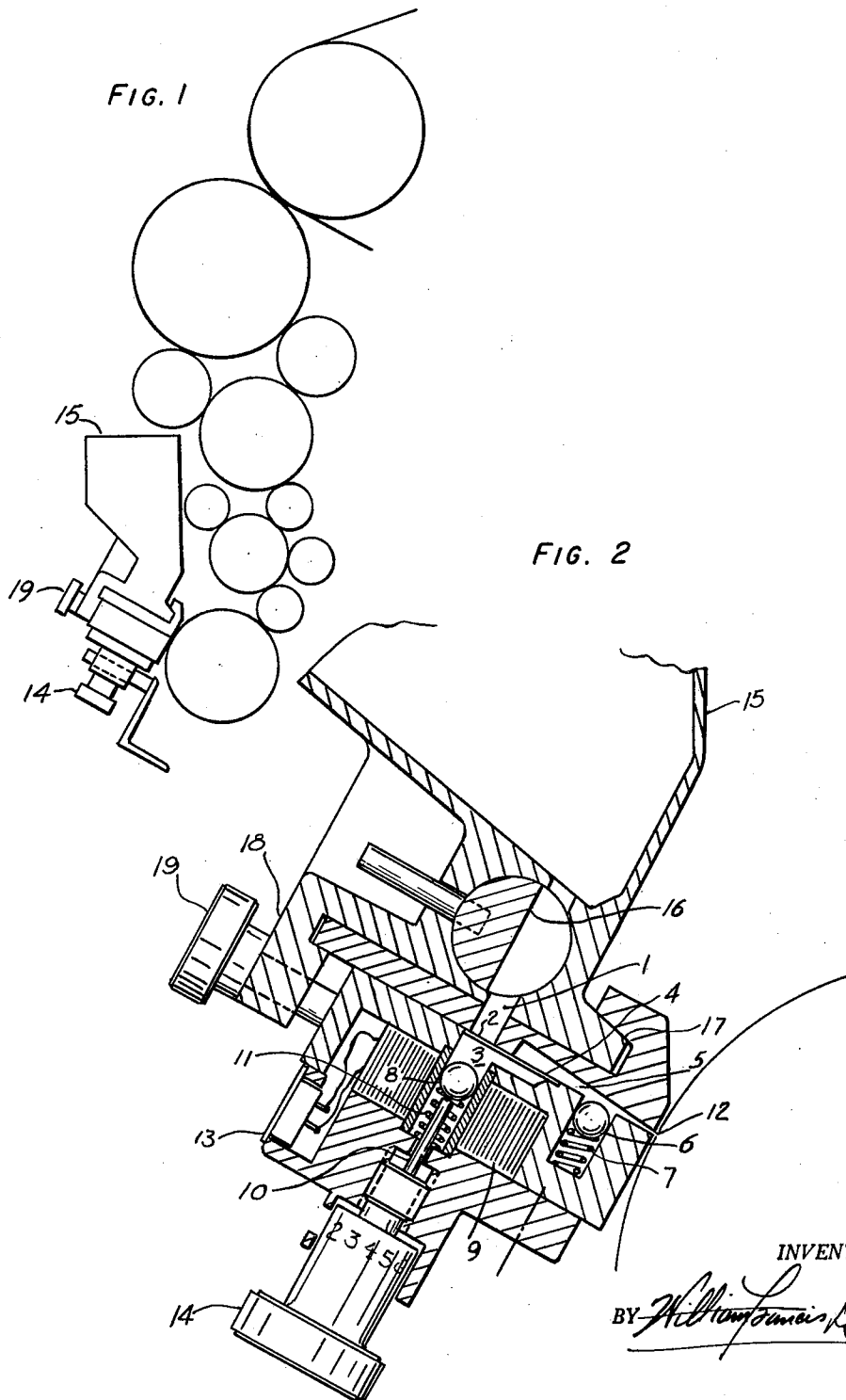
W. F. DAVIS

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MACHINERY FOR APPORTIONING AND DISPENSING FLUIDS

Filed July 15, 1959

4 Sheets-Sheet 1



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MACHINERY FOR APPORTIONING AND DISPENSING FLUIDS

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FIG. 3

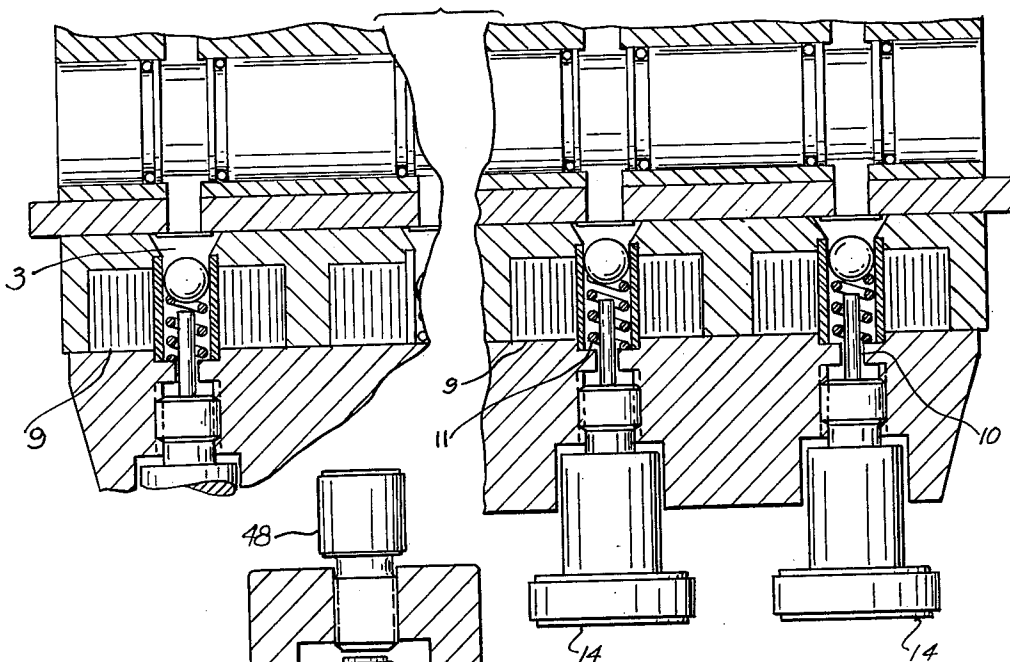
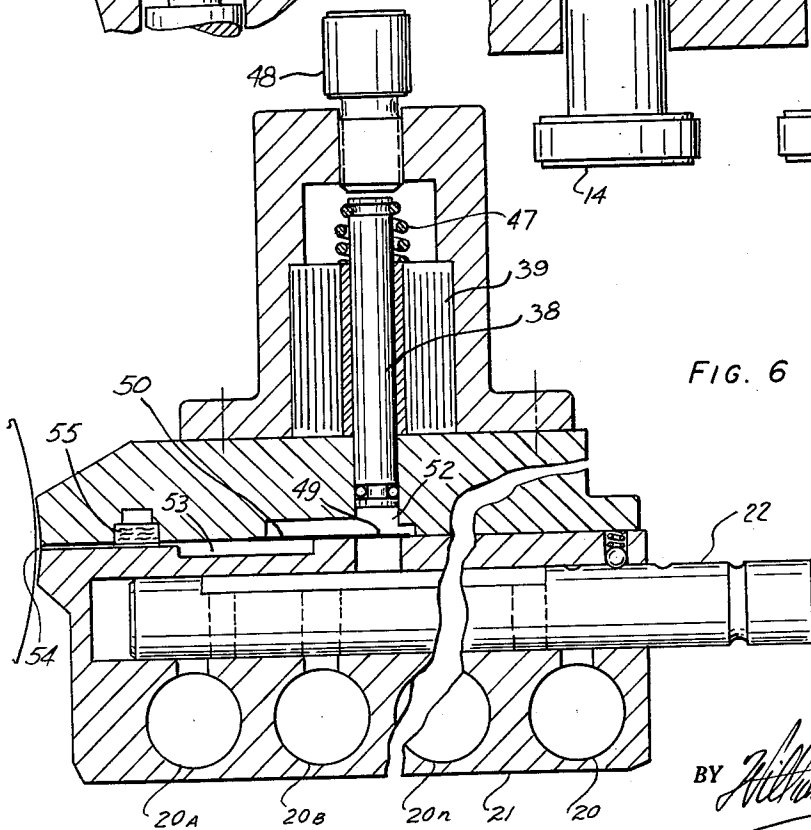


FIG. 6



INVENTOR.

BY *William F. Davis*

May 26, 1964

W. F. DAVIS

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FIG. 4

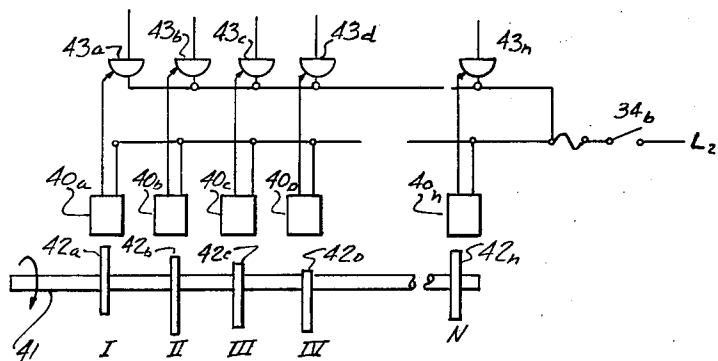
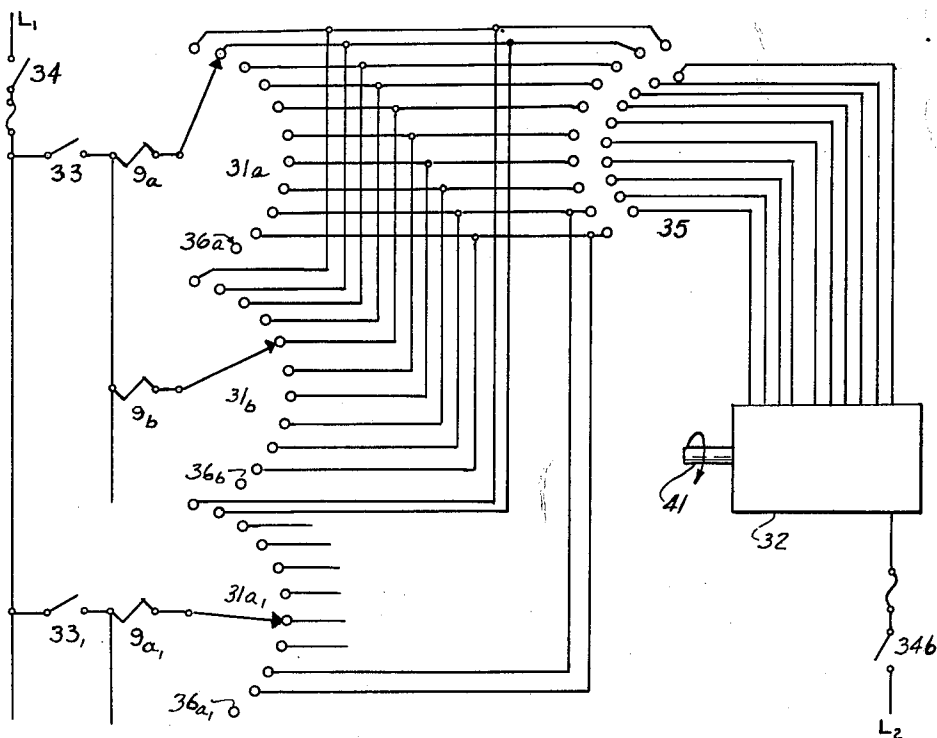


FIG. 5

INVENTOR.  
BY *W. F. Davis*

May 26, 1964

W. F. DAVIS

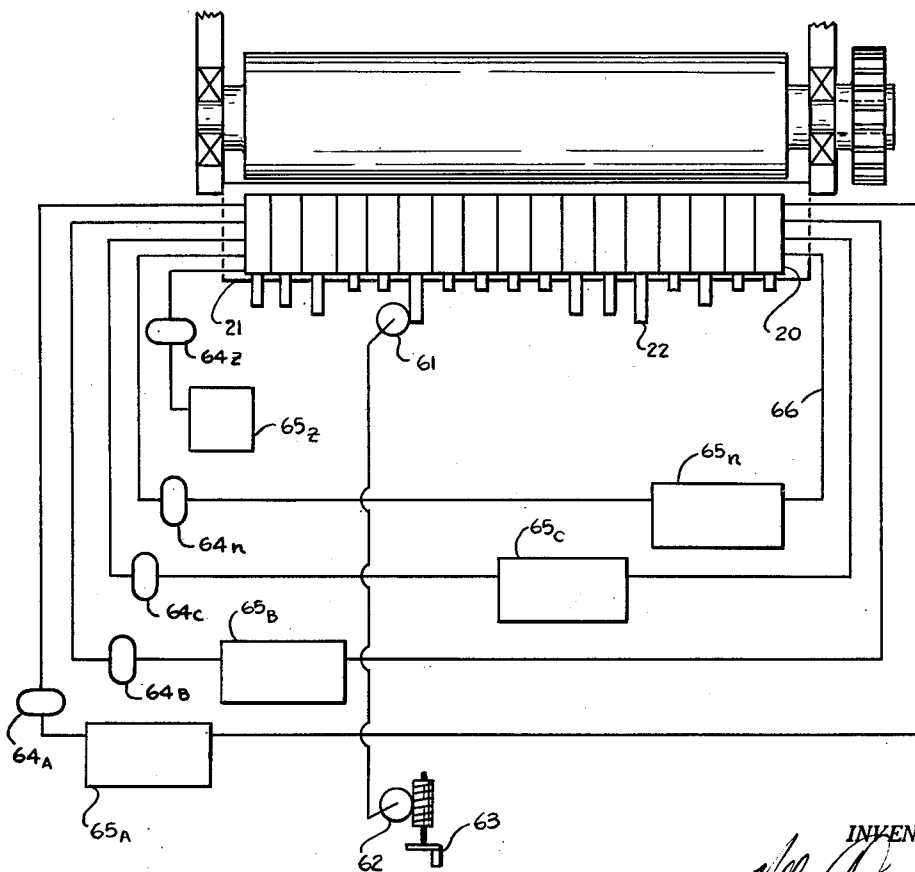
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FIG. 7



INVENTOR.  
BY *W. F. Davis*

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## 3,134,326 MACHINERY FOR APPORTIONING AND DISPENSING FLUIDS

William F. Davis, Windsor, N.J.  
(P.O. Box 179, Hightstown, N.J.)  
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15 Claims. (Cl. 101-366)

The present invention relates to new and useful improvements in the method of and the machinery for the apportioning and dispensing of fluids. More particularly, the invention is concerned with fluid dispensing as applied to inking mechanism of printing presses.

Objects and advantages of the invention will be set forth in part hereinafter and in part will be obvious herefrom, or may be learned by practice with the invention, the same being realized and attained by the instrumentalities and combinations pointed out in the appended claims.

The invention consists in novel parts, constructions, arrangements, combinations and improvements herein described and disclosed.

The accompanying drawings, referred to herein and constituting a part hereof, illustrate the embodiments of the invention, and together with the description, serve to explain the principles of the invention.

The present invention has for its object the provision of a novel and improved method of apportioning and dispensing fluid, such as ink, and the machinery to accomplish this improved method of apportioning and dispensing of fluid.

The prime object of the present invention is to provide a means to apportion and dispense fluids, such as ink, in a continuous flow from a plurality of orifices in individually controllable quantities.

A second object of the present invention is to provide a means of remote control of the plurality of fluid volumes being apportioned and dispensed both individually and in combination with each other collectively.

A further object of the invention is to provide a simple mechanical means to change the ink supply.

Other objects and advantages of the invention will become apparent to those skilled in the art.

Referring to the drawings:

FIGURE 1 is a schematic of the present invention as applied to the ink motion of a newspaper printing press.

FIGURE 2 is a schematic cross section of the present invention taken through the fluid apportioning, dispensing and supply apparatus.

FIGURE 3 is a schematic presentation of the present invention taken along the length of the fluid feeding apparatus.

FIGURE 4 is a diagrammatic presentation of the control means which both activates and regulates fluid feed mechanism.

FIGURE 5 is a schematic of the pulse generating mechanism employed in the embodiment of the present invention to energize the plurality of fluid dispensing and apportioning elements.

FIGURE 6 is a schematic presentation of the present invention when equipped with a centralized fluid supply, and in alternate construction.

FIGURE 7 is a schematic illustration depicting remotely controlled fluid supply change apparatus.

While the invention is susceptible of various modifications and alternate constructions and uses, I have depicted in the drawings and disclosed in detail herein preferred embodiments of the invention. It is understood, however, that the broader aspects of the invention are not limited to the specific mechanisms shown and described but departures may be made therefrom within the spirit and scope of the accompanying claims without sacrificing

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its concomitant benefits and advantages. Therefore, I do not intend to limit the invention by the aforementioned drawings and description but intend to cover all modifications and alternate constructions falling within the spirit and scope of the invention as expressed in the appended claims.

In the following, the invention will be disclosed as applied to a printing press and therefore the terminology will conform to that employed in ink feeding mechanisms as employed in printing presses. In accordance with the illustrative embodiment shown in FIGURES 1, 2 and 3 the fluid dispensing means consists of a series of laterally disposed ink pumping elements mounted on a structural member which extends the width of the press.

Referring to FIGURE 2, the pumping mechanism consists of a tubular channel, commencing at the ink supply and extending through the pump to the ink egress orifice. Said channel is divided into three chambers; the first chamber 1, provides an ingress for the ink from the ink supply or sump to the first pressure responsive valve 2; the second chamber 3, in which pressure variations required to actuate the chamber valves 2 and 4, are developed and volumetric variations are produced to measure the fluid volume dispensed per unit pumping cycle.

The third chamber 5, provides the egress for the controlled fluid feed to the press ink motion. Chamber 5, is equipped with a resilient section in its wall to absorb pressure peaks and to filter the pulse feed of the ink into a smooth continuous discharge flow. For illustrative purposes the resilient portion of the third chamber 5, is shown as a ball 6, with a spring 7, to oppose the fluid pressure.

### Operation of the Fluid Handling Mechanism

Referring to FIGURE 2, an electric pulse of current is passed through coil 9, establishing a magnetic field which causes ball 8, to be displaced toward the excursion limit rod 10, and thereby stores strain energy in spring 11, as well as producing a reduction of pressure in chamber 3, below the pressure of chamber 1. The pressure sensitive valve 2, opens and admits ink fluid in proportion to the ball 8, excursion in chamber 3. Upon decay of the electromagnetic field the stored energy of spring 11, displaces the ball 8, toward valve 2. Valve 2 and valve 4 are constructed to have unidirectional action, hence valve 2 is prevented from opening except when flowing fluid into chamber 3 as illustrated in FIGURE 2; and valve 4 is prevented from opening except when flowing fluid out of chamber 3. As the ball 8, moves toward valve 2 the fluid in chamber 3 is forced to flow through valve 4 into chamber 5. In chamber 5 the fluid pressure forces ball 6 to recede, compressing spring 7, which is weaker than spring 11, thereby absorbing the pressure peak and storing the excess fluid volume incapable of immediate discharge through orifice 12 resulting in a prolonged discharge of the fluid. Since the pumping cycle is rapid, the ink stored by ball 6 is replenished before the previously charged quantity in chamber 5 is exhausted thereby the flow from the orifice is a smooth continuous flow of ink.

The electric pulses which energize coil 9 are generated by apparatus depicted in FIGURE 5 and communicated to coils 9 by cables coupled together at connector 13 shown in FIGURE 2. The volume being discharged may be regulated by either of two means. The first of which is illustrated in FIGURE 2 and provides direct at the pump control. The control consists of adjusting screw 14 which is made to include the excursion limit rod 10 and thereby regulates the travel or stroke of ball 8. The adjusting screw 14 is provided with graduations to facilitate resetting and relative adjustment. The second means of volumetric control is disclosed under the heading of controls.

Ink dispensing devices employed heretofore have immersed the working mechanism in the ink supply which is being dispensed and have the ink sumps integrally constructed with the dispensing means. Naturally, this necessitates removal of the fluid being fed and a thorough cleaning of the entire mechanism whenever an ink change is made. This procedure has limited the application of color printing and the flexibility of color printing due to the time and expense involved to clean the ink feed machinery.

Referring to FIGURE 2 in the present invention the ink supply sump 18 comprises a portable container 15 with a shut off valve 16 in the passage which provides egress of the ink to the fluid feeding elements. Said container 15 is provided with suitable fastening and locking lugs 17, 18 and 19 to secure the container 15 to the fluid feeding mechanisms structure. The small volume of fluid in the pumping channel may be rapidly removed by pumping a cleaner fluid or solvent from another supply sump for a short period of time prior to installation of the new fluid or ink supply.

When the pump is so employed it applies solvent or cleaning fluid to the ink motion of the press while purging the pumping channel; said application of cleaning fluid to the ink motion assisting in washing up operations of the ink motion which are required prior to inking up with the new ink color. Fluid supply sumps are removed by moving shut off valve 16 laterally closing the fluid egresses at the bottom of the sump, removing the clamping screws 19 and lifting the supply sump from the pumping mechanisms structure. Another sump may then be fastened to the pumping mechanism with screws 19 and the fluid passage from the sump to the pumping elements opened by shifting the valve 16 laterally. Thus color ink and different fluid may be dispensed to preferred locations of the ink motions and color printing may be rapidly and economically achieved at any desired part of the printed page or copy.

The ink supply sump has been devised to accept the installations of partitions dividing the sump into a plurality of smaller sumps supplying one or more pumping elements at adjacent pump egress orifices.

In some press room installations it is found desirable to employ centralized ink color supply tanks. The present invention as illustrated in FIGURE 6 with the addition of ink color selector valves 20 provides plants with centralized ink sumps a means to change ink color without the cleaning of the fluid dispensing mechanism or the alternate employment of auxiliary ink feeding devices. Referring to FIG. 7, multiple centralized ink supply sumps, 65A, 65B, 65C . . . 65n, are provided with a pumping means 64A, 64B, 64C . . . 64n to cause the fluid to flow to the distribution rail 21, as depicted in FIGURE 7, said rail having a plurality of closed channels extending across the press width and at right angles to the plurality of fluid pumping and apportioning elements wherein each channel provides a possible communication from the centralized supply to the fluid dispensing elements for that particular fluid. The aforementioned valve 20 is so constructed as to maintain all ink supplies closed, by the blocking action of valve spool 22, except the one fluid to be dispensed. Selection of the fluid to be dispensed is accomplished by axially positioning the valve spool 22, which is shown as manually positioned in FIGURE 6 but may be remotely positioned by electrical solenoid or pneumatic means. As the spool 22 is moved from position to position it interconnects a different supply to the pumping elements and block all the remaining fluid supplies.

In FIGURE 7, the valve spool 22 is illustrated as remotely positioned by a position servo arrangement in which 61 is the output servo motor displacing the spool 22 in accordance with a command signal generated by 62 the servo generator. The command signal is selectably set by rotation of the input handwheel 63.

When the present invention is applied to the ink motion of a printing press it is necessary to feed ink in proportion to the press's operating speed, as well as the requirements established by the image being reproduced. Since the pumping elements, as depicted, are actuated by the passage of a pulse of electrical energy; the pulse generator, which may drive a number of fluid dispensing and apportioning units, consists of a series of energy interrupting devices, which will be referred to as switches, with the switch actuating means driven at a rate proportional to the press's operating speed. This may be accomplished by connecting the switch cam shaft 41 to the press drive shaft. The cam shaft 41 carries a number of cams 42 which have differing numbers of lobes such that the first cam 42a actuates switch 40a once per revolution; cam 42b actuating switch 40b twice per revolution and so on, the last switch 40n which produces the maximum number of pulses required, per press revolution. In applications requiring one or only a few fluid dispensing units the energy pulses developed by interrupting the power source supply may directly actuate the dispensing units; however, in larger installations the switches are connected to power amplifiers, say of thyatron type, and said amplifying devices 43 feed power to the control circuit and fluid dispensing means. The entire power generator is depicted in FIGURE 4 by character 32.

#### Controls and Their Operation

The control of the fluid dispensing and apportioning elements may be located at any convenient and desirable location, such as the press's folder or the quality control office. Referring to FIGURE 4 each electromagnetic field producing coil 9 is connected in series with disconnect switches 34 and 33 and with multiple circuit selector devices 31, which are illustrated as multi position contact switches but may embody inductive and other circuit connecting or control means, and also with the multi circuit selector transfer device 35 and thence to the pulse generator 32. As depicted, each coil 9 is associated with an individual circuit selector 31 to permit the selection of the desired number of pulses per press revolution. The individual coils 9 are grouped into sets and connected to continuity switch 33; such that each switch 33 controls a set of coils 9. The function of switch 33 is to provide group shut off of a plurality of fluid dispensing means. In current practice on printing presses the shut off of a page; which is coincident with shutting off a set of fluid dispensing elements in the present invention, usually necessitates the employment of special ink cut off blades, relieved periphery ductors and/or readjustment of blade (and therefore ink adjustment) control means. The switch 34 provides for a printing unit shut down as occurs on multi unit publication presses as the page capacity of the publication varies from issue to issue.

On printing images, particularly in multicolor work it is not necessary to dispense ink the full width of the web since a color may occur only in some local columns of the web width, therefore, the selector switch 31 is provided with a non connecting position 36 to provide individual column shut off when required. As shown in FIGURE 4 the web width of a printing unit's ink control is divided into page wide sets of fluid dispensing elements each set capable of collective shut off and each individual capable of individual adjustment for ink apportioning and shut off.

It often occurs that the volume of ink apportioned to a web will need to be varied due to the slight difference of the paper stock from roll to roll. It also occurs that the setting of an image, or page width is properly adjusted for the column apportionment relative to each other but that the group or set of fluid dispensing elements need to be collectively adjusted to apportion a larger, or smaller volume of fluid to produce the proper density of reproduction of the image. Switch 35 has been provided for this purpose. As shown in FIGURE 4 the switch 35 is located

in the circuit to reassociate the circuits from the pulse generator 32 to the individual selector switches 31, such that the circuit from the generator with one pulse may be reassociated to a selector switch position of say two pulses, thereby reducing the number of pulses communicated to the associated coil. Since all the pulse circuits are connected thru the switch 35 to the associated selector switch positions and since all the poles of the switch 35 are transferred together by the switch 35 the pulses distributed to the various switches are increased, or decreased by the same amount. That is, with the pulses connected in consecutive order; if the coil 9a was set at position 2 (pulses) with switch 31a and coil 9b was set at position 5 (pulses) by selector switch 31b and so on; then adjusting the transfer switch 35 from say position 1 (pulse) to say 2 (pulse) the pulses distributed to coil 9a would be 3 and to coil 9b would be 6.

The FIGURE 4 shows one transfer switch 35 controlling the collective operation of sets of coils, as for web width control; it is clear that a switch 35 may be provided for each set of coils and thereby provide page collective control.

Since each pulse causes a measured volume of ink to be dispensed; the tuning in on multiple pulse circuits necessarily apportions a fluid discharge, per press revolution, proportionate to the multiple of the basic unit volume discharged by a single pulse.

Therefore, if the maximum volume to be discharged is divided by, say 10, and this volume is made equal to the basic single pulse fluid dispensement (this may be set by adjusting the piston's 8 excursion with limit rod 10 for the basic volume), then the apportionment of fluid is controlled by the remote selectors for the desired pulse count and apportionment.

Alternate construction of the pumping element is shown in FIGURE 6 with adaptation for centralized ink and fluid supply. The pumping means is as described above but the components have been altered as follows. The piston 38 is driven by the spring 47 toward the abutment of the adjusting screw 48 reducing the pressure in the second chamber and drawing fluid past valve 49 into said chamber. With the occurrence of an energy pulse the coil 39 drives the piston 38 against the spring 47 forcing the fluid out of chamber 52 thru valve 50 and into chamber 53 whence said fluid is dispensed thru the orifice 54. Chamber 53 is provided with a resilient portion 55 in its wall to absorb the volumetric pulsations and to filter such into a smooth flow thru the orifice 54. In this configuration of the present invention the fluid selected by the positioning of valve spool 22 enters the pump's first chamber from the bottom of the pump and is forced out the orifice by the electromagnetic field's energy.

While the discussion has been presented as applied to the ink motion of a printing press this is not intended to limit the invention in any manner since the advantages and benefits of the invention may be equally realized when dispensing other fluids and semi-fluids, i.e. fluid containing fine suspensions, as in the case of adhesives, coatings, and other chemical solutions dispensed in precisely regulated quantities, etc.

It is clear the present invention affords simple and complete remote control of fluid dispensement and apportioning with dispensing elements, or units, which may be remotely located from each other and their control means.

In the following "fluid processing machine" refers to whatever mechanism the dispensing and apportioning means is applied to and is intended to include the fluid taking element whether it is a part of said machine or the product passing thru, and being processed by said machine.

The term piston is intended to include all shapes of pistons (such as the ball 8 or the piston 38) as well as flexible chamber devices such as tubes, etc., deformed to produce the volumetric changes depicted in chamber 3 to flow the fluid.

What I claim is:

1. A fluid dispensing and apportioning element which comprises, in combination, a tubular channel, two pressure sensitive unidirectional valves, a piston made of magnetically responsive material in the form of a sphere, a resilient member, an electromagnetic field producing means, a resilient portion in said tubular channel's wall, a threaded adjustable limit stop, and a multi-piece frame housing supporting and containing said channel, valves, piston resilient member, electromagnetic field producing means, and supporting said threaded adjustable limit stop; said valves disposed and oriented in said channel to permit fluid flow from the fluid supply end of said channel to the fluid egress orifice end of said channel and dividing said channel into three chambers, the first chamber providing fluid ingress to the second center chamber, the second center chamber containing said piston in its wall, said piston driven alternately by said resilient member and said electromagnetic field producing means which is disposed and oriented to displace said piston against said resilient member, the third chamber providing fluid egress from the second center chamber and containing the said resilient portion in its wall to absorb volumetric pulsations from the second chamber; said piston's reciprocations producing pressure variations causing fluid to pass through said pump section in the direction controlled by said valves; said threaded adjustable stop mounted in aforesaid frame housing and disposed to intercept said piston during its excursion, said adjustable limit stop varying the excursion of said piston in proportion to its axial displacement relative to said piston; said dispensing and apportioning means dispensing fluid in direct proportion to the number of magnetic field energizations and adjustment of said threaded adjustable limit stop.

2. In a fluid processing machine, a fluid apportioning and dispensing element according to claim 1 and further comprising additional fluid apportioning and dispensing elements each according to claim 3; a pulse generator driven at a rate proportional to the operating speed of said fluid processing machine; an electric circuit connecting said plurality of fluid dispensing elements in parallel with each other and in series with an electric power supply and said pulse generator; said pulse generator interrupting the flow of current from said power supply to said plurality of dispensing elements into pulses of energy at a rate proportional to said machine's operating speed; thereby causing said plurality of fluid dispensing elements to apportion and dispense fluid in accordance with the machine's operating speed and the individual independent adjustment of each fluid dispensing element.

3. In a fluid processing machine, or the like, a fluid dispensing and apportioning means comprising, in combination, a pump driven by pulses of energy and dispensing a constant discrete volume of fluid for each pulse of energy activating said pump; a pulse generator having elements to produce independent individual sets of pulses of energy of different frequency, each frequency being directly proportional to the operating speed of the fluid processing machine; a manually operatable selector means connecting said pump with said pulse generator, said selector means comprising elements to selectively couple said pump with any one of the said independent individual sets of pulses of energy available from said pulse generator; said pump, which may be at a location remote from said selector means, adapted to be at a location remote from said pulse generator; said pump thereby dispensing fluid in constant volume discrete quantities directly proportional to the fluid processing machine's operating speed and the controllable settings of said selector means.

4. In a fluid processing machine, or the like, a fluid dispensing and apportioning means comprising, in combination, a fluid dispensing element comprising a tubular channel, two pressure sensitive unidirectional valves, a piston made of magnetically responsive material, a resili-

ent member, an electromagnetic field producing means, a resilient portion in said tubular channel's wall and a multi-piece frame housing, said valves disposed and oriented in said tubular channel to permit fluid flow from the fluid supply end of said channel to the fluid egress end of said channel and dividing said channel into three chambers, the first chamber providing fluid ingress to the second center chamber, the second center chamber containing the said piston in its wall, said piston driven alternately by the said resilient member and the electromagnetic field producing means which is disposed and oriented to displace said piston against said resilient member, the third chamber providing fluid egress from the second center chamber and containing the said resilient portion in its wall to absorb fluid volumetric pulsations from the second chamber, said piston's excursions producing pressure variation in the second chamber causing the fluid to flow through the tubular channel in the direction controlled by the pressure sensitive valves; a selector switch; and a pulse generator adapted to be driven at a rate proportional to the operating speed of associated fluid processing machinery and consisting of a plurality of switches each associated with an independent circuit connected to said selector switch, which may be located at a position remote from said pulse generator and fluid dispensing element, each of said plurality of switches operated to complete and interrupt said circuits a recurring cyclic number of times per machine revolution, or cycle, and each switch operated an arithmetically greater number of cycles per machine revolution than its preceding switch thereby providing the availability of an arithmetically increasing number of pulses of electrical energy per machine cycle, or revolution, for selection by the selector switch for transmission to said electromagnetic field producing means; said pulse generator, selector switch and electromagnetic field producing means all connected in series with an electric power supply, thereby dispensing and apportioning fluid at a rate directly proportional to the machine's operating speed and in selectively apportioned discrete integral multiples of the unit pulse dispensed volume of fluid.

5. In a fluid processing machine or the like, a fluid dispensing and apportioning means, comprising, in combination, a plurality of pumps, a plurality of selector means and a pulse generator, each of which may be at locations remote from each other, each as set forth in claim 3; each of said pumps connected individually and independently to one of said selector means; each selector means individually connected to each pulse set frequency source of said pulse generator; whereby each pump may be individually and independently remotely controlled to dispense and apportion fluid in constant volume discrete quantities directly proportional to the said fluid processing machine's operating speed and in multiples thereof in accordance with the controllable settings of said individual selector means.

6. A fluid dispensing and apportioning means according to claim 4 and further comprising additional selector switches associated and individually communicating with one of said fluid dispensing elements, all of said fluid dispensing elements being driven by pulses from said pulse generator and receiving the pulses thru said associated and individually communicating selector switches; thereby permitting each of said fluid dispensing elements to be individually and independently controlled to apportion fluid at the unit discrete volume and multiples thereof; said selector switches, which may be at locations remote from said dispensing elements, each provided with a settable position which interrupts the transfer of pulses from said pulse generator, which may be at a location remote from said dispensing elements, to its associated fluid dispensing element; thereby providing individual shut off of any fluid supply as well as control of the apportioning of the individual fluid volumes.

7. In a fluid processing machine, a fluid dispensing and apportioning means in accordance with claim 5 and which also encompasses, in combination therewith, a pulse transfer means inserted in series with said pulse generator and said plurality of selector means; said transfer means reassociating the sets of pulses from said pulse generator to the said plurality of individual selector means so that said sets of pulses are progressively increased, or decreased, in controllable and selectable magnitude by the reassociation with pulses of progressively differing sets from the pulse generator; thereby effecting collective change of the individually controllable discrete volumes of fluid dispensed by said pumps; said transfer means which may be at a location distant from said plurality of pumps, thereby effecting remote collective control of a plurality of individually and independently remotely controlled pumps.

8. A fluid dispensing and apportioning means which consists of the elements and structure of claim 6 and comprises, in combination therewith, a transfer switch inserted in series with the said electric pulse generator and the plurality of selector switches; said transfer switch progressively reassociating the circuits from said pulse generator to said selector switches; said transfer switch when selectively so actuated, effecting collective variation of the individually controllable discrete volumes of fluid dispensed by said dispensing elements; said collective adjustment by said transfer switch, which may be at a location remote from said plurality of dispensing elements, apportioning the pluralities of fluid dispensed in progressively increased, or decreased, discrete volumes of fluid.

9. In a fluid processing machine, or the like, a fluid dispensing and apportioning combination as set forth in claim 7 and, in combination therewith, a plurality of fluid supplies each containing different fluids; a closed loop piping system from each said fluid supply to each of said plurality of pumps, and thence returning to said fluid supply; said different fluids flowing in said piping system; said pumps ingress connected to each of said different fluid supply with remotely energized valves; said valves constructed to have a multiplicity of positions, one for each said fluid supply, and to communicate fluid from the selected fluid supply to the associated pump while restricting the other said fluids to their closed loop circuits; said valves also having a position restricting all said fluids to their closed loop circuits; thereby effecting remote control of the fluids being dispensed by the plurality of collectively and individually remotely controlled pumps.

10. A fluid dispensing and apportioning means according to claim 6, which may be portable, and further comprising at least one fluid tank which may be portable; each of said portable tanks provided with a plurality of channels extending from the bottom inside of said tanks to the outside of said tanks, each of said channels positioned to individually coincide with the ingress of said fluid dispensing elements; said channels in each said tank intersected by a valve common to all said channels in said tank and equipped with seals retaining the fluid to the vicinity of the associated channels; the valve having two positions, each predetermined, the first position blocking the flow of fluid through all said channels in said tank and the second position removing said flow restriction from said channels; thereby permitting rapid separation or attachment of said tanks from or to said fluid dispensing elements.

11. A fluid dispensing and apportioning means according to claim 6 and further comprising a fluid sump or tank of uniform cross section, said sump supplying fluids to a group of said fluid dispensing elements; a plurality of resilient forms with a contour conforming to the internal cross section of said sump; said forms placeable between any of the plurality of ports which provide fluid egress from said sump to said group of fluid dispensing elements; said plurality of fluid dispensing elements dis-

tributed along the length of said sump; thereby permitting the dispensing and apportioning of different fluids in sections or columns.

12. In a printing press, or similar machine, an ink dispensing and apportioning means encompassing the elements and structure of claim 7 wherein said pumps are arranged in groups, and sub groups; and wherein said selector controls, including both individual and collective controls, may be at a location remote from said groups, and sub groups of pumps; said selector controls are arranged in groups and sub groups corresponding to the functional location of said plurality of pumps; each of said plurality of pumps apportioning ink to the ink motions of the printing press at locations across the width of the press and corresponding to the columnar sections of the form; the said distribution of pumps across the press width collectively controlled by said selector transfer means, in page wide sub groups of pumps; i.e. a set of pumps distributed across the press width and apportioning ink for a page width of printing is a sub group; the said sub groups forming a group supplying ink for the printing of a web or sheet; thereby affording individual remote column control, collective remote page control, and precise repetitively settable apportioning of the fluid dispensing means.

13. In a printing press, a fluid dispensing and apportioning means and controls therefore comprising the elements and structure of claim 9 and in combination therewith, a plurality of continuity means arranged in the following manner; said individual pumps being disposed laterally across the width of the press units in proximity of an ink taking drum; thereby transferring ink to the printing unit's ink motion; said pumps spaced to ink preferred sections or column widths of the form; said pumps remotely controlled individually, and collectively in page wide groups; said continuity means located in series with the common from said pumps' electromagnetic field producing means and the power supply; said continuity means controlling a page width, or group, of pumps; one of said continuity means provided for each page width; a plurality of selective actuating means actuating the said fluid selection valves in their various positions; one said valve for each page width; said pumping, apportioning and control means duplicated for each printing unit, and for each side printing of the web, in said printing press; said means providing remote individual control of ink dispensed in any column, remote collective control of ink dispensed in page wide widths, remote collective shut off of page wide widths of ink dispensing means, remote ink color, or fluid, selection all repetitively controllable to dis-

pense and apportion ink to the ink motion in precisely, and numerically repetitive volumes of ink.

14. In combination, a fluid apportioning and dispensing means which may be portable, said means comprising a plurality of individual fluid apportioning and dispensing elements each having individual fluid ingresses; a driving means operating said dispensing means at a rate proportional to the operating speed of associated fluid taking means; at least one portable fluid tank; each of said fluid tanks provided with a plurality of individual closed channels extending from the bottom inside of said tanks to the outside of said tanks; each of said channels positioned to individually coincide with said ingress of each of said plurality of fluid dispensing elements; said channels in each said tank intersected by a valve common to all said channels in said tank and equipped with seals retaining the fluid to the vicinity of the associated channels; said valve having two positions, each predetermined, the first position blocking the fluid flow thru all said channels in said tank and the second position removing said flow restriction from said channels; thereby permitting rapid separation of each of said tanks from said plurality of fluid dispensing elements and facilitating rapid attachment of said tanks to said fluid dispensing means.

15. In a printing press, a fluid apportioning and dispensing means comprising, in combination, a pulse generator producing pulses of electrical energy at a rate proportional to the operating speed of said printing press; at least one portable pump for dispensing fluid from an independently portable fluid supply sump thru an orifice directly to a fluid taking roll, each said pump which may be at locations remote from said pulse generator driven by pulses of electrical energy from said pulse generator and dispensing discrete quantities of fluid for each said pulse of electrical energy received by each said pump, each said pump provided with individual volume control means to apportion the volume of fluid discharged for each said pulse, from zero shut-off to the maximum capacity of said pump.

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