Fig. 4

Fig. 5

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APPLICATOR DEVICE FOR EJECTING DISCRETE DROPLETS


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This invention relates generally to an applicator device for applying a viscous product to an article and to the method of such application. More particularly the invention relates to a device and method for metering discrete droplets of a viscous product, such as an adhesive, onto each of a series of articles, such as filled and sealed food cartons, moving continuously therethrough in an uninterrupted fashion. The metering mechanism of the device is operative in timed relationship with movement of the cartons relative thereto so that product may be applied to the cartons in a neat and efficient manner.

While adhesive applicator devices employable for applying adhesive to a series of moving cartons have been known in the art heretofore, generally such prior art constructions are of the direct contact type. That is, rollers or brushes heretofore generally have been employed which engage directly a given portion of a carton and apply adhesive directly thereto. Also, spray devices have been generally known heretofore for applying a mist of product to an article. Such prior art constructions frequently use unnecessary and wasteful amounts of adhesive and often result in messy application procedures.

In the present invention, the cartons or other articles to which product is being applied at all times remain free of contact with the applicator device in that the product is ejected from the device onto the cartons or articles as the same move relative thereto. Discrete droplets of product are ejected from the device and a highly efficient procedure results which uses a minimum amount of adhesive and which results in a very neat operation.

This invention is intended primarily for the application of product to filled and sealed cartons, it should be understood that the same has application in many other varied situations. Similarly, although the invention primarily is intended to meter droplets of adhesive of the so-called hot-melt type, cold adhesives and other viscous products which are flowable at normal temperatures also could be metered thereby.

Objects of this invention include the provision of a device and method for applying discrete droplets of product to articles moving relative to such device; the provision of novel valve structure for effecting metering of such product in a neat controlled manner; the provision of control means for regulating operation of the valve structure in timed relationship with movement of the articles past the device; the provision of connecting mechanism extending between the control means of the device and the valve structure for transmitting motion to valve structure metering mechanism in response to actuation of the control means; the provision of means for maintaining product of the hot-melt type flowable until the same is metered by the valve structure; and the provision of means for making the valve structure of the device adjustable for application onto articles of varying sizes.

These and other objects of this invention will become apparent upon reading the following specification in which reference is directed to the accompanying drawings:

FIG. 1 is a front elevation of the applicator device illustrating the same inoperative position relative to a series of cartons movable therethrough on suitable conveyor means;

FIG. 2 is a side elevation of the device shown in FIG. 1;

FIG. 3 is a generally schematic isometric view of one embodiment of the connecting mechanism extending between the metering mechanism valve structure and the control means thereof;

FIG. 4 is a vertical section through the applicator device taken in the plane of line 4—4 of FIG. 1;

FIG. 5 is a vertical section through the applicator device taken in the plane of line 5—5 of FIG. 2;

FIG. 6 is a vertical section through one of the valves of the applicator device valve structure illustrating internal details thereof;

FIG. 7 is a horizontal section through a valve taken in the plane of line 7—7 of FIG. 6;

FIG. 8 is a horizontal section through a valve taken in the plane of line 8—8 of FIG. 6;

FIG. 9 is a plan view of a valve taken in the plane of line 9—9 of FIG. 6;

FIG. 10 is a more or less schematic isometric view of the internal product metering mechanism of a valve illustrating the manner in which the same operates to meter product in a controlled manner.

FIGS. 11 and 11a are isometric views of one embodiment of a paperboard or like food carton well suited for use with this invention;

FIG. 12 is a generally schematic isometric view of another embodiment of the mechanism connecting the valve control means to the internal metering mechanism of the valve structure;

FIG. 13 is an isometric schematic view of one solenoid control arrangement employable with the valve control means.

While this invention is usable for applying product of various and varied natures to articles of various types, the applicator device and method disclosed herein are particularly well suited for metering and applying discrete droplets of hot-melt adhesive to a series of food cartons moving in continuous and uninterrupted fashion past a given station. Such cartons may be in contact with or spaced from each other. The purpose of such adhesive application is so that flaps or other portions of such cartons may be securely held in a given position after folding thereof.

The subject applicator device is well suited for use in combination with machines of the type which set up, fill, close and seal cartons in a continuous and uninterrupted fashion at high rates of speed. Such a carton machine is illustrated in the application by Albert R. Lubersky, John D. Winters and Edward L. Wong, Serial No. 835,605 filed August 24, 1959. However, the applicator device hereof also is usable with other carton machines and for applying adhesive to cartons of a type other than that shown herein and in the above noted application.

Summarizing the adhesive application procedure and method, a series of containers are moved preferably in continuous fashion, although the subject device also is usable with a step-by-step carton movement, past a given station. At such station a valve housing is provided which has at least one adhesive discharge port there through. Normally, the discharge port is closed. A quantity of product is introduced under pressure of predetermined amount into the housing and periodically the discharge port is opened and closed in timed relationship to movement of the series of cartons therethrough. Because the adhesive is under pressure and because the discharge port is only open for a brief controlled time period, a discrete droplet of adhesive is applied to a moving carton each time the discharge port is opened.

Referring first to FIGS. 11 and 11a, cartons 1 of a type well suited for use in conjunction with this invention are illustrated which comprise a closed body 2 hav-
ing extending straight and unfolded from opposite ends 3 and 4 thereof a pair of upstanding sealed extremities 6 and 7 which have been closed and sealed in any suitable manner, such as in the manner disclosed in the aforementioned application. Because such projecting extremities make the package somewhat difficult to stack, handle and/or overwrap, it is desirable for such extremities to be folded into engagement with the respective carton ends. Adhesive is applied to the opposite ends of the carton for maintaining the extremities folded. As noted previously, the subject applicator device dispenses discrete droplets of adhesive, indicated at 8 in FIG. 11. In this manner, a minimum amount of adhesive is required and a very neat adhesive application procedure results. With the carton embodiment illustrated, two spots of adhesive or other product are affixed to each end of the carton but more or less than two spots may be employed as desired or required, depending upon the size and character of the article to which the product is being applied.

The filled, sealed and folded carton illustrated in FIG. 11a, because of its compact configuration and fluid tight heat-sealed construction, is well suited for packaging frozen foods and other various fluid or semi-fluid products.

Referring now to FIGS. 1 and 2, a series of cartons 1 in the filled and sealed condition illustrated in FIG. 11. They are carried on suitable conveyor means, such as a conveyor belt 9 movable in a generally horizontal plane which has spaced pockets thereon defined by carton engaging fingers 11 and 12 which cooperate with a guide rod 13 in maintaining the series of cartons in position on the conveyor. Such conveyor is movable in a continuous and uninterrupted fashion and desirably at a high rate of speed so that as many as several hundred cartons per minute may be carried past the applicator device. However, because operation of the applicator device is timed to the speed of the conveyor, the cartons may be moved past the device at any speed chosen without affecting operation of the device. The conveyor forms part of the carton machine and is driven in any suitable manner, such as that disclosed in the aforementioned application.

Although not shown, desirably a "no carton-no adhesive" control is employed with the subject device so that if one of the conveyor pockets is empty, no adhesive will be metered by the valve structure of the applicator device. Such "no carton-no adhesive" controls are well known and do not form any part of this invention and accordingly are not specifically illustrated.

As shown in FIGS. 1, 2, 4 and 5 the applicator device comprises a valve 14 mounted adjacent to and above conveyor 9 by means of spaced brackets 17 and 18 secured by bolts 19 or equivalent fastening means to the framework of the carton machine with which the device is employed. A horizontal reinforcing brace 20 extends between brackets 17 and 18. Container 16 is secured by bolts 21 to the brackets and is supported therebetween.

Depending from supply container 16 is a column 22 which in part defines conduit means through which adhesive passes from container 16 to the metering valve structure. The valve structure desirably comprises a pair of spaced valves so that adhesive may be applied simultaneously to each of opposite ends of a carton. A fixed lower valve 23 is operatively connected with the lower end of column 22 and an upper valve 24 is mounted on a head 25 which is adjustable by means of bolt connectors 26 which extend through vertical slots in the column. As a result, the spacing between the valves may be modified as desired to accommodate cartons of various sizes and styles.

Column 22 has a vertical passage 27 therein which communicates with horizontal passages 28 and 29 extending into and connecting the upper and lower valves with such vertical passage as shown in FIG. 4. These vertical and horizontal passages cooperate to define conduit means through which adhesive to be metered flows to the valves.

Intermediate its ends vertical passage 27 has an elongated cut-out portion 31 extending through the wall of column 22 and communicating with upper valve passage 29. That is, adhesive flowing from the container 16 through vertical passage 27 enters cut-out portion 31 before passing into horizontal passage 28. In this manner, valve mounting head 25 may be moved vertically on the column within predetermined limits for adjustment thereon and passage 29 will remain in operative alignment with the vertical passage so that adhesive may be introduced into upper valve 24 regardless of its position on the column.

Plugs 32 are provided adjacent the bottom of the column to permit access to the respective passages thereof for cleaning and draining of the column and the respective passages.

Means are provided in the supply container and in the column for heating and maintaining flowable the supply of adhesive in the container and in the conduit passages which connect the column with the valves. As shown in FIGS. 4 and 5, electrical heater elements 33 extend through the bottom of container 16 and are connectable to any suitable power source in any well known manner. Space is provided at 34 in the container bottom for reception of a thermostat control (not shown) for regulating the heat level of the elements 33. Channels or like openings 35 also are provided in the column 22 for receiving heater elements (not shown) and a thermostat (not shown) as illustrated in FIG. 5. Similar channels for the reception of heating elements and thermostat controls are provided parallel to the horizontal passages 28 and 29 which extend from the column into the respective valves. As a result of this heating arrangement, hot-melt adhesive is maintained flowable at a predetermined temperature from the time it leaves the supply container until it enters the respective valves and is ejected therefrom in the manner to be described.

Means is provided at supply container 16 for applying pressure to adhesive passing therefrom so that adhesive is introduced to the valves under pressure whereby adhesive may be ejected or forced from the valves when the same are periodically opened in timed relationship to movement of cartons therepast. In the embodiment illustrated a gear pump 37 of any suitable construction is located in the container which is driven by a vertical drive shaft 38 operatively connected by coupler 39 between a gear box 41 and the pump. The pump assembly above the container on a suitable upright bracket 44 is actuated by a motor 42 or other suitable power supply source operatively connected to the mechanism in gear box 40. Upon operation of the motor, adhesive is pumped under pressure through the passage 27 in column 22 into the respective valves. As shown in FIG. 4, an adhesive intake port 43 is provided in the pump housing through which adhesive may be drawn into the gear pump and, as shown in FIG. 5, adhesive may pass from the pump housing through a fitting 44 into a pump mounting block 45 and therefrom into a vertical passage 46 extending through the container bottom which is aligned with the vertical passage 27 in the column.

An overload control device 47 also is mounted on the mounting block 45 and is operatively connected with the gear pump by means of a passage 48 extending through the mounting block. This device is of well known construction and insures the maintenance of a constant predetermined pressure within the conduit and pump system of the applicator device. Desirably, a spring loaded or like by-pass control is incorporated with device 47 so that if the valve becomes clogged or the like, adhesive may be discharged through a by-pass outlet 49 provided for that purpose back into the container in this manner, damage to the system may be precluded.

A thermostatic control 51 is positioned adjacent the
bottom of the adhesive supply container and is operatively connected by suitable switch means (not shown) through electrical wires 52 at its upper end to a control arrangement for regulating operation of motor 42. In this manner, operation of motor 42 is correlated to the temperature of the adhesive in the container. That is, the motor is precluded from operating unless the adhesive in the container is at a predetermined temperature. If the hot-melt adhesive is not sufficiently hot to flow properly or is too hot so that damage might result to the cartons to which it is applied, the thermostatic control 51 will prevent operation of the motor 42 so that gear pump 37 will not operate and adhesive will not be forced into the valves through the passages provided therefor.

With this arrangement a constant and steady source of adhesive may be supplied to the proper temperature to each of the upper and lower valves 33 and 24. As the supply of adhesive in the container diminishes, additional adhesive may be introduced into the container through the top thereof. Referring now to FIGS. 6 through 10, a valve found suitable for use in the valve assembly of the adhesive application device is illustrated. In the drawings, bottom valve 23 is shown but it should be understood that the upper valve 24 is of the same construction and is merely mounted in an inverted position.

Valve 23 comprises a housing 56 through which the aforementioned horizontal adhesive passage 28 extends. Housing 56 has a hollow interior 57 and the upper wall 58 thereof is defined by the undersurface of a removable cap 59 separately connected with the housing by means of a series of screw fasteners 61 as shown in FIGS. 6 and 9. An adhesive discharge port of a predetermined size extends through cap 59. It is through such port 62 that adhesive flows into the discharge passage into the hollow column 72 where it has been found desirable to oscillate or reciprocate shaft 74 and disc 63 therewith so that the discharge passage periodically aligned with discharge port 62 as it passes back and forth beneath the valve housing. It has been found desirable to oscillate or reciprocate shaft 74 and desirably a leakage preventing rubber or like O-ring 64 is interposed between the discharge passage and disc 63 aligned with the discharge port 62 in cap 59 as shown in FIGS. 6 and 9. Because of the metering of adhesive is thus controlled directly at the discharge port, the possibility of the valves clogging when the device is not in use is greatly minimized if not entirely precluded.

Normally, disc member 63 is positioned so that its discharge passage is not aligned with the discharge port 62 through the valve housing so that the discharge port normally is closed. By moving the disc in a predetermined controlled manner, alignment of the discharge port and discharge passage can be readily effected to permit adhesive metering. Movement of the disc relative to the discharge port is effected by movement of shaft 74. While shaft 74 and disc 63 could be rotated in a unidirectional circular path, to preclude unnecessary wear on the parts of the valve mechanism and to permit metering in a more rapid and more easily controlled manner, it has been found desirable to oscillate or reciprocate shaft 74 and disc 63 therewith so that the discharge passage through the disc member is periodically aligned with the discharge port 62 as it passes back and forth beneath the discharge port. As a result, each time the disc member moves relative to the discharge port and the discharge passage is brought into alignment therewith a discrete droplet of adhesive is ejected from the valve in an upward or downward direction, depending upon the manner in which the valve is oriented. In this respect, reference is directed to FIG. 2 which illustrates the spaced relationship between the upper and lower valves and the opposite ends of the cartons carried thereat. Because there is no direct contact between the carton ends and the respective valves, adhesive may be applied neatly, rapidly and effectively to a long succession of continuously moving cartons.

Control means desirably is operatively connected with each of the upper and lower valves of the applicator device for regulating operation thereof and for controlling adhesive metering therefrom in timed relationship with movement of cartons therepast. One embodiment of such control means is illustrated in FIGS. 1 through 6 and includes a pulley and cable arrangement generally designated 80 for transmitting motion from the control means to the valves. As shown in FIG. 6, a pulley 81, secured by a set screw 82 or other suitable means is mounted on the end of shaft 74 operatively connected to the control disc of the lower valve 23. A similar pulley 83 is mounted on the valve stem or shaft 84 extending upright from the lower valve 24. As illustrated schematically in FIG. 3, a cable 86 passes around the pulleys 81 and 83 and extends therefrom in a continuous fashion over a pair of direction changing bottom idler pulleys 87 and 88 and a pair of upper idler pulleys 89.
and 91. Desirably a threaded connector 92 is interposed between opposite ends of the cable to permit adjustment of tension thereon and to compensate for movement of the upper valve toward or away from the lower valve in the manner described previously.

Opposite ends 93 and 94 of the cable are connected in any well known manner to the respective ends 96 and 97 of a double ended piston rod engaged with and extending from opposite sides of a piston 98 slidably mounted in an air cylinder 99 as shown in FIG. 4. It should be understood that upon movement of piston 98 in either direction within the air cylinder the valve stem 97 and 91 are secured to the respective valves 74 and 84 of the respective valves will be rotated simultaneously by cable 86 to effect rotation of the respective discs in the valves. In this manner, periodic alignment of the valve discharge passages and valve housing discharge ports may be effected.

To produce movement of piston 98 the same is connected in any well known manner to a source of fluid under pressure. Air may be introduced under pressure into the cylinder 99 through spaced air inlet and outlet conduits 101 and 102 on opposite sides of the piston 98. In this manner, when air is introduced on one side of the piston under pressure through conduit 101, the piston is moved as shown in FIG. 4. The air on the opposite side of the piston is simultaneously exhausted from the cylinder through conduit 102. Conversely, upon air being introduced into the cylinder through conduit 102, the piston moves upwardly in FIG. 4 and is exhausted through conduit 101. Various air cylinder arrangements of this type are readily available and any suitable construction may be employed.

Upon movement of the double acting piston in a predetermined direction, the disc members in the respective valve housings will be moved in unison. However, because a single cable is employed, the disc members will rotate in opposite directions upon each stroke of the piston. However, the adhesive discharge passage and discharge port of each valve will be aligned simultaneously so that simultaneous ejection of adhesive therefrom is effected.

By controlling the stroke of the piston in the cylinder 99 and the timing of movement thereof, adhesive may be ejected from the respective valves in any predetermined controlled manner found desirable. Desirably, electrical means of the solenoid valve type are operatively connected to the carton machine with which the present apparatus is used. Referring to FIG. 2, such solenoid air distribution valves 103 and 104 which in turn regulate alternate air flow into and out of air cylinder 99 in a well known manner so that piston 98 therein reciprocates in a controlled manner to effect adhesive metering.

Because the adhesive discharge passage and discharge port of each valve are only periodically and briefly aligned, the adhesive is actually squirited or ejected during the brief interval of alignment in discrete droplets. By properly timing movement of the disc member relative to the discharge port in the respective valve casing and by moving the discharge passage back and forth relative to the discharge port, a pair of droplets may be applied to each carton carried therewith as shown in FIG. 11. Obviously, however, by modifying the timing of the reciprocation of the piston, less than or more than two droplets of adhesive may be applied to each carton.

If desired, a modified type of control means and connecting mechanism may be employed for regulating operation of the upper and lower valves. Such modified construction is shown in FIG. 12 and comprises interengaged clevis and yoke arrangements. With this construction, a pair of air cylinders 106 and 107 are required with one cylinder being operatively connected to each piston rod 108 and 109 respectively with each of the upper and lower valves 23 and 24.

A piston is slidably mounted in each of the air cylinders as shown at 111 in FIG. 12, and desirably a piston rod extension 112 extends in the direction opposite from piston rod 109 so that the volume of air introducible into the cylinder on opposite sides of the cylinder therein may be balanced for proper operation. Solenoid controlled air valves 113, 114, 116 and 117 are employed with the respective air cylinders for controlling introduction of air into and exhaust air from the respective cylinders in response to operation of the solenoid switches.

The clevis and yoke arrangement operatively interconnected with each valve is the same and only that construction shown at the bottom of FIG. 12 will be specifically described. Desirably, a clevis 118 is secured to the end of piston rod 109 with extending upright therethrough around which is mounted a cam roller 120. This roller is positioned in the slot 121 of a yoke member 122 and transmits motion from the piston rod 120 to the yoke. At its end opposite from the slot 121 the yoke is non-rotatably secured to the bottom of the shaft 74 extending downward through the column 72 of the lower valve 23.

Upon movement of piston rod 109 in a given direction, shaft 74 is rotated because of its connection with yoke 122. Because piston rod 109 oscillates, yoke 122 similarly oscillates and adhesive metering in the manner previously described is effected. In this embodiment of the control means and connecting mechanism it is that a pair of air cylinders and two pairs of air valves are employed as opposed to the single air cylinder and one pair of air valves employed with the pulley and cable arrangement described previously.

For controlling operation of the respective air valves whether the double valve arrangement of FIG. 12 or the single valve arrangement of FIGS. 2 to 5 is employed, desirably commercially available solenoid switches and air valves are utilized. The solenoids may be actuated in various manners, such as by well known circular switches or by a cam and cam follower arrangement of the type shown in FIG. 13. A pair of micro switches 125 and 126 are adjustably mounted by threaded bolts 127 extending through adjusting slots 128 of a mounting plate member 129. Respective cam followers 131 and 132 are operatively connected with the switches and are engaged respectively with cam wheels 133 and 134 which are keyed or otherwise secured to a continuously rotating shaft 135. Shaft 135 may be any driven shaft of the carton machine with which the adhesive applicator device is employed so long as the same is driven in timed relationship with movement of the carton conveyor. Camming projections are provided on the periphery of the cam wheels for periodically actuating the respective cam followers for alternately energizing and de-energizing the micro switches which in turn control the solenoid air valves of the respective air cylinders to cause controlled reciprocation of the pistons therein in the manner described to effect oscillation of the metering mechanism in the respective adhesive metering valves.

Because the switches are adjustably mounted on plate 129 the timing and sequence of opening and closing the discharge ports of the respective metering valves may be regulated and modified in any desirable manner. In this way, discrete droplets of adhesive may be metered from the respective adhesive valves in a predetermined controlled manner and such droplets may be applied to the cartons or other articles moved therethrough irrespective of the speed of movement, size or the like of the cartons.

The exemplary solenoid control arrangement illustrated in FIG. 15 may be employed with either the single air cylinder pulley and cable arrangement of FIGS. 2-5 or the double air cylinder clevis and yoke arrangement of FIG. 12. In the single air cylinder arrangement, each of the solenoid switches controls one of the air valves shown in FIG. 2 to effect piston reciprocation. In the
double air cylinder arrangement, each of the solenoid switches controls a pair of air valves connected together in parallel. That is, referring to FIG. 12, one solenoid switch will regulate simultaneously air valves 113 and 116 while the other solenoid switch will regulate simultaneously air valves 111 and 117. In this way, the timing of and simultaneous ejection of adhesive from each metering valve may be regulated.

Depending upon the particular type and nature of the hot-melt type adhesive chosen, the temperature and pressure applied thereto may vary. Proper viscosity and flowability of a typical adhesive which has been found suitable for use with wax coated cartons, can be attained if such adhesive is heated to a level of about 350° F. at a pressure of about 70 psi. These figures are intended to be only illustrative of desirable operating conditions for the adhesive described and reasonable variation in the temperature and pressure levels applied to the adhesive is permissible.

While certain specific embodiments of this invention have been illustrated, it should be understood that modifications thereof which may become evident to persons skilled in the art are intended to fall within the purview of the invention and the same should be interpreted in light of the appended claims.

We claim:
1. An adhesive applicator device for ejecting discrete droplets of adhesive onto each of opposite ends of a carton or like container conveyed in an uninterrupted fashion therethrough, comprising spaced valve bodies between which such carton is movable with its opposite ends adjacent to but free of direct contact with the respective valve bodies, an inlet port and adhesive metering valve means in each of said bodies, said adhesive metering valve means including a discharge port formed in said valve body and an oscillating disc journaled to said housing wall and formed with an opening registrable with said discharge port, a supply container in which a quantity of adhesive is maintainable read for use, conduit means extending between said supply container and each of said valve bodies, said conduit means including a fluid passageway terminating in an outlet port bringing said supply container into communication with said valve body inlet port, one of said inlet and outlet ports being elongated longitudinally of said conduit means whereby said valve bodies are adjustable relative to each other along said conduit means without interrupting communication therebetween for applying adhesive to cartons of varying sizes, means for applying pressure to said adhesive metered by said metering valve means whereby said adhesive may be ejected in discrete droplets from said carton without said carton contacting said valve bodies, and control means operatively connected with said valve bodies and regulating metering of adhesive droplets from each of said valve bodies in a predetermined controlled manner in timed relationship with movement of said carton whereby adhesive may be ejected from said valve bodies when a carton is located therebetween.
2. The applicator device of claim 1 wherein said device is intended to meter adhesive of the hot-melt type and wherein means are provided at said supply container within the walls thereof for maintaining said adhesive flowable prior to ejection thereof from said valve bodies.
3. The claim 1 wherein said control means comprises an air cylinder operatively connected by pulley and cable structure which extends between said cylinder and said metering valve means, and means controlling flow of compressed air to said cylinder in a direction to move said cylinder in timed relationship to movement of said carton.
4. The applicator device of claim 1 wherein said control means comprises a pair of air cylinders operatively connected by interengaged clevis and yoke arrangements which extend between the cylinders and the respective metering valve means, and means controlling flow of compressed air to said cylinder operated in timed relation to movement of said carton.
5. An adhesive applicator device for ejecting discrete droplets of adhesive simultaneously to each of opposite ends of a carton or like container conveyed in an uninterrupted fashion therethrough, comprising spaced adhesive metering valves between which such carton is movable with its opposite ends adjacent to but free of direct contact with the respective valves, a supply container in which a quantity of adhesive is maintainable ready for use, conduit means extending between and connecting said container with each of said valves, means for applying pressure to said adhesive metered by said valves whereby said adhesive may be ejected in discrete droplets from said valves under pressure and such droplets applied to said carton without said carton contacting said valves, pressure fluid-operated control means operatively connected with said valves and regulating metering of adhesive droplets from said valve in unison and in a predetermined controlled manner, and valve means connected to said control means operated in timed relationship with movement of said carton whereby said control means are operated and adhesive is ejected from said valves; each of said valves comprising a housing having an adhesive discharge port extending through a wall thereof, a disc member engaged with said wall normally closing said discharge port, said disc member having an adhesive discharge passage therethrough, and means connecting said disc member with said control means whereby said discharge passage and said discharge port are periodically aligned to permit adhesive metering from each said valve in timed relationship to movement of said carton.
6. An adhesive applicator device, comprising a hollow valve housing having an adhesive discharge port extending through a wall thereof, a hollow valve body operatively connected to a connector member movingly engaged with said housing wall and normally closing said discharge port, said disc member having an adhesive discharge passage therethrough, and means for controlling said movements whereby said discharge passage and said discharge port are periodically aligned to permit adhesive metering from each said valve in timed relationship to movement of said carton.
7. The valve structure of claim 6 wherein said shift is rotatably oscillated whereby said disc member is oscillatable relative to said housing wall, said pressure fluid-operated means comprises a cylinder and a piston connected to said shaft to produce oscillation thereof, and said valve means controls reciprocation of said piston in timed relationship to movement of said valves thereupon so that said disc member passage is movable back and forth across said discharge port to permit periodic adhesive flow therethrough.
8. The valve structure of claim 6 wherein said disc member is urged by spring means into engagement with said housing wall whereby the need for packing around said disc member is precluded and adhesive leakage from said housing is obviated.
9. The valve structure of claim 8 wherein a connector is interposed between and operatively connects said disc member and said shaft, said spring means engaging both said disc member and said connector and urging the same in opposite directions.

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