

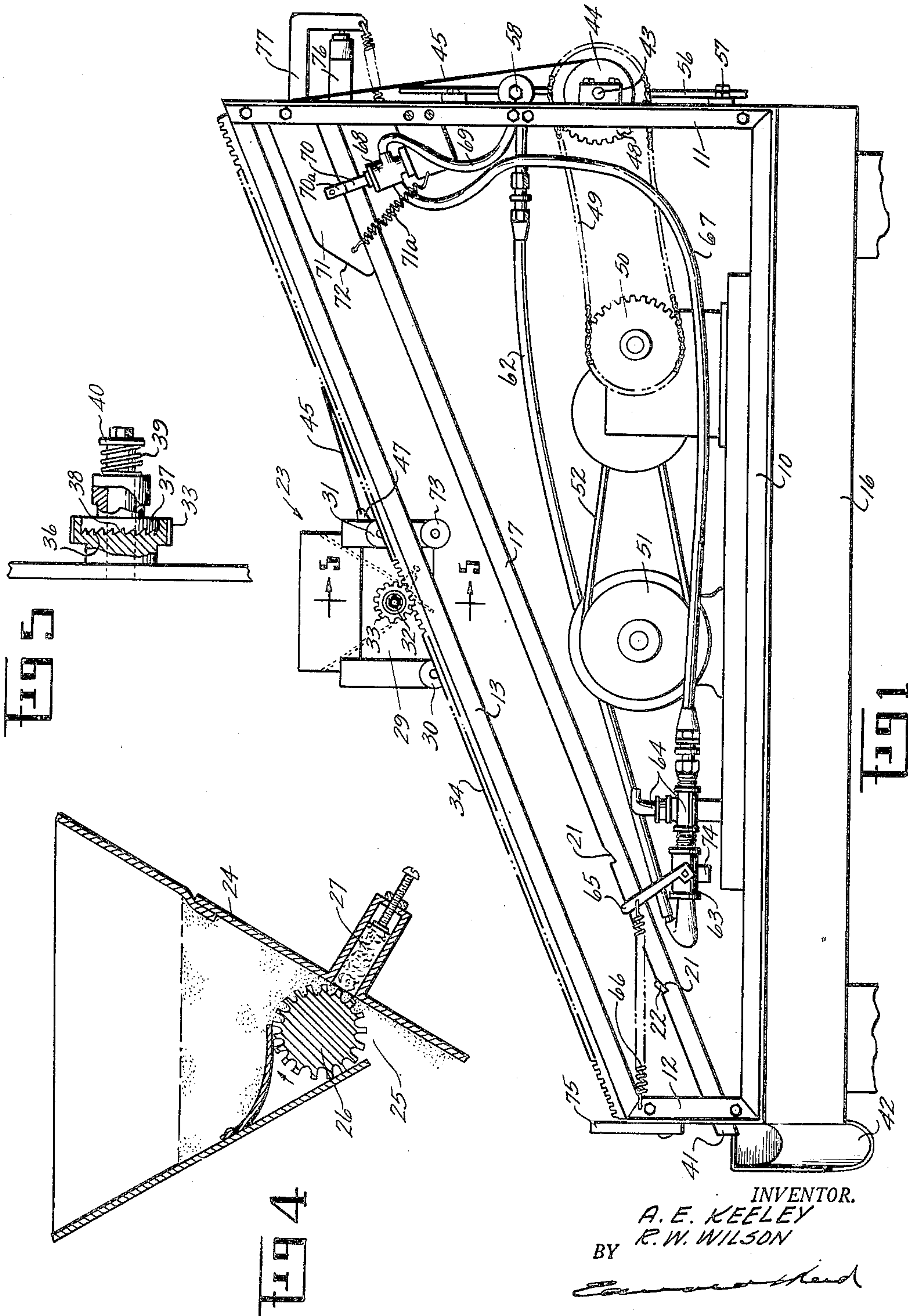
Jan. 23, 1951

A. E. KEELEY ET AL
APPARATUS FOR APPLYING PELLETS TO
THE SURFACE OF AN ARTICLE

2,539,084

Filed March 22, 1948

3 Sheets-Sheet 1



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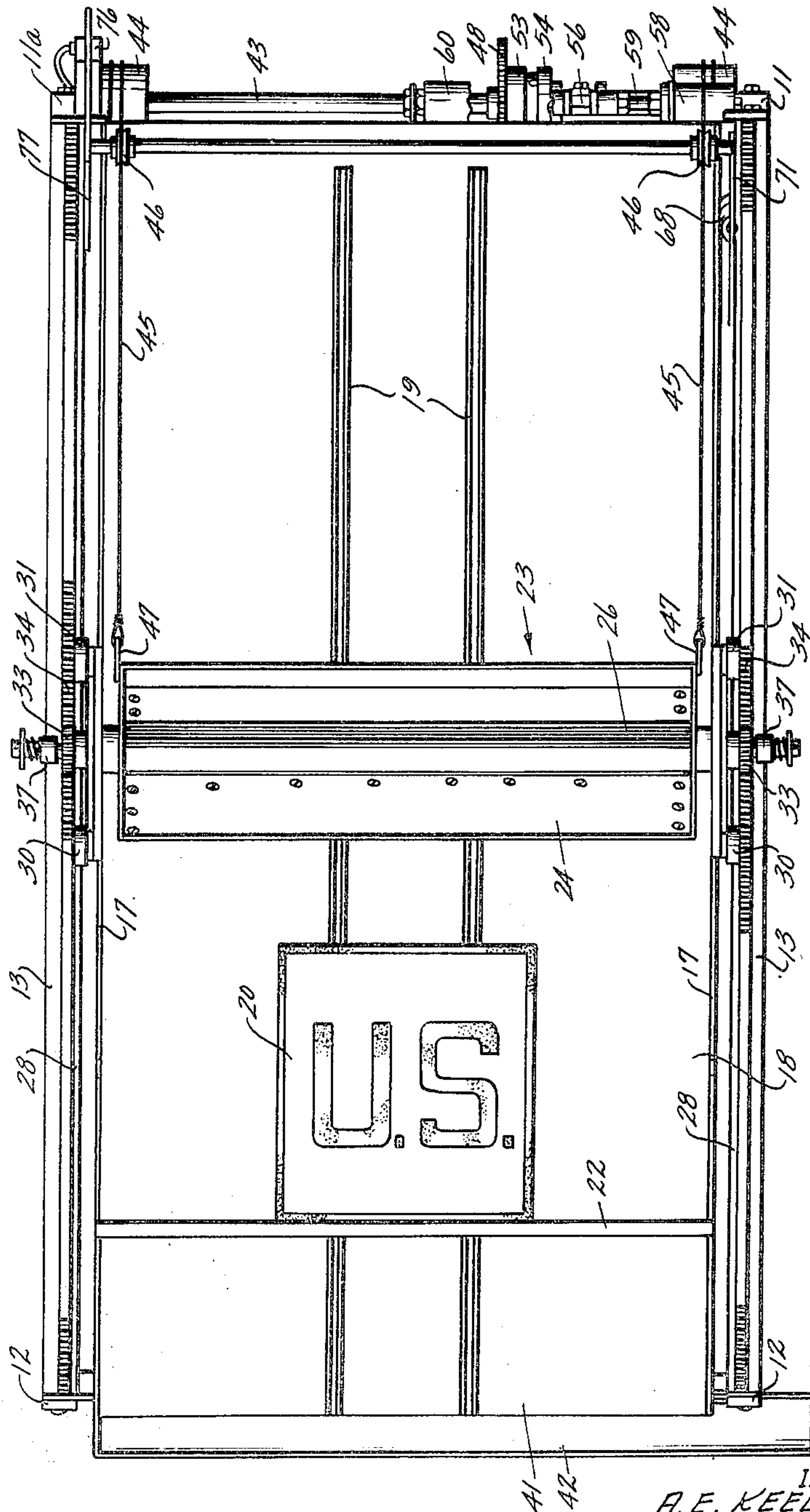


Fig. 2

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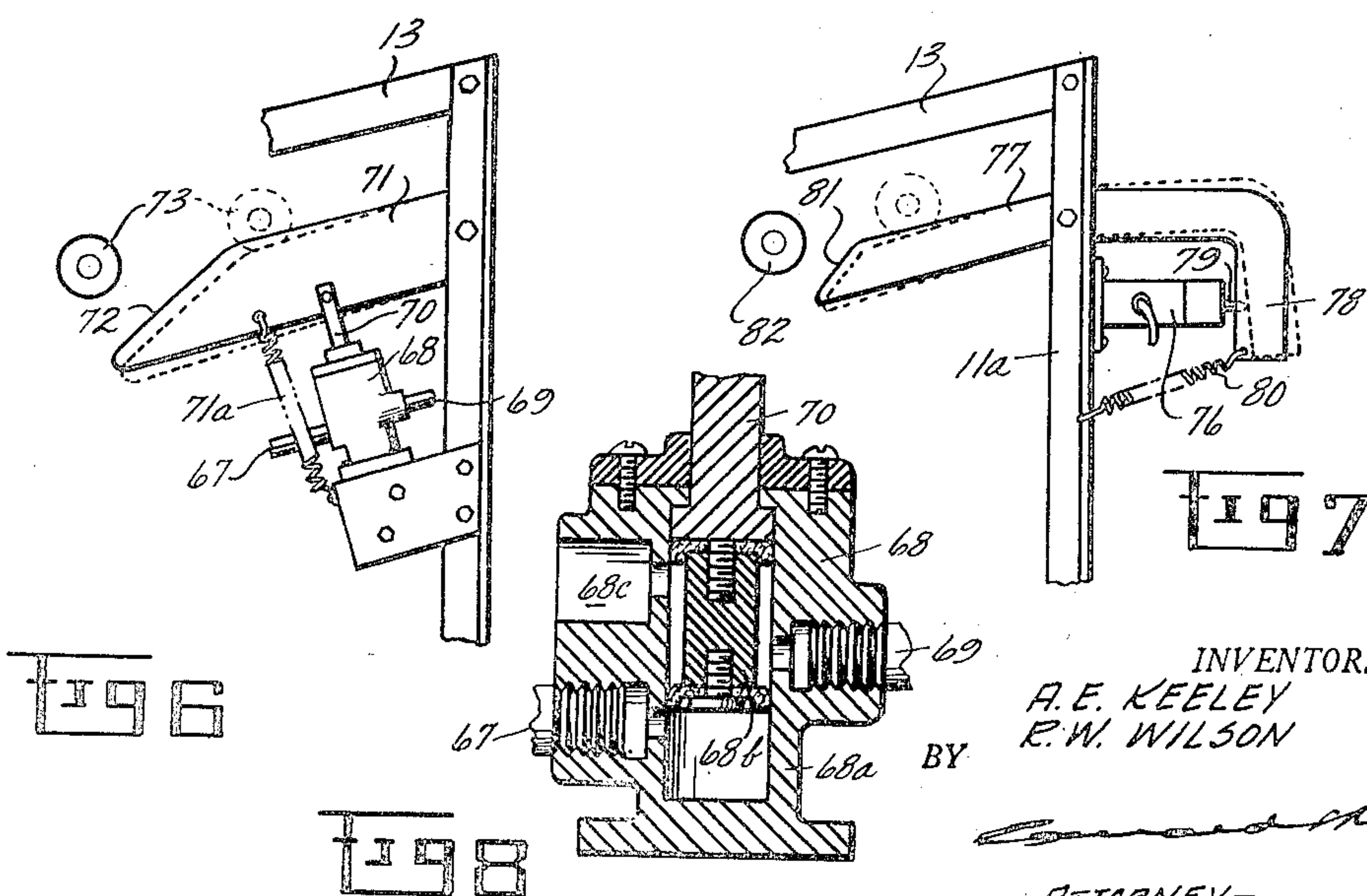
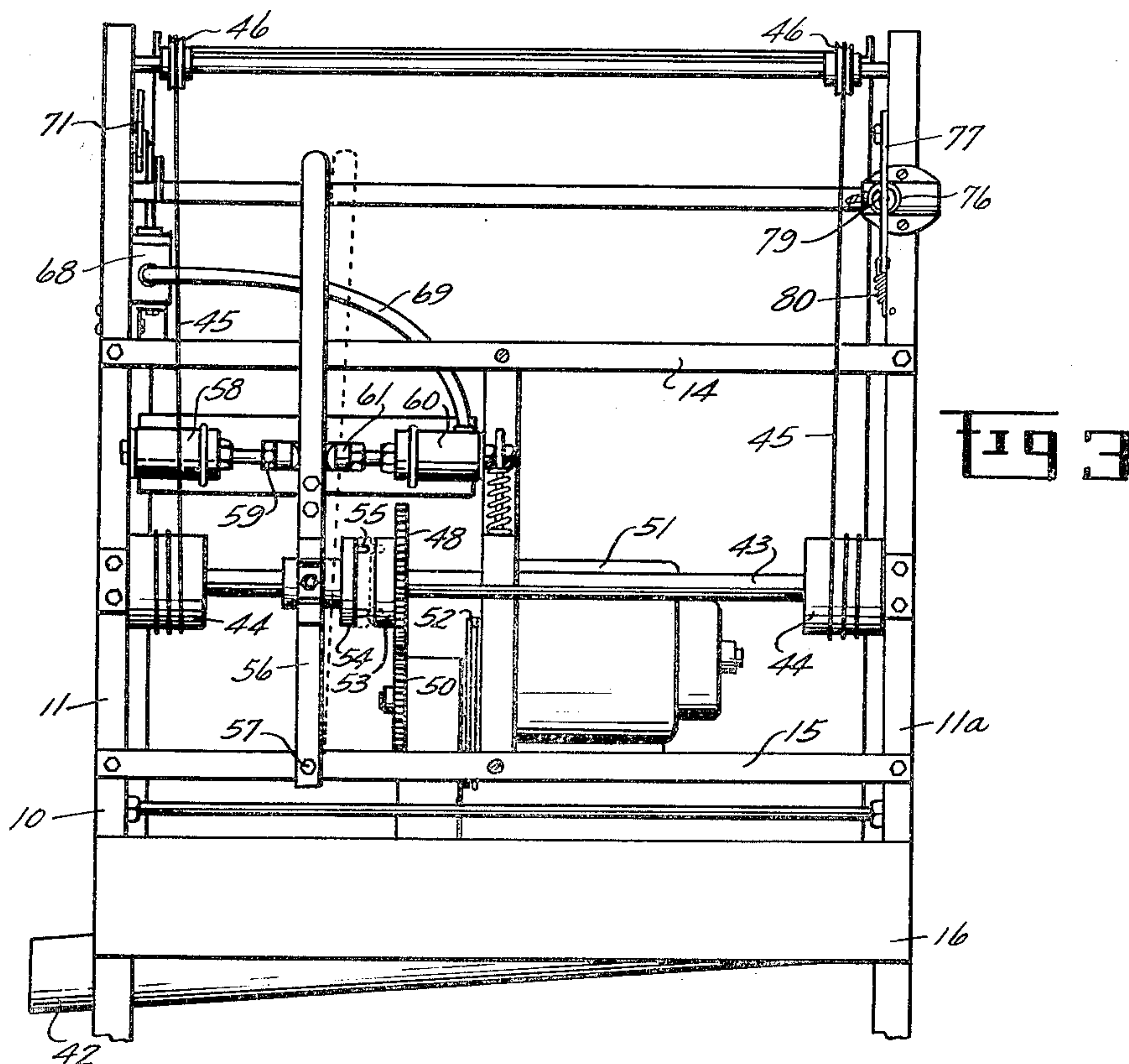
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UNITED STATES PATENT OFFICE

2,539,084

APPARATUS FOR APPLYING PELLETS TO
THE SURFACE OF AN ARTICLEArmand E. Keeley and Rufus W. Wilson, Hunt-
ington, Pa., assignors to Prismo Products, Inc.,
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10 Claims. (Cl. 91—43)

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This invention relates to an apparatus for applying pellets to the surface of an article, and is intended more particularly for distributing small reflecting elements over an adhesive surface on a sign.

One method of imparting reflectivity to a sign is to apply to the surface of the sign, or a selected part thereof, a coating of a paint-like binder and distributing over the coated surface a multiplicity of minute autocollimating pellets, such as glass spheres, which adhere to and are partially embedded in the coating, and it is one object of the invention to provide an apparatus which will quickly and uniformly distribute the pellets over the coated surface of the sign.

A further object of the invention is to provide such an apparatus in which a pellet dispensing device is moved over the sign and caused to distribute the pellets over the surface thereof.

A further object of the invention is to provide such an apparatus in which the movement of the dispensing device is automatically reversed at the end of a predetermined movement and the device returned to its initial position.

A further object of the invention is to provide such an apparatus in which the discharge of the pellets from the dispensing device is controlled by the movement of that device.

A further object of the invention is to provide such an apparatus which is simple in construction and in operation and which can be produced at a relatively low cost.

Other objects of the invention may appear as the apparatus is described in detail.

In the accompanying drawings Fig. 1 is a side elevation of an apparatus embodying the invention; Fig. 2 is a top plan view of the same; Fig. 3 is a rear end elevation of the apparatus, Fig. 4 is a sectional view taken through a pellet dispensing device; Fig. 5 is a section taken through one end of the dispensing device and the track on the line 5—5 of Fig. 1; Fig. 6 is a detail view of a valve actuating device; Fig. 7 is a detail view of a switch controlling device; and Fig. 8 is a sectional detail view of an air valve.

In these drawings we have illustrated one embodiment of our invention and have shown the same as an apparatus designed primarily for applying minute glass spheres to the sign, but it is to be understood that the apparatus as a whole, as well as the several parts thereof, may take various forms and may be used for applying materials of various kinds to articles of various kinds, without departing from the spirit of the invention. As herein used the term "pellets" is

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intended to include small elements or finely divided material of any kind capable of being applied in the manner hereinafter set forth, and the term "sign" is intended to include any article to which said elements or material may be so applied.

The invention includes a pellet dispensing device, means for supporting a sign below the dispensing device, and means for moving one of said elements with relation to the other to cause pellets discharged from the dispensing device to be distributed over the surface of the sign. Preferably the dispensing device is mounted for movement in a fixed path and the sign is supported in a fixed position beneath that path.

In the illustrated embodiment the apparatus comprises a supporting structure on which the various operating parts are mounted. This supporting structure preferably comprises laterally spaced side frames each including a base member 10, an upright rear end member, 11, 11a, a relatively short front end member 12, and an inclined member or bar 13 extending between and supported by the two end members. The side frames may be connected one with the other in any suitable manner as by cross bars 14 and 15. This structure may be mounted on any suitable support such as a table or base structure 16. Also supported by the end frame members 11 and 12 and arranged below and substantially parallel with the inclined bars 13 is a second pair of laterally spaced inclined bars 17. Arranged between the bars 17 is a tray 18 preferably formed by a sheet of metal, or other suitable material, supported by the bars 17, the purpose of which will hereinafter appear. Arranged above this tray and preferably supported thereon are means for supporting a sign, which means are here shown as comprising two rails 19 supported on the tray 18 and spaced one from the other to receive and support a sign 20. To prevent the downward movement of the sign on the inclined rails the latter may be provided with notches 21 adapted to receive a stop or stops, such as a bar 22, with which the lower edge of the sign contacts. There are preferably a plurality of notches in each rail to enable the sign to be supported in different positions or to enable a plurality of signs to be supported simultaneously on the rails. The sign may be of any suitable character and it is here shown as comprising a flat structure having formed thereon two letters. The face of a sign or a selected part thereof has an adhesive surface, which in the present instance is provided by applying to the letters and to the

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border of the sign a coating of a paint like binder which is applied to the sign just prior to placing it on the sign support, so that it will be then in a wet or soft condition.

The inclined bars 13 constitute a support on which a pellet dispensing device 23 is mounted for movement lengthwise of the bars. The dispensing device may be of any suitable character but preferably comprises a hopper shaped receptacle 24 adapted to receive a quantity of pellets and having in its lower portion an outlet 25 through which the pellets may be discharged, this outlet extending lengthwise of the hopper for substantially the full length of the latter. The hopper is provided with a closure for the discharge opening 25 to normally prevent the passage of pellets through the opening. In the present instance this closure is in the nature of a fluted rotor 26 mounted in the hopper above the outlet. A sealing member 27 of felt or the like extends through the rear wall of the hopper and has sealing contact with the rotor, so that when the rotor is stationary no pellets can escape through the outlet and when the rotor is rotated the only pellets that can pass to the outlet are those which enter the flutes in the rotor. The hopper has at the ends thereof means for supporting the same on the bars 13. Preferably the inner portions 28 of the bars 13 constitute the rails of a track, and there is secured to each end of the hopper a truck 29 which is rigid with the hopper and is provided with rollers 30 and 31 to engage the adjacent rail of the track, the two rollers of each truck being arranged at such elevations with relation to the dispensing device that the latter will be supported in a substantially horizontal position. The dispensing device is moved on the inclined track in a manner to be hereinafter described and the movement of the dispensing device controls the discharge of pellets from the hopper. In the construction here shown the rotor 26 has at each end thereof a portion constituting a shaft 32 which extends through and beyond the trucks 29 and across the respective inclined bars 13. Rotatably mounted on each shaft is a gear or pinion 33 which meshes with a toothed bar 34 rigidly secured to the adjacent inclined bar 13. A one-way clutch is provided for connecting each gear with its shaft, so that when the dispensing device is moved in one direction the rotor will be rotated in a direction to dispense the pellets and when the dispensing device is moved in the other direction the gears will rotate with respect to the shafts and the rotor will have no movement, and of course pellets will not be discharged thereby. In the arrangement shown the web 35 of the gear 33 has formed on the outer surface thereof a circumferential series of ratchet teeth 36, and is spaced some distance from the outer side of the gear so as to form a cavity in the latter. Thus the web 35 forms one member of a clutch, the other member 37 of which is mounted on the shaft for axial movement with relation thereto but rotates with the shaft. This member 37 is provided on its inner surface with a circumferential series of ratchet teeth 38 facing in a direction opposite the direction in which the teeth 36 face. The axially movable clutch member is held normally in engagement with the fixed clutch member 35 by a spring 39 confined between the hub of the member 37 and a stop 40 on the outer portion of the shaft. The arrangement of the ratchet teeth is such that when the dispensing device is moved up the inclined track

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the teeth thereof will have clutching engagement with the clutch member 37 and the rotor will be rotated in the direction to dispense the pellets. When the dispensing device moves downwardly on the track the rotation of the gear will cause the ratchet teeth thereon to ride over the ratchet teeth on the yieldable clutch member thus preventing the rotation of the rotor by the gear as the dispensing device moves downwardly on the track.

The dispensing device is supported normally adjacent the lower end of the track and after a sign has been placed on the sign supporting device the dispensing device is moved upwardly and the rotor actuated to discharge pellets from the hopper. A portion of these pellets will fall on the adhesive surfaces of the sign in sufficient numbers to cover those surfaces and the pellets which do not adhere to the sign will run off of the same and onto the tray 18. When the sign is in small dimension, as here shown, pellets will flow past the ends of the sign onto the tray and will continue to flow onto the tray as the dispensing device moves upwardly beyond the sign. Of course if a series of signs are arranged beneath the dispensing device pellets will be applied to each of those signs during the upward movement of the dispensing device. Thus pellets which fall directly onto the tray and those which do not adhere to the sign and run off onto the tray, run downwardly on the tray and are discharged through the open lower end 41 thereof into a trough 42 by which they are conveyed to a suitable receptacle and thus may be returned to the dispensing device.

Any suitable means may be provided for imparting movement to the dispensing device and for controlling that movement. Preferably power operated means are provided for moving the dispensing device upwardly on the track at predetermined distance and for then disconnecting the dispensing device from the power operated means and permitting it to move downwardly by gravity to its initial position. In the construction here illustrated an actuating device is mounted at the rear end of the supporting structure and is provided with means whereby it may be operatively connected with the dispensing device. Preferably this actuating device comprises a shaft 43 rotatably mounted on the upright members 11 and 11a of the side frames and having secured thereto adjacent the respective ends thereof drums 44 on which are wound flexible members, such as cables 45, which extend upwardly therefrom, about guide pulleys 46 and thence forwardly, and are connected at their forward ends with the dispensing device, as shown at 47. Mounted on the shaft 43 for rotation thereon is a sprocket wheel 48 which is connected by a sprocket chain 49 with a gear 50 of a speed reducing mechanism which is driven from an electric motor 51 by a belt 52.

The motor operates continuously while the apparatus is in use and a suitable clutch is provided for connecting the sprocket wheel 48 with and for disconnecting the same from the shaft. In the present instance the hub 53 of the sprocket wheel constitutes one member of a clutch, the other member 54 of which is mounted on the shaft 43 for axial movement with relation thereto. The clutch members may be of any suitable construction but in the form shown a movable member 54 is provided with a plurality of pins 55 projecting therefrom and adapted to extend into corresponding recesses in the clutch mem-

ber 53. A clutch shifting device is operatively connected with the movable clutch member to impart axial movement thereto and in the present instance this shifting device comprises a lever 56 pivotally mounted at 57 on the cross bar 15 of the frame structure.

The upper end portion of the lever constitutes a handle by which the clutch may be shifted manually but in normal operation the clutch is automatically shifted by power operated means. In the present arrangement there is mounted on the frame structure a fluid operated device comprising a cylinder 58 and a plunger 59 adapted to engage one side of the shifting lever and move the clutch member 54 into clutching engagement with the clutch member 53. A second fluid operated device, comprising a cylinder 60 and a plunger 61, acts on the lever to move the same in the opposite direction and thus disengage the clutch members. The cylinder 58 is connected by a conduit, such as a flexible tube 62, with a valve 63 by which it is connected with a fitting 64 adapted for connection with a conduit leading to a source of air under pressure, not here shown. The valve 63 has a handle 65 for actuating the same and is held normally in its closed position by a spring 66. Also connected with the fitting 64 is a second conduit 67 the other end of which is connected through a valve 68 and a conduit 69 with the cylinder 60, the valve being mounted on the rear portion of the frame structure. The valve 68 includes a cylinder 68a and a double end piston 68b which is provided with a stem 70 extending through the top wall of the cylinder and arranged to be actuated by the dispensing device 23 as the latter approaches the upper end of the inclined track. The actuation of the valve by the dispensing device may be effected in any suitable manner but as here shown a trip arm 71 is pivotally mounted on the frame and has its forward end inclined as shown at 72 and arranged to be engaged by a part of the dispensing device, such as a roller 73, as the dispensing device approaches the upper end of the track. The valve cylinder 68a is connected adjacent its lower end with the conduit 67 and is provided near its upper end with an exhaust port 68c. At an intermediate point the valve cylinder is connected with the conduit 69. The arrangement of the piston 68b with relation to the conduits is such that when the piston is in its normal position, as shown in Fig. 8, the lower end of the piston will be between the points of connection of the conduits 67 and 69 with the valve and the conduit 69 will be in open communication with the exhaust port 68c. When the valve piston is moved to its lower position the conduit 67 will be connected with the conduit 69 and the exhaust port will be closed. The valve stem 70 may be connected directly with the trip arm 71, if desired, but in the present instance the valve stem 70 is arranged to be engaged by a part 70a which is secured to the trip arm and arranged in line with the valve stem.

The dispensing device is normally at the lower end of the inclined track and the clutch 53—54 is disengaged. When a sign has been placed on the apparatus in a position to receive pellets from the dispensing device the valve 63 is opened, by moving the handle 65 against the action of the spring 66 and air is thus admitted to the cylinder 58 to actuate the lever 56 and move the clutch member 54 into driving engagement with the clutch member 53, thus initiating the upward movement of the dispensing device. After the

clutch members have been engaged the valve handle 65 is released and the valve 63 is closed by the action of the spring 66 but the clutch members remain engaged. The lower end of the valve cylinder 68a is at all times in open communication with the fitting 64 through the conduit 67 and air entering the valve from the conduit 67 retains the valve piston 68b in its elevated position so that the conduit 69 is connected with the exhaust port and the clutch operating cylinder 60 is free from pressure. As the dispensing device approaches the upper end of the track the roller 73 engages the inclined end of the trip arm 71 and depresses the valve stem 70 thus moving the valve piston 68b downwardly to close the exhaust port 68c and connect the conduit 67 with the conduit 69 and thus supply air under pressure to the cylinder 60 and actuate the lever 56 to disconnect the clutch members and release the shaft 43 for rotation in a reverse direction. When the shaft is thus released the dispensing device moves downwardly by gravity to its initial position at the lower end of the track.

If the valve 63 should remain open so that the cylinder 48 remained under pressure, or if for any reason the clutch is not shifted to disconnect the sprocket wheel from the shaft, the continued operation of the motor might and probably would cause more or less damage to the apparatus. Therefore, we have provided means for automatically interrupting the operation of the motor in the event the dispensing device continues to move after the trip arm 71 has been depressed to open the valve 63. For this purpose a switch 76 is mounted on the rear portion of the frame and connected in the motor circuit. Pivotally mounted on the frame is a trip arm 77 which extends rearwardly beyond its pivotal axis and has its rear end turned downwardly, as shown at 78, and adapted to engage the actuating device 79 of the switch. A spring 80 connected with the part 78 of the trip arm and with the frame causes the part 78 to retain the switch normally in its closed position. The trip arm 77 has an inclined surface 81 arranged in the path of a roller 82 carried by the dispensing device. The trip arm 77 is of such length and is so arranged that if the clutch is disengaged by the action of the trip arm 72 the movement of the dispensing device will be interrupted before the roller 82 engages the trip arm 77, but if the roller does engage the trip arm 77 the latter will be moved about its axis to retract the part 78 thereof and release the switch actuating member 79 for movement in switch opening direction by the usual spring. It will be noted that the trip arm 77 is mounted on that side of the frame structure opposite the trip arm 71, and the roller 82, shown in Fig. 7, is mounted on that side of the dispensing device opposite the roller 73 and in the same position as that roller.

While we have shown and described one embodiment of our invention, we wish it to be understood that we do not desire to be limited to the details thereof as various modifications may occur to a person skilled in the art.

Having now fully described our invention, what we claim as new and desire to secure by Letters Patent, is:

1. In an apparatus for applying pellets to a sign, an inclined track, a pellet dispensing device movably supported on said track, means for supporting a sign below the path of said dispens-

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ing device, a shaft, flexible means actuated by said shaft for moving said dispensing device upwardly on said track, a motor, means including a clutch for drivingly connecting said motor with said shaft, manually controlled means for actuating said clutch to connect said shaft with said motor, and means operable by said dispensing device to actuate said clutch to disconnect said shaft from said motor and thereby release said dispensing device for downward movement by gravity.

2. In an apparatus for applying pellets to a sign, an inclined track, a pellet dispensing device movably supported on said track, means for supporting a sign below the path of said dispensing device, a shaft, flexible means actuated by said shaft for moving said dispensing device upwardly on said track, a clutch member rotatable on said shaft, a motor, means for drivingly connecting said motor with said clutch member, a second clutch member mounted on said shaft for rotation therewith and for axial movement with relation thereto, a fluid operated device for moving said second clutch member into clutching engagement with the first mentioned clutch member, means including a valve for connecting said fluid operated device with a source of fluid under pressure, a second fluid operated device for moving said second clutch member out of engagement with said first mentioned clutch member, means including a valve for connecting said second fluid operated device with a source of fluid under pressure, and means controlled by the upward movement of dispensing device for opening the last mentioned valve.

3. In an apparatus for applying pellets to a sign, an inclined track, a pellet dispensing device movably supported on said track, means for supporting a sign below the path of said dispensing device, a shaft, a flexible means actuated by said shaft moving said dispensing device upwardly on said track, a clutch member rotatable on said shaft, a motor, means for drivingly connecting said motor with said clutch member, a second clutch member mounted on said shaft for rotation therewith and for axial movement with relation thereto, an actuating member connected with said second clutch member, two fluid operated devices connected with said actuating member and adapted to move the latter in opposite directions, means including valves for separately connecting said fluid operated devices with a source of fluid under pressure, and means controlled by said dispensing device to actuate one of said valves.

4. In an apparatus for applying pellets to a sign, a support for a sign, a track, a pellet dispensing device supported on said track for movement over a sign on said support, means including an actuating device for moving said dispensing device in one direction, a motor, means for drivingly connecting said motor with said actuating device, means controlled by said dispensing device for disconnecting said actuating device from said motor when said dispensing device arrives at a predetermined point in its travel, and other means controlled by said dispensing device for interrupting the operation of said motor in the event said dispensing device moves beyond said predetermined point.

5. In an apparatus for applying pellets to a sign, an inclined track, a pellet dispensing device movably supported on said track, means for supporting a sign below the path of said dispensing device, a shaft, flexible means actuated by said

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shaft moving said dispensing device upwardly on said track, a clutch member rotatable on said shaft, a motor, means for drivingly connecting said motor with said clutch member, a second clutch member mounted on said shaft for rotation therewith and for axial movement with relation thereto, a fluid operated device for moving said second clutch member into clutching engagement with the first mentioned clutch member, means including a valve for connecting said fluid operated device with a source of fluid under pressure, a second fluid operated device for moving said second clutch member out of engagement with said first mentioned clutch member, means including a valve for connecting said second fluid operated device with a source of fluid under pressure, means controlled by the upward movement of said dispensing device for opening the last mentioned valve when said dispensing device arrives at a predetermined point in its upward movement, and other means actuated by said dispensing device to interrupt the operation of said motor in the event said second fluid operated device does not disconnect said clutch member.

6. In an apparatus for applying pellets to a sign, a pellet dispensing device, a device for supporting a sign in a position to receive pellets from said dispensing device, an inclined track on which one of said devices is movably supported, and means for moving said one of said devices toward the upper end of said track with relation to the other device to cause said pellets to be discharged over the surface of said sign and for releasing said movable device for return movement by gravity.

7. In an apparatus for applying pellets to a sign, a pellet dispensing device, a device for supporting a sign in a position to receive pellets from said dispensing device, an inclined track on which one of said devices is movably supported, power operated means for moving said one of said devices toward the upper end of said track with relation to the other device to cause said pellets to be distributed over the surface of said sign, means for initiating the operation of said power operated means, and means controlled by said movable device for disconnecting the same from said moving means for return movement by gravity at the end of a predetermined movement of said movable device.

8. In an apparatus for applying pellets to a sign, a pellet dispensing device, a device for supporting a sign in a position to receive pellets from said dispensing device, normally inoperative means for moving one of said devices with relation to the other device to cause said pellets to be distributed over the surface of said sign, manually controlled means for initiating the operation of said moving means, and means controlled by said movable device for interrupting the operation of said moving means at the end of a predetermined movement of said movable device.

9. In an apparatus for applying pellets to a sign, a support for a sign, a track, a pellet dispensing device supported on said track for movement from an initial position over a sign on said support, and for return movement to said initial position, an actuating device for moving said dispensing device in the first mentioned direction, means controlled by the operator for connecting said actuating device with a source of power, and means controlled by the movement of said dispensing device for disconnecting said actuating device from said source of power.

10. In an apparatus for applying pellets to a sign, a support for a sign, a track, a pellet dispensing device supported on said track for movement over a sign on said support, means including an actuating device for moving said dispensing device in one direction, a motor, means for drivingly connecting said motor with said actuating device, and means controlled by said dispensing device for disconnecting said actuating device from said motor when said dispensing device arrives at a predetermined point in its travel.

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