

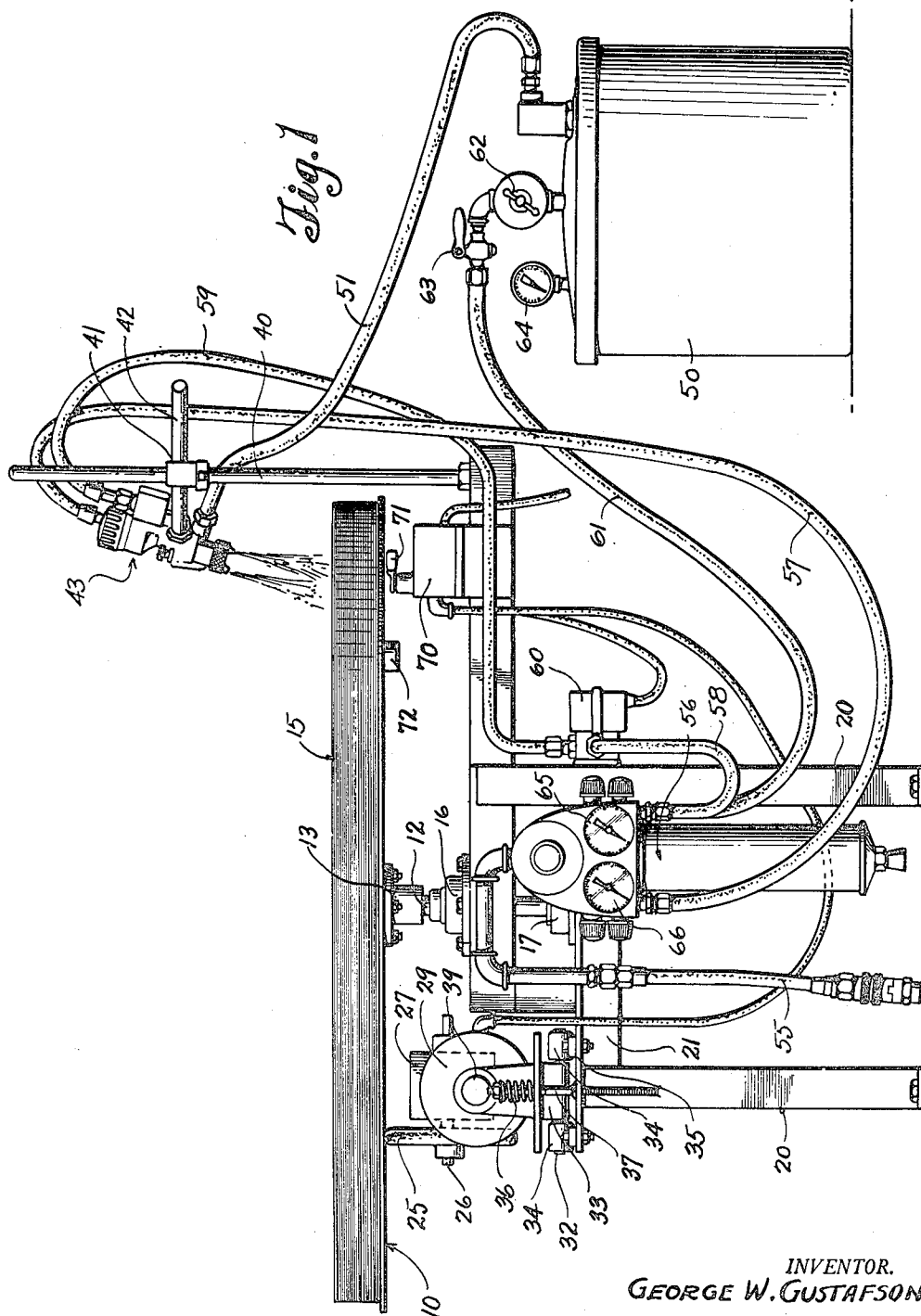
Nov. 13, 1956

G. W. GUSTAFSON
GLUE APPLYING APPARATUS

2,770,211

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3 Sheets-Sheet 1



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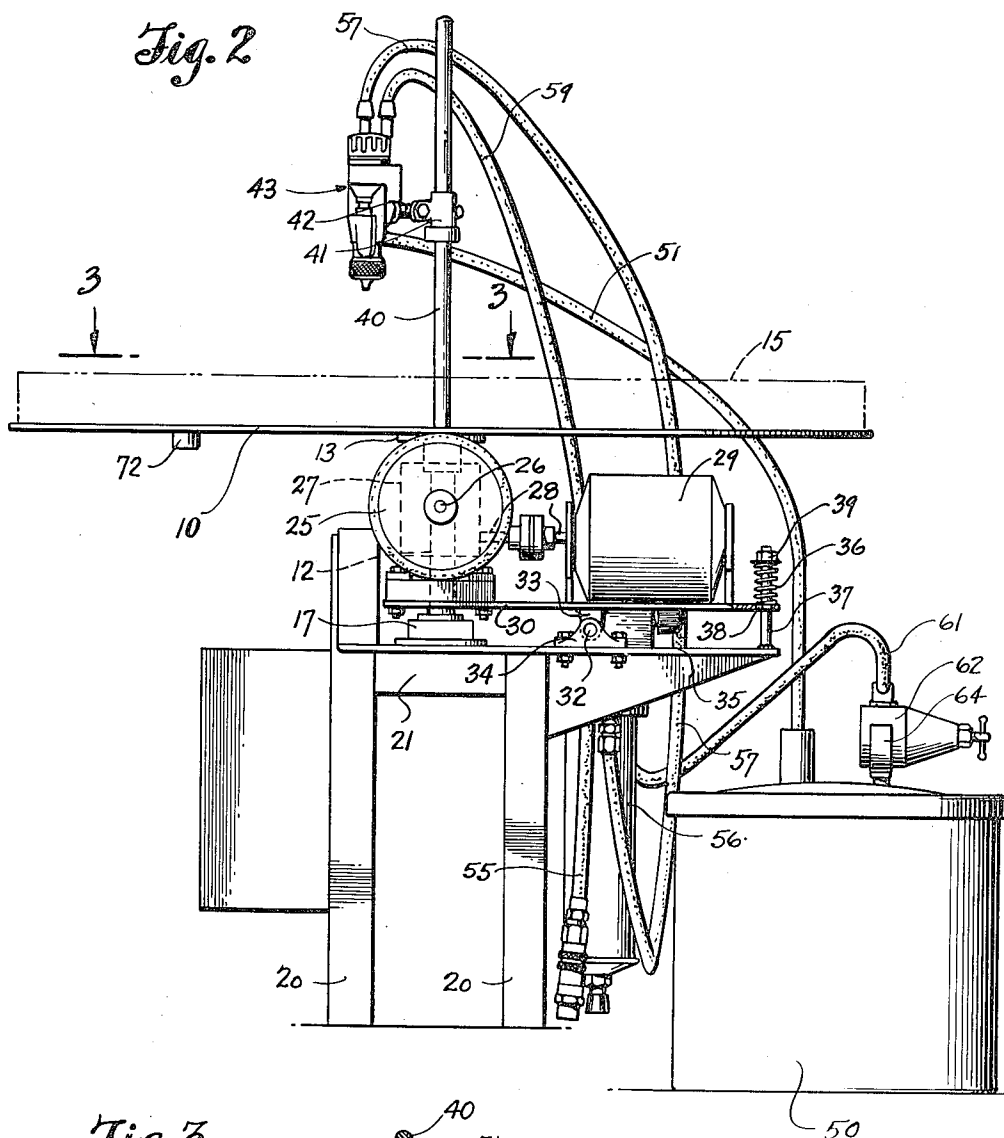
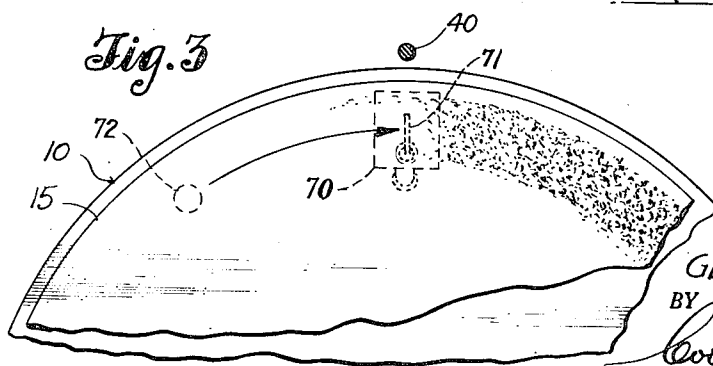
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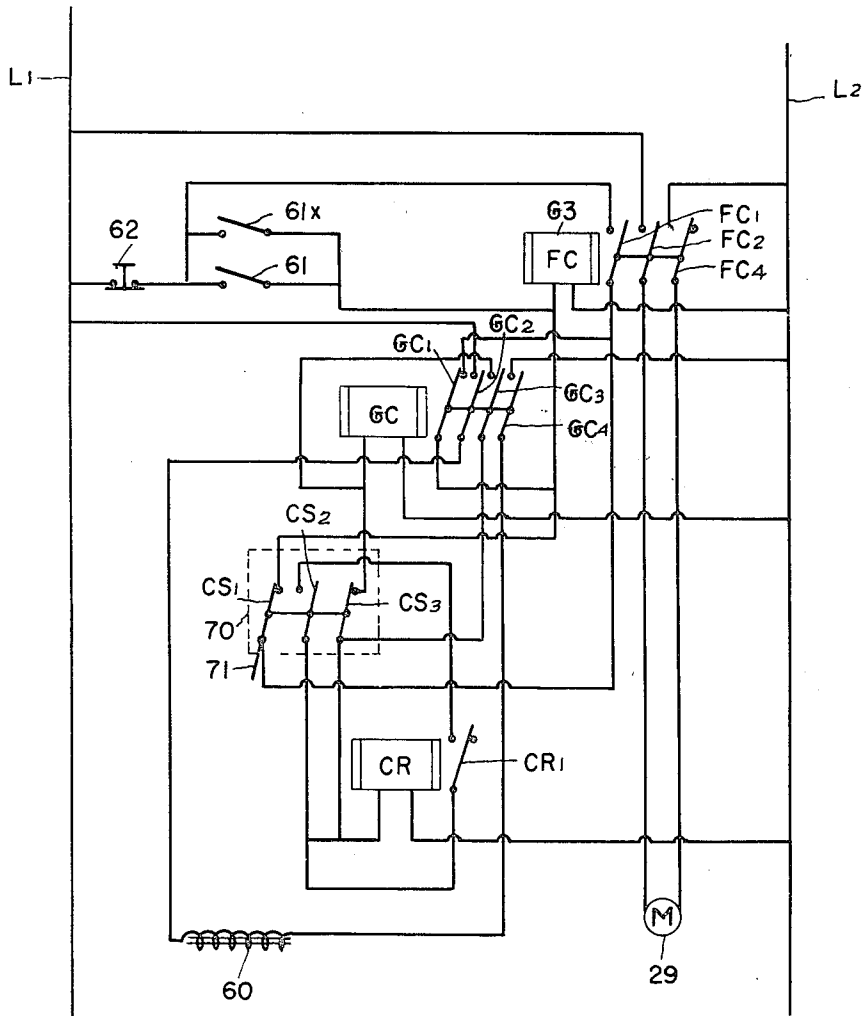
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FIG. 4



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GLUE APPLYING APPARATUS

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3 Claims. (Cl. 118—11)

This invention relates to glue applying apparatus and it has reference more particularly to the provision of an apparatus that is especially designed for the applying of glue, or other liquid adhesive substance, to the paper heads, or caps, that are used for sealing the ends of large paper and pulp roll packages.

Previously, glue has been applied to paper heads, or caps as used for the above stated purpose, by means of a brush, either by applying a swath of glue about the peripheral area of the cap or over its entire surface. The disadvantage in the direct brush application is that an excess of glue is caused to run down the same and often is transferred onto the end of the pulp or paper roll.

An improvement in the above previously used method which has been employed to some extent, has been to apply the glue to the surface of one of the paper caps, then to place the glued surface of this cap in face to face contact with another cap and press them together. This transfers the excess glue from the first to the second cap and when they are separated leaves a sufficient amount on the first cap for its proper application to the package.

In view of the foregoing and other objections to the methods and means previously employed for this particular work of applying glue to the paper heads or caps, it has been the principal object of the present invention to provide a glue applicator whereby the circular paper caps may be coated without waste of glue; may be coated evenly over a peripheral portion of predetermined width; and which operates under automatic control, after being manually started, to stop after one complete cycle of operations.

More specifically stated, the objects and advantages of the present invention reside in the details of construction and in the combination of its parts, and in their mode of operation as will hereinafter be fully described.

In accomplishing these and other objects of the invention, I have provided the improved details of construction, the preferred forms of which are illustrated in the accompanying drawings wherein:

Fig. 1 is an elevation of a glue applying machine embodying the improvements of the present invention therein.

Fig. 2 is an elevation of the machine as seen from the right hand side of Fig. 1.

Fig. 3 is a top view of a portion of the turntable with paper heads stacked thereon and indicating the position of the stopping switch.

Fig. 4 is a schematic and wiring diagram of the electrical equipment of the present machine.

The machine of this invention can be described in a general way as including a horizontal turntable upon which a stack of caps or heads, comprising circular sheets of paper can be centered for the axial rotation of the stack; a spray gun with means adjustably supporting it in fixed position for directing a spray of atomized glue against a selected peripheral portion of the top sheet of

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the stack as the stack rotates; an electric motor for rotating the turntable, and means controlled by the rotative movement of the table for automatically stopping the motor at the end of each cycle of operation and for cutting off glue from the spray, and a manual means for starting each cycle of operation.

Referring more in detail to the drawings:

The turntable of the present machine is designated in its entirety by numeral 10 and it is supported in a horizontal plane for axial rotation by a vertical center shaft 12. This shaft has a flanged fitting 13 fixed to its upper end to which the turntable is bolted. In the present instance, the turntable is a metal disk about forty-four inches diameter, and it is designed for the support thereon of a stack of the paper sheets which are to serve as the caps or end heads for the paper roll containing packages; such a stack being designated by numeral 15 in Fig. 1.

The shaft 12 is rotatably supported in upper and lower bearings 16 and 17 that are fixed in vertical spacing in the rigid frame structure of the machine. This structure is here shown to comprise four vertical legs 20 which, at their upper ends, are joined by horizontal members, 21 and 22, and it is to the horizontal parts that the bearings 16 and 17 are fixed as has been shown in Figure 1.

The turntable 10, as rotatably mounted by shaft 12, is adapted to be turned by a friction wheel 25 that is pressed in rolling contact against its underside, outwardly from the shaft 12 as well shown in Fig. 1. The wheel 25 is mounted by a driving shaft 26 that extends horizontally and in a direction radially of the disk from a housing or gear box 27 containing speed reduction gears through which connection of the shaft 26 is made with the drive shaft 28 of an electric motor 29.

The motor 29 and the gear case 27 are mounted on opposite ends of a horizontal platform 30 which is pivotally supported between its ends for rocking action upon a horizontal cross-shaft 32 that passes through a mounting block 33 fixed to the underside of the platform, and is rotatable at its opposite ends in bearings 34—34 that are bolted upon a horizontal plate 35 affixed to the main frame structure. The friction wheel is mounted on one end of the platform and it is urged upwardly and maintained in frictional driving contact with the underside of disk 10 by the force of a coiled spring 36 applied downwardly against that end of the platform 30 that is opposite that on which the friction wheel and gear box is carried. It is shown in Figs. 1 and 2 that a post 37 is vertically fixed to plate 35 to extend upwardly through a hole 38 in the platform. The coiled spring 36 is mounted about the upper end of this post and is held thereon under compression by a nut and washer 39 applied to the upper end of the post. The force of spring 36 causes the friction wheel 25 to be urged upwardly and maintained in frictional driving contact with the disk 10.

Erected on the main frame structure of the machine, to extend to a substantial distance above the disk 10, closely adjacent one side thereof, is a post 40 on which a fitting 41 is vertically and rotatably adjustable. Extended through this fitting for longitudinal adjustment therein, is a horizontal arm 42 which, at its end, carries a spray gun designated in its entirety by numeral 43. This gun is typical of spray guns as used for painting and it is equipped to receive regulated quantities of glue and air under pressure for the discharge of the glue in a finely atomized condition against a portion of the top sheet in the stack 15 of paper sheets disposed on the turntable 10, thus to cause a band of glue to be applied to the sheet as it rotates. The location of this band of glue is determined by the position and direction of the spray gun,

and this is determined through the adjustable supports for the gun as applied to post 40.

Ordinarily a band of glue from four to six inches wide is applied to the peripheral portion of the paper head as indicated in Fig. 3. For this operation, a supply of glue of proper fluid consistency is maintained in a closed tank 50 that can be located at any convenient position adjacent the machine. A hose connection 51 leads from the tank to the spray gun 43 for the supplying of glue thereto as it may be required.

Air for the automatic operation of the gun and the atomization of the glue, and also for the feeding of glue to the gun from the tank, is brought to the machine from a source of supply, not shown, through a hose and pipe line designated generally at 55. This line connects with an air transformer which is herein designated in its entirety by numeral 56. From the transformer, air is delivered under controlled pressure to the spray gun 43 for the atomization of glue, through a hose connection 57. Likewise, air is delivered to the spray gun from the transformer for the automatic operation of the gun; this being supplied through conduits 58 and 59 that are connected together through a solenoid valve 60; this valve being supported from the frame structure. Air as required for the feeding of glue to the gun is delivered, under pressure, from the transformer 56, to the tank 50, through a hose connection 61. This connects to the tank through a pressure regulator 62. This particular connection also includes a manually set cut-off valve 63. Pressure in the tank 50 is indicated by a pressure gauge 64 thereon.

The air transformer 56 is equipped with pressure regulating valves for the various hose connections and also with gauges, as at 65 and 66, which respectively indicate the pressure of air as supplied to the hose connections leading to tank and gun.

The spray gun 43 is one of those type having an air cylinder which controls the automatic operation of the gun. When the solenoid valve 60 is energized by the electric current, it is opened, and air under pressure is thus admitted through hose connections 58-59 to the cylinder and this effects the immediate opening of the fluid and atomizing air tips of the gun, and glue is caused to be atomized and sprayed from the gun onto the paper head. When the solenoid valve is de-energized, the cylinder operates to cut off flow of glue and atomizing air to the gun tips, and the glue applying operation is thus stopped.

The wiring diagram for the electrical system of the machine is shown diagrammatically in Figure 4. In this figure, L1 and L2 indicate the power supply lines across which the motor 29 and the solenoid valve 60 are connected, the switches FC2, FC4 and GC2 and GC4, respectively, being disposed in these connections for controlling respectively the operation of the motor and the solenoid valve.

The control circuit includes the starting switch 61 which is normally open, as shown, and in series therewith the winding 63 of relay with which the contacts of the normally open switch FC1 are associated. Connected in series with the normally open switch FC1 is a second switch GC1 which is normally closed and which is a relay switch under control of the relay winding GC whose operation will be later described.

The control switch for the system is indicated generally by the reference character 70 in Figure 3 and includes an actuating arm 71 connected to the three switch members CS1, CS2, CS3 in Figure 4. In the normal position of the arm 71, the three switches controlled thereby are in the position as shown in Figure 4. That is, the switch CS1 in that figure is closed, the switch CS2 in that figure is open, and the switch CS3 in that figure is closed. At any time that the lug 72 carried on the undersurface of the turntable 10 engages the arm 71 to

move the same, the relative positions of the switches CS1, CS2, and CS3 are reversed.

The switch CS1 is in parallel with the previously mentioned switch GC1 for a purpose which will be presently apparent, whereas the switch CS2 is in series with the relay winding CR which, in turn, controls the normally open switch CR1 which is in parallel with the switch CS2 and in series with the aforementioned switch CS3 and the previously mentioned relay winding GC. The various switches controlled by the relay winding GC are switches GC1, GC2, GC3 and GC4. The switch GC3 is in parallel with the switch CS3 for a purpose presently to be apparent.

In addition to the switch FC1, the relay winding 63 also controls the two motor switches FC2 and FC4.

The operation is as follows. With the electrical components in the positions shown in Figure 4, the turntable is at rest and the spray control valve actuated by solenoid 60 is closed. To initiate the operation of the device, the start switch 61 is depressed to make contact to energize the relay 63 which consequently closes the normally open switches FC1, FC2 and FC4. Switches FC2 and FC4 complete the circuit to the motor 29 and the turntable immediately starts to rotate. At the same time, the switch FC1, being in parallel with the start switch 61, completes the circuit through the normally closed switch GC1 to maintain the relay 63 energized and the switch FC1 together with the switch GC1 therefore forms stick circuit for the relay winding 63.

At this time, the glue is not being applied but the turntable is rotating and the turntable will continue to rotate until the lug 72 engages the switch arm 71 to open the switch CS1 and close the switch CS2 while opening the switch CS3. During the time that this switch arm is so engaged, the circuit through the relay winding CR will be made, and consequently switch CR1 will be closed to form a stick circuit in parallel with the switch CS2 for the relay winding CR. The relay winding CR or more properly, the energization thereof, arms or prepares the circuitry for actuation of the solenoid valve 60 to control the spraying of the glue.

Since the contact CS3 is open during the time in which the switch arm 71 is engaged by the lug 72, the relay winding GC which controls the solenoid valve switches GC2 and GC4 will not be energized until the lug releases the arm 71 to permit it to return to its normal position, at which time, the switch CS3 will be closed to complete the circuitry through the relay winding GC to close the four switches actuated thereby, namely, GC1, GC2, GC3 and GC4.

The spraying of the glue occurs immediately, and the spraying will continue until such time as the turntable rotates a full turn and the lug 72 again engages the switch arm 71. At this time, the switch CS1 will once again be open, while the switch CS2 will once again be closed, and the switch CS3 once again opened. Since the switch GC1 is now open due to the energization of the relay winding GC, and since the switch CS1 is open, there will be no stick circuit through the relay winding 63, and consequently, the switches FC1, FC2 and FC4 will be broken and the motor will stop to stop the turntable. Simultaneously with the reopening of the switch FC1, the circuitry to the relay winding CR and GC will be broken, and consequently the solenoid valve controlled switches GC2 and GC4 will be broken to simultaneously cease the spraying of glue from the head.

From the above, it will be appreciated that the inertia of the turntable is sufficient to carry the lug 72 sufficiently far to release the switch arm 71 so that the turntable ends up in the position where the lug 72 has just passed the switch arm 71 and the parts are once again in the position shown in Figure 4. From this, it will be readily apparent that upon re-energization of the electrical circuitry to start the next cycle, the turntable will pass through substantially one complete revolution before the

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spraying operation takes place. This is a very beneficial operation since this permits the motor to bring the turntable up to a uniform speed before the glue is applied, and consequently, there is no danger of the glue being applied unevenly or nonuniformly due to variations in rotational speed of the turntable. The complete operating cycle of the turntable requires two complete revolutions thereof, as will be readily apparent.

In the wiring diagram there has been shown a remote control button at 61x. This may be located at any remote point so that it will not be necessary for the operator to remain in the close vicinity of the machine to begin its operation.

It is also anticipated that the head gluing unit may be energized by a spare set of contacts in a relay or contactor used for the operation of some other piece of equipment in a roll finishing line, thereby making it unnecessary for anyone to start the operation of the head gluing machine.

Having thus described my invention, what I claim as new therein and desire to secure by Letters Patent is:

1. Apparatus of the character described comprising, a turntable for supporting paper heads thereon, a spray gun mounted in spaced relation to the turntable for applying glue to a paper head, an electric motor for rotating said turntable, a valve for controlling said spray gun, and an electric circuit for controlling said motor and said valve, said circuit including a switch for energizing said motor and a switch for actuating said valve, means on the turntable for actuating the valve switch in response to a predetermined position of the turntable, and said valve switch including mechanism for de-energizing said motor after every other actuation of the valve switch.

2. Apparatus of the character described comprising, a turntable for supporting a stack of paper heads, a spray gun mounted above the turntable for applying glue to the uppermost paper head, an electric motor for rotating said turntable, a valve for controlling the application of glue by said spray gun, a solenoid for operating said valve, and an electric circuit for controlling the energization of said motor and said solenoid, said circuit including first and second normally closed switches and a third normally open switch all connected together for simultaneous

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actuation, means on said turntable for actuating said first, second and third switches in response to a predetermined position of the turntable, said circuit also including first, second and third relay windings and a starting switch, said first relay winding being in series with the starting switch and there being two normally open first relay switches actuated by the first relay disposed respectively in parallel with said starting switch and in series with said motor, said second relay being disposed in series with said third switch and there being a third relay switch actuated by the third relay and disposed in parallel with said third switch, said third relay winding being disposed in series with said third relay switch and said second switch and there being two normally open third relay switches and a normally closed third relay switch actuated by the third relay and disposed respectively in series with said solenoid, in parallel with said third switch and in series with said first relay winding and the first mentioned of said first relay switches.

3. Apparatus of the character described comprising, a turntable for supporting a stack of paper heads, a spray gun mounted above the turntable for applying glue to the uppermost paper head, an electric motor for rotating said turntable, a solenoid valve for controlling application of glue by said spray gun, and electric circuit means including a starting switch and switches actuated in response to a predetermined position of the turntable to sequentially energize said solenoid valve after said turntable has completed one revolution and de-energize said solenoid valve and said motor after said turntable has completed a second revolution.

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