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DISPENSING DEVICE FOR COLLAPSIBLE TUBES

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FIG. 1

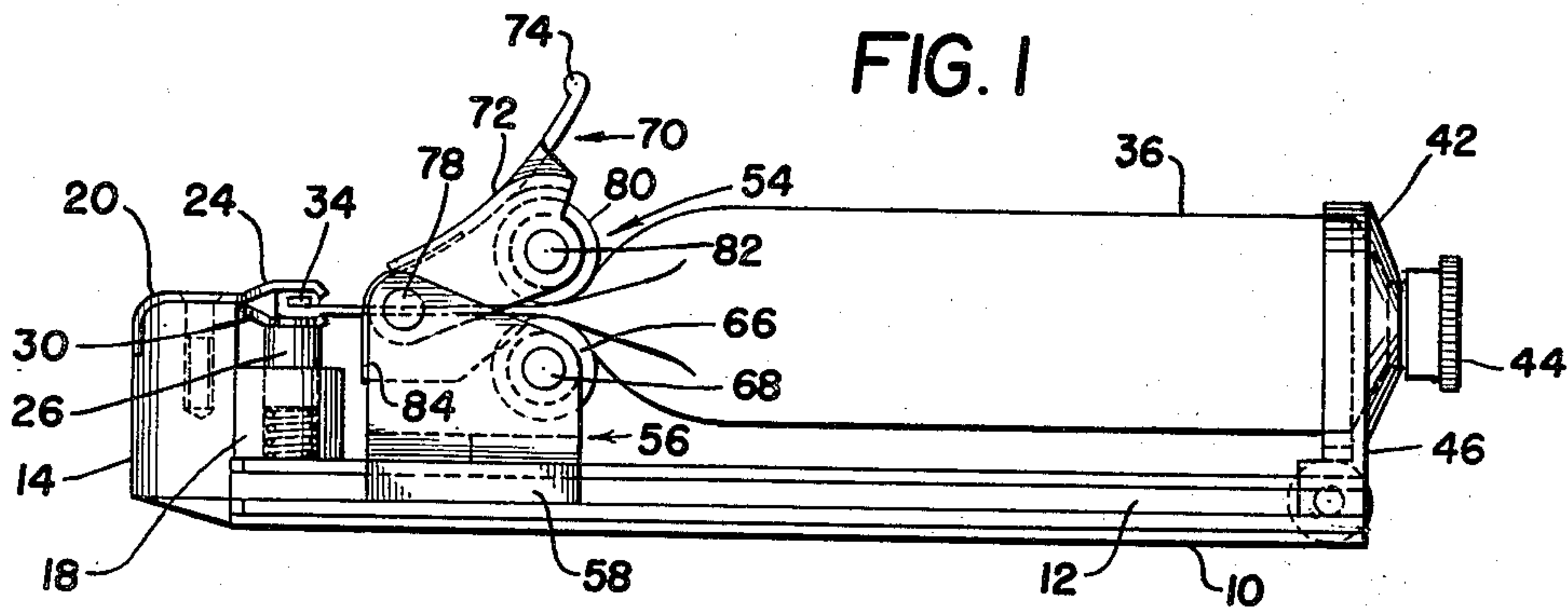


FIG. 2

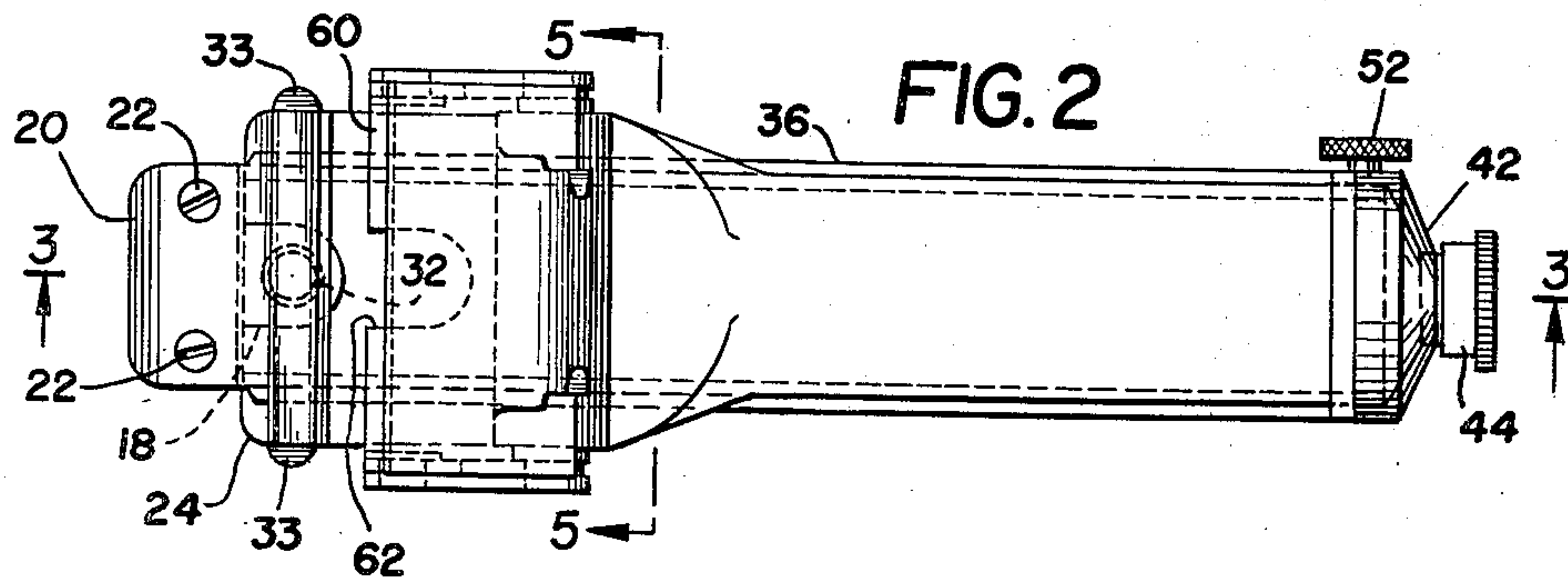


FIG. 3

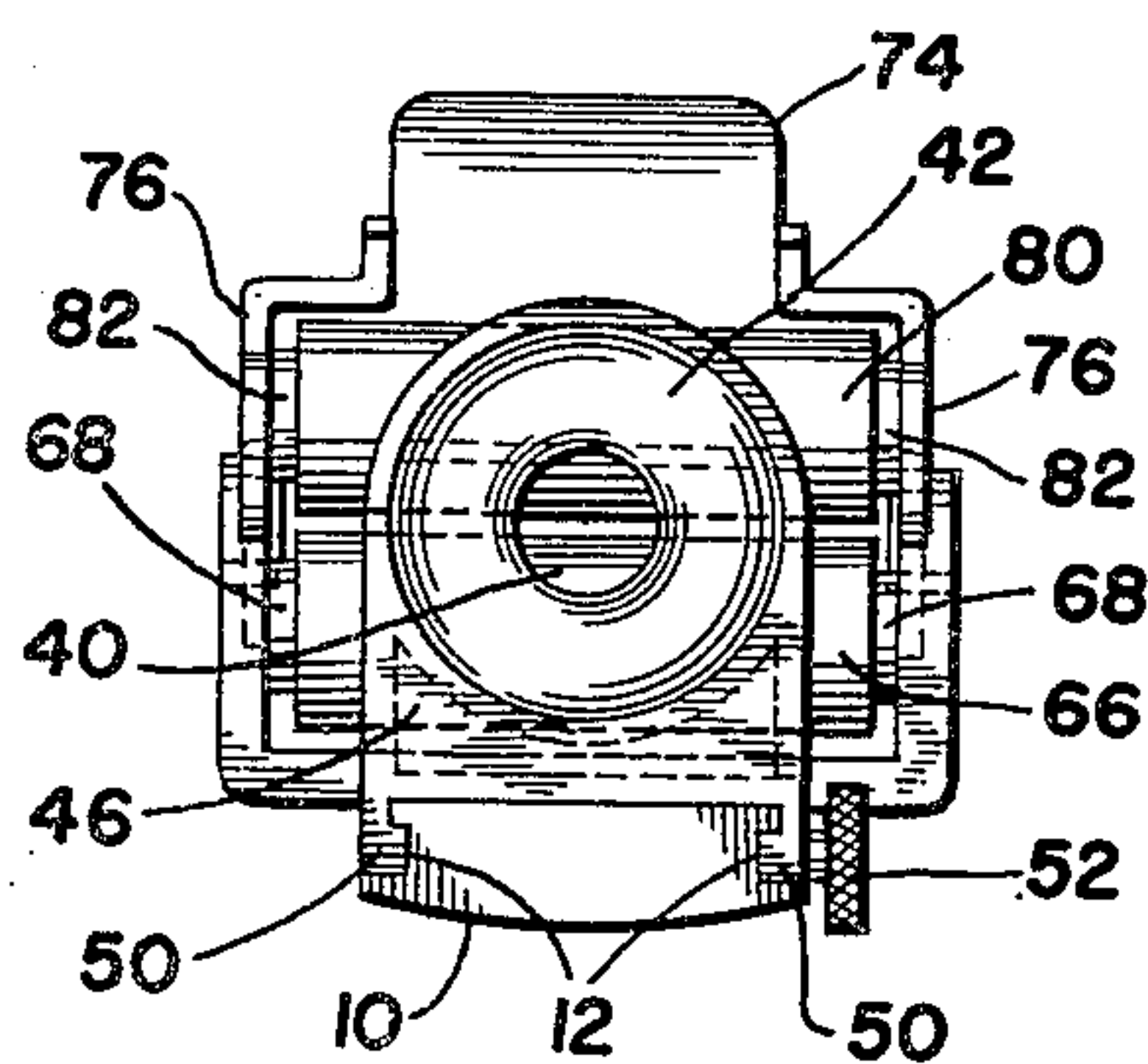
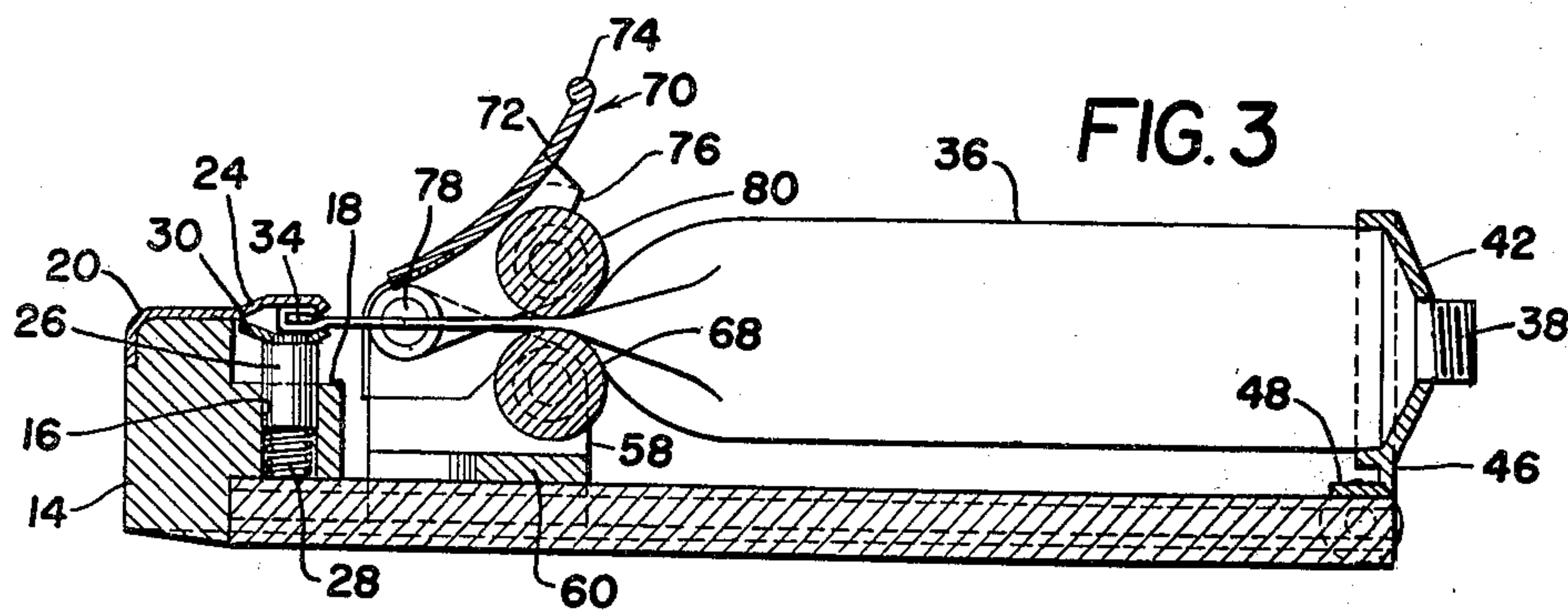


FIG. 4

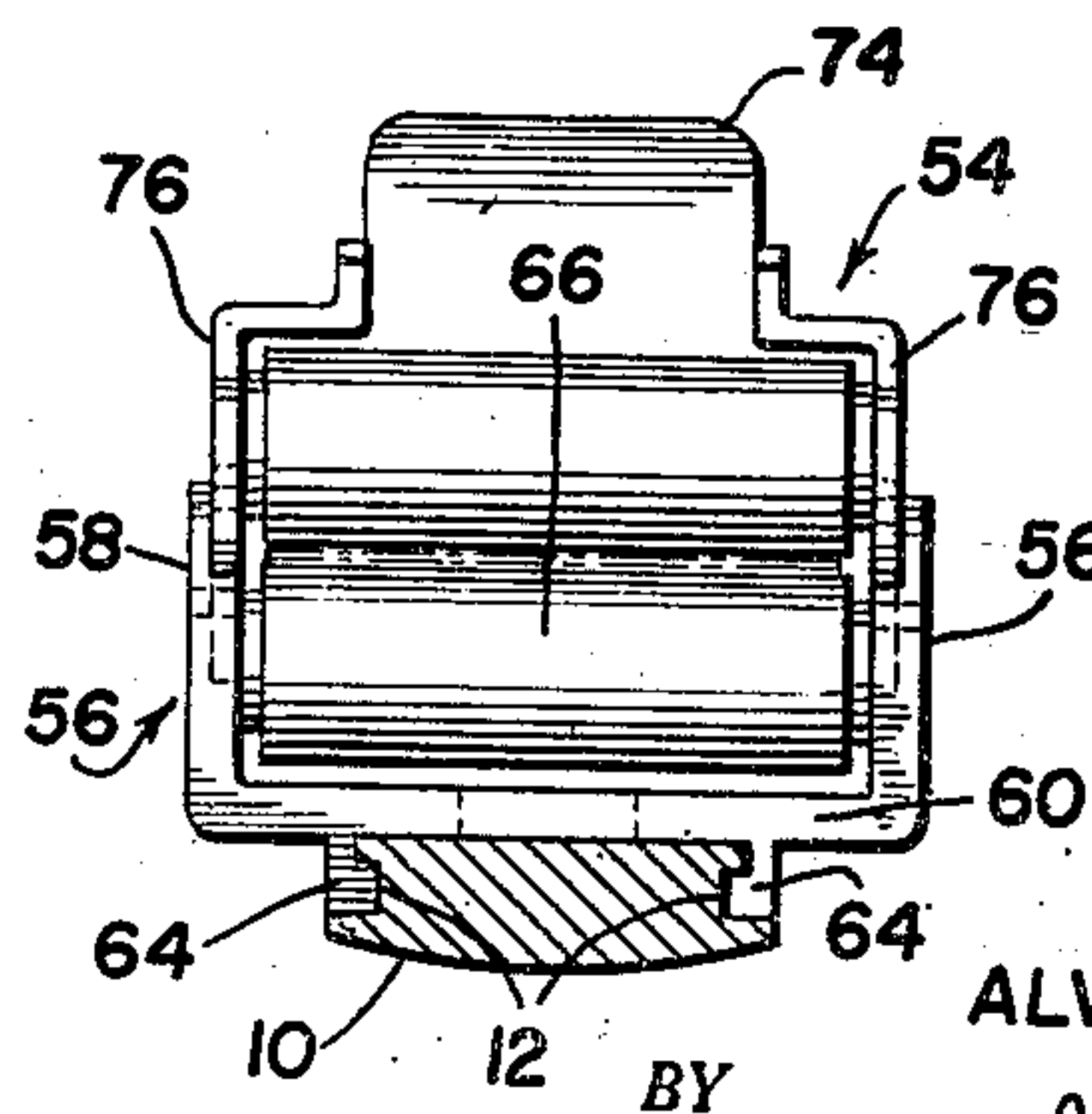


FIG. 5

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## UNITED STATES PATENT OFFICE

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## DISPENSING DEVICE FOR COLLAPSIBLE TUBES

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11 Claims. (Cl. 222-102)

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This invention relates generally to dispensing devices, and more particularly to an improved apparatus for supporting collapsible tubes, containing paste-like materials, such as paste pigments, shaving cream, tooth paste and the like, and for ejecting the contents of such tubes.

It is an important object of the invention to provide an improved device for supporting a collapsible tube and dispensing the contents thereof, as desired.

The invention has for another object the provision of a device of the character indicated that is capable of ejecting substantially all of the contents from a collapsible tube.

A further object of the invention is to provide a device for supporting and dispensing the contents of collapsible tubes of different diameters and/or lengths.

The invention has for a still further object the provision of a combined adjustable, supporting and dispensing device for collapsible tubes that is simple, compact and sturdy in construction, that is reasonable in initial and maintenance costs, that may be readily assembled, adjusted and dismantled, and that is efficient and trouble-free in operation.

The foregoing objects, as well as other objects, together with the advantages, construction and operation of the dispensing device of this invention will be readily comprehended by persons skilled in the art from the following detailed description and accompanying drawing, which respectively describe and illustrate a preferred arrangement of elements embodying the invention.

In the drawing:

Figure 1 is a view in side elevation of a device constructed in accordance with the invention and having a partially depleted collapsible tube mounted thereon;

Figure 2 is a top plan view of Figure 1;

Figure 3 is a central longitudinal cross-sectional view taken along line 3-3 of Figure 2, with the screw cap of the collapsible tube omitted;

Figure 4 is an end elevational view of the device of this invention as observed from the right of Figure 1, the collapsible tube being omitted; and

Figure 5 is a view taken along line 5-5 of Figure 2.

Referring now to the drawing wherein like reference numerals denote corresponding parts throughout the several views, the device of this invention include a base 10, the bottom surface of which (not shown) is preferably knurl-finished so as to minimize the possibility of slippage

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when the device is held in the palm of a hand. The base is provided with a pair of longitudinal parallel grooves 12. One such groove, as best shown in Figures 1 and 5, is formed in each side of the base. Secured to the rear end of the base, preferably by welding, is an upstanding bracket 14 having a through vertical drill hole 16 in a forward extension 18 (Figure 3). A member 20 made of suitable spring steel is secured to the top of bracket 14 by screws 22.

Integral with member 20 is a stationary upper jaw 24 that overhangs bracket extension 18 and that constitutes an element of a clamping mechanism or vise which will now be described. The clamping mechanism also includes a plunger 26 reciprocable in drill hole 16 and normally urged upwardly by a helical compression spring 28 that is located within the drill hole and bears against the upper surface of the base and the under surface of the plunger. A lower jaw 30 has an opening 32 (Figure 2) which receives the upper end of reduced diameter of plunger 26 whereby the lower jaw is press-fitted to the plunger. The lower jaw is provided with extensions or wings 33 (Figure 2) that project laterally beyond upper jaw 24 to facilitate downward movement of the lower jaw and plunger against the action of compression spring 28.

As is best shown in Figures 1 and 3, upper jaw 24 is generally concave upwardly, while lower jaw 30 is generally concave downwardly. Further, both jaws are of sufficient width to accommodate and clamp therebetween the clipped or folded closed end 34 of a collapsible tube 36. The illustrated tube is partially depleted of its contents and includes the usual threaded discharge neck 38 (Figure 3). The tube neck is adapted to project through and beyond a central opening 40 in a dished support member 42. A conventional tube cap 44 threadedly engages the tube neck to protect the contents of the tube against evaporation or contamination by the air when the contents are not being discharged from the tube. Support 42 has an integral depending plate 46 formed with a rearwardly projecting flange 48 (Figure 3), that bears against the upper surface of base 10, and a pair of parallel spaced-apart inwardly projecting tongues 50 that register with grooves 12 in the base to permit sliding movement of the support along the base. Support 42 is illustrated as being at the forward end of the base. It will be apparent that the support may be moved along the base to any desired location and locked in such location by a knurled set screw 52 (Figures 2 and 4).



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A roller carrier, generally denoted by numeral 54, is movable longitudinally of the tube in the direction of its discharge end to compress the tube and effect emission of the contents of the tube through neck 38. The carrier comprises a lower roller support frame 56 having a pair of parallel side walls 58 and a bottom wall 60, which is notched as indicated at 62 (Figure 2) for the reception of extension 18 of bracket 14 upon pre-determined movement of the carrier toward the left as viewed in Figures 1-3. Depending from bottom wall 60 is a pair of spaced-apart, parallel, inwardly projecting tongues 64, each of which registers with a corresponding groove 12 in the base. A lower cylindrical roller 66 is provided with coaxial press-fitted trunnions 68 that are rotatably supported by side walls 58.

The carrier also includes an upper roller support frame or bracket 70 having a top wall 72, terminating in a forwardly and upwardly projecting lip 74, and depending side walls 76. Bracket 70 is pivotal with respect to lower roller support frame 56 through the medium of coaxial pins 78. An upper roller 80 having press-fitted trunnions 82 is positioned between side walls 76 and freely rotatable with respect to the bracket. It will be noted from an examination of the drawing that upper roller 80 is positioned above lower roller 66 and is rotatable about an axis parallel to the axis of rotation of the lower roller. A flat stock spring 84 is press-fitted in an opening provided in wall 72 and bears against the rear of support frame 56 in a manner to normally urge bracket 70 in a counter-clockwise direction, as viewed in Figure 1, to thereby move upper roller 80 away from lower roller 66.

For the purpose of outlining the operation of the illustrated embodiment of the invention, it is first assumed that the parts are in the relative position shown in the drawing and that the device is being held in the palm of the left hand of a user. At such times, the clipped or folded end 34 of collapsible tube 36 is clamped between jaws 24 and 30 of the clamping mechanism, while the discharge end of the tube is mounted in support 42. Roller carrier 54 is positioned intermediate the clamping mechanism and forward support 42, the rearward portion of tube 36 having been depleted due to the action of the roller carrier which has its rollers 66 and 80 positioned respectively below and above the flattened portion of the tube.

When it is desired to withdraw a supply of paste material from the tube, the operator removes tube cap 44 and then grasps lip 74 of bracket 70 with the fingers of his right hand. He next exerts a combined downward and forward thrust on bracket 70 against the action of spring 84, causing upper roller 80 to move downwardly toward lower roller 66 and simultaneously moving roller carrier 54 forwardly or to the right as viewed in Figure 1. This flattens an additional portion of the tube and effects emission of a quantity of the contents of the tube through thread discharge neck 38.

It will be apparent that the device of this invention is adapted to readily and effectively eject substantially all of the contents from tube 36.

After the tube has become depleted, it may be readily and quickly removed and replaced with a full tube. The depleted tube may be removed from the device by first detaching its discharge end from support 42, and next pressing downwardly on extensions 33 of lower jaw 30

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to disengage the closed end of the tube from the clamping mechanism. The tube may be then withdrawn from between rollers 66 and 80. Roller carrier 54 is moved rearwardly or toward the left as viewed in Figure 1 until extension 18 of bracket 14 registers with opening 62 in the support frame bottom wall 60. Side walls 58 are spaced apart a sufficient distance to permit entry of the clamping jaws therebetween when the roller carrier is moved to its rearwardmost position. A full tube may then be mounted in the device and the foregoing procedural steps repeated.

From the foregoing, it is believed that the construction, operation, and advantages of my present invention will be readily comprehended by persons skilled in the art. It is to be clearly understood, however, that various changes in the apparatus set forth above may be made without departing from the scope of the invention, it being intended that all matter contained in the description or shown in the drawing shall be interpreted as illustrative only and not in a limiting sense.

I claim:

1. In a device for supporting a collapsible tube and dispensing the contents thereof, a base, a clamping mechanism carried by the rear portion of the base and adapted to engage the closed end of the tube, said mechanism comprising an upper jaw overhanging the base, a lower jaw intermediate the upper jaw and the base, one of the jaws being stationary and the other being movable relative thereto, and resilient means for normally urging the movable jaw toward the stationary jaw, a member mounted on the base forward of the clamping mechanism and adapted to removably support the discharge end of the tube, said member including a pair of spaced-apart parallel tongues adapted to register with and slide along corresponding grooves formed in the base, and means slidable along the base and movable longitudinally of the tube in the direction of its discharge end for compressing the tube to effect emission of the contents of the tube through the discharge end.

2. In a device for supporting a collapsible tube and dispensing the contents thereof, a base, a clamping mechanism carried by the rear portion of the base and adapted to engage the closed end of the tube, said mechanism comprising an upper jaw overhanging the base, a lower jaw intermediate the upper jaw and the base, one of the jaws being stationary and the other being movable relative thereto, and resilient means for normally urging the movable jaw toward the stationary jaw, a member mounted on the base forward of the clamping mechanism and adapted to removably support the discharge end of the tube, and means slidable along the base and movable longitudinally of the tube in the direction of its discharge end for compressing the tube to effect emission of the contents of the tube through the discharge end, said slidable means including a pair of spaced-apart parallel tongues that register with grooves formed in the base.

3. In a device for supporting a collapsible tube and dispensing the contents thereof, a base, a clamping mechanism carried by the rear portion of the base and adapted to engage the closed end of the tube, said mechanism comprising an upper jaw overhanging the base, a lower jaw intermediate the upper jaw and the base, one of the jaws being stationary and the other being



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movable relative thereto, and resilient means for normally urging the movable jaw toward the stationary jaw, a member mounted on the base forward of the clamping mechanism and adapted to removably support the discharge end of the tube, and means slidable along the base and movable longitudinally of the tube in the direction of its discharge end for compressing the tube to effect emission of the contents of the tube through the discharge end, said member and slidable means each including a pair of spaced-apart inwardly projecting tongues that register with and are movable along a path defined by a pair of tongues formed in the sides of the base.

4. In a device for supporting a collapsible tube and dispensing the contents thereof, a base, a clamping mechanism carried by the rear portion of the base and adapted to engage the closed end of the tube, said mechanism comprising a stationary upper jaw overhanging the base, a substantially vertically reciprocable plunger positioned between the upper jaw and the base, a lower jaw secured to the upper end of the plunger, a spring for normally urging the plunger and the lower jaw toward the upper jaw, a member mounted on the base forward of the clamping mechanism and adapted to removably support the discharge end of the tube, and means slidable along the base and movable longitudinally of the tube in the direction of its discharge end for compressing the tube to effect emission of the contents of the tube through the discharge end.

5. A device in accordance with claim 4 wherein the member and the slidable means each includes a pair of spaced-apart inwardly projecting parallel tongues that register with and are movable along a path defined by a pair of grooves formed in the sides of the base.

6. In a device for supporting a collapsible tube and dispensing the contents thereof, a base, a clamping mechanism carried by the rear portion of the base and adapted to engage the closed end of the tube, said mechanism comprising an upper jaw overhanging the base, a lower jaw intermediate the upper jaw and the base, one of the jaws being stationary and the other being movable relative thereto, and resilient means for normally urging the movable jaw toward the stationary jaw, a member mounted on the base forward of the clamping mechanism and adapted to removably support the discharge end of the tube, and a roller carrier movable longitudinally of the tube in the direction of its discharge end for compressing the tube to effect emission of the contents of the tube through the discharge end, said carrier comprising a support frame slidable along the base, a lower roller mounted in the support frame and freely rotatable with respect thereto, a bracket pivotally connected to the support frame, an upper roller carried by the bracket and freely rotatable about an axis that is above and substantially parallel to the axis of the lower roller, and a spring for normally urging the bracket in one direction about its pivotal connection with the support frame.

7. In a device for supporting a collapsible tube and dispensing the contents thereof, a base, a clamping mechanism carried by the rear portion of the base and adapted to engage the closed end of the tube, said mechanism comprising an upper jaw overhanging the base, a lower jaw intermediate the upper jaw and the base, one of the jaws being stationary and the other being movable relative thereto, and resilient means for normally

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urging the movable jaw toward the stationary jaw, a member mounted on the base forward of the clamping mechanism and adapted to removably support the discharge end of the tube, and a roller carrier movable longitudinally of the tube in the direction of its discharge end for compressing the tube to effect emission of the contents of the tube through the discharge end, said carrier comprising a support frame slidable along the base and including a bottom wall disposed above the base, a pair of spaced-apart side walls, a pair of spaced, inwardly projecting parallel tongues depending from the bottom wall and registering with corresponding grooves formed in the sides of the base, and a lower roller mounted between the side walls and freely rotatable with respect to the support frame, a bracket pivotally connected to the support frame, an upper roller carried by the bracket and freely rotatable about an axis that is above and parallel to the axis of the lower roller, and a spring for normally urging the bracket in one direction about its pivotal connection with the support frame.

8. A device in accordance with claim 7 wherein the member includes a pair of spaced-apart tongues adapted to register with and slide along the grooves in the base, and the spring normally urges the bracket in a direction about its pivotal connection with the support frame to move the upper roller away from the lower roller.

9. In a device for supporting a collapsible tube and dispensing the contents thereof, a base, a clamping mechanism carried by the rear portion of the base and adapted to engage the closed end of the tube, said mechanism comprising a stationary upper jaw overhanging the base, a substantially vertically reciprocable plunger positioned between the upper jaw and the base, a lower jaw secured to the upper end of the plunger, a spring for normally urging the plunger and the lower jaw toward the upper jaw, a member mounted on the base forward of the clamping mechanism and adapted to removably support the discharge end of the tube, and a roller carrier movable longitudinally of the tube in the direction of its discharge end for compressing the tube to effect emission of the contents of the tube through the discharge end, said carrier comprising a support frame slidable along the base, a lower roller mounted in the support frame and freely rotatable with respect thereto, a bracket pivotally connected to the support frame, an upper roller carried by the bracket and freely rotatable about an axis that is above and substantially parallel to the axis of the lower roller, and a spring for normally urging the bracket in one direction about its pivotal connection with the support frame.

10. In a device for supporting a collapsible tube and dispensing the contents thereof, a base, a clamping mechanism carried by the rear portion of the base and adapted to engage the closed end of the tube, said mechanism comprising a stationary upper jaw overhanging the base, a substantially vertically reciprocable plunger positioned between the upper jaw and the base, a lower jaw secured to the upper end of the plunger, a spring for normally urging the plunger and the lower jaw toward the upper jaw, a member mounted on the base forward of the clamping mechanism and adapted to removably support the discharge end of the tube, and a roller carrier movable longitudinally of the tube in the direction of its discharge end for compressing the tube to effect emission of the contents of the tube



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through the discharge end, said carrier comprising a support frame slidable along the base and including a bottom wall disposed above the base, a pair of spaced-apart side walls, a pair of spaced, inwardly projecting parallel tongues depending from the bottom wall and registering with corresponding grooves formed in the sides of the base, and a lower roller mounted between the side walls and freely rotatable with respect to the support frame, a bracket pivotally connected to the support frame, an upper roller carried by the bracket and freely rotatable about an axis that is above and parallel to the axis of the lower roller, and a spring for normally urging the bracket in one direction about its pivotal connection with the support frame.

11. A device in accordance with claim 10 where-

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in the member includes a pair of spaced-apart tongues adapted to register with and slide along the grooves in the base, and the last mentioned spring normally urges the bracket in a direction about its pivotal connection with the support frame to move the upper roller away from the lower roller.

ALVARO CADALZO.

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