Dec. 22, 1936. C. W. ABBOTT 2,065,298

APPARATUS FOR APPLYING CONDUITS

Filed May 7, 1934

Fig. 1.

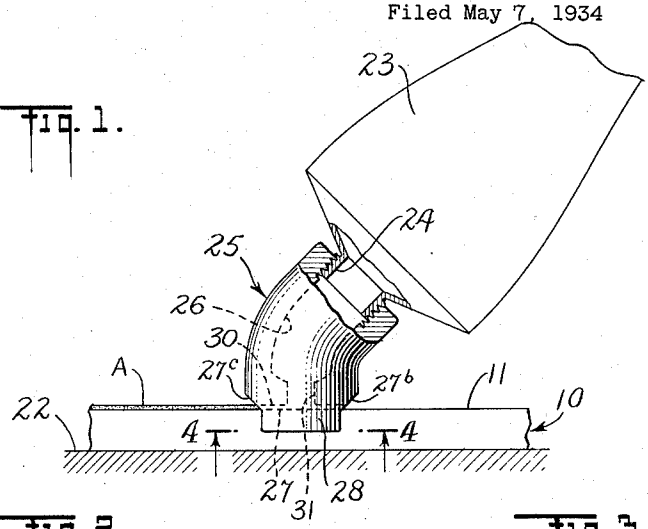


Fig. 10.

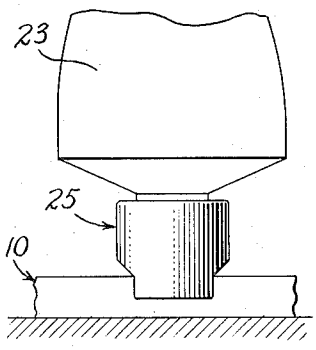


Fig. 2.

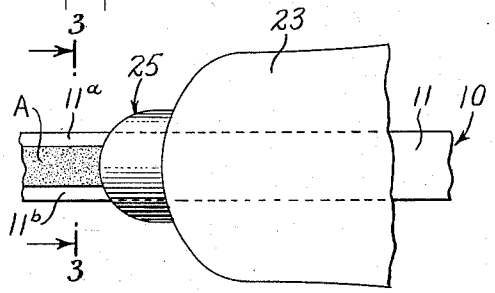


Fig. 3.

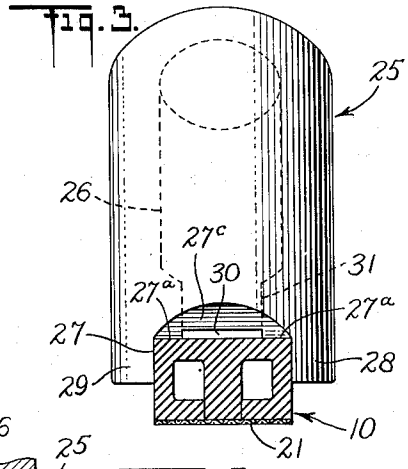


Fig. 4.

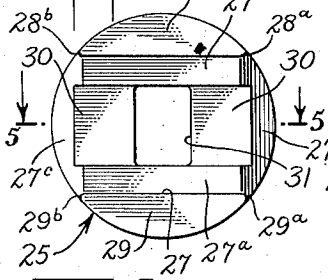


Fig. 5.

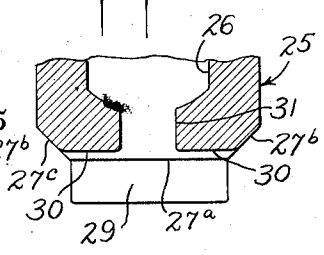


Fig. 6.

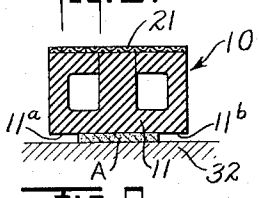


Fig. 8.

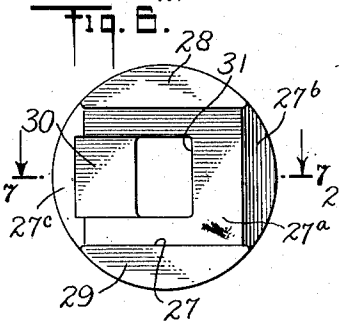


Fig. 7.

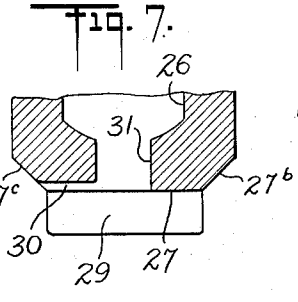
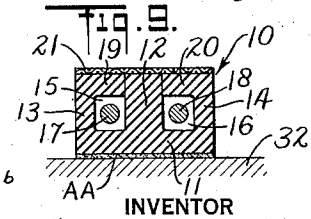


Fig. 9.



INVENTOR
Charles W. Abbott
BY
Blair, Curtis & Dunne
ATTORNEYS

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APPARATUS FOR APPLYING CONDUITS

Charles W. Abbott, Larchmont, N. Y., assignor to The Bryant Electric Company, Bridgeport, Conn., a corporation of Connecticut

Application May 7, 1934, Serial No. 724,370

8 Claims. (Cl. 91—67.4)

This invention relates to the application of conduit to a supporting surface, such as a wall, or the like, and more particularly to a method and apparatus for thus applying conduit.

One of the objects of this invention is to provide a thoroughly practical and inexpensive apparatus for preparing conduit, particularly conduit of flexible dielectric material, such as rubber, for application to a supporting surface, such as a wall, or the like, and to provide an apparatus and method whereby such preparation and application of the conduit may be speedily, inexpensively and dependably effected. Another object is to provide a thoroughly practical and efficient apparatus for applying an adhesive to conduit of the above-mentioned nature preliminary to the application of the conduit itself to the supporting surface. Another object is to provide an apparatus of this character by which the adhesive, having due regard to its character or properties, such as viscosity, or the like, may be applied quickly and efficiently in the appropriate quantity to achieve the desired result of neatly and securely holding the conduit and the supporting surface together. Another object is to provide a simple and thoroughly practical method of securing conduit, such as that above illustratively mentioned, and a supporting surface together. Other objects will be in part obvious or in part pointed out hereinafter.

The invention accordingly consists in the features of construction, combinations of elements, arrangements of parts and in the several steps and relation and order of each of the same to one or more of the others all as will be illustratively described herein, and the scope of the application of which will be indicated in the following claims.

In the accompanying drawing, in which are shown several of the various possible embodiments of the mechanical features of my invention,

Figure 1 is a side elevation of the apparatus shown in operative relation to the conduit being prepared for application to a supporting surface;

Figure 2 is a plan view, as seen from the top in Figure 1;

Figure 3 is an end elevation partly in section, as seen from the left in Figure 2, and substantially along the line 3—3, certain parts, however, being omitted;

Figure 4 is an elevation, as seen from the bottom in Figure 1 or, more particularly, as seen along the line 4—4 of Figure 1, omitting the conduit itself and showing in bottom elevation the end face of the orifice structure;

Figure 5 is a fragmentary sectional view, as seen along the line 5—5 of Figure 4;

Figure 6 is a view similar to that of Figure 4 showing a possible modified form of orifice structure;

Figure 7 is a sectional view, as seen along the line 7—7 of Figure 6;

Figure 8 is a transverse sectional view of a prepared conduit in relation to its supporting wall or the like, at the initial moment of application of one to the other;

Figure 9 is a view similar to that of Figure 8 showing the final interrelation of conduit, adhesive, and supporting surface or wall, certain parts in both Figures 8 and 9 being somewhat exaggerated in order to depict certain actions more clearly, and

Figure 10 is a view like that of Figure 1 showing a modified form or shape of device.

Similar reference characters refer to similar parts throughout the several views of the drawing.

As conducive to a clearer understanding of certain features of my invention, it might at this point be noted that I have disclosed and claimed in my application Serial No. 571,962, filed October 30, 1931, certain forms of flexible dielectric conduit which I sometimes term as "extension feeders", having certain features of construction and action and adaptability of installation, and among the latter is the feature of applying the conduit, which may be given an extraneous form or shape or finish to be ornamental or unobjectionable in appearance, directly, by a suitable adhesive to a supporting surface, such as a wall, ceiling, or the like. Though, as disclosed in the above-mentioned application, the conduit may assume various structural forms, the conduit therein disclosed may serve as illustrative of a form of conduit with the application or mounting of which my present invention is particularly concerned and by a typical or preferred form of which conduit my present invention may be illustratively set forth. I have, therefore, for purposes of illustration herein, assumed that the conduit to be prepared and mounted in accordance with my present invention may take the form of that generally indicated at 10 in Figure 9 herein, that form being one of the several disclosed in my above-mentioned application, but it is to be understood that, in so far as certain aspects of my present invention are concerned, I do not intend or wish

to be limited to that particular form of conduit thus selected for illustration.

Referring, therefore, to Figure 9, in which the above-mentioned illustrative form of conductor-carrying conduit 10 is shown in transverse section, it will be seen that the conduit 10, made up of any suitable flexible dielectric composition, such as rubber, has a flat base 11 from which there extend upwardly a central rib 12 and two lateral ribs 13—14, each spaced to one side of the central rib 12, thereby forming channels 15—16 in which the conductors 17—18 (which may be bare) are received; the outermost ribs 13—14 have extensions or flaps 19—20 turned inwardly toward and brought into contact with the central rib 12, thereby closing the conductor-receiving channels 15—16, respectively. The channel-closing flaps are held in position by a fiber or other suitable tape 21 suitably cemented or otherwise secured to the several parts with which it contacts.

The conduit 10 is to be run along and secured to such supporting surfaces, usually the walls or other bounding surfaces of a room, or the like, to extend or carry the circuit from point to point, as may be required or desired, as pointed out in my above-mentioned application and, as will now be clear, it may run, for example, along baseboards, moldings, door frames, window frames, or the like, and the lengths of the required sections or portions of conduit to reach from one point to another will, of course, vary according to conditions met with in practice. To achieve a rapid, efficient, and inexpensive preparation of such sections or portions of the conduit for mounting in place and to achieve a similarly speedy, efficient, and inexpensive securing or mounting of the prepared conduit in place, are among the dominant aims of this invention.

Accordingly, referring now to Figure 1, I first cut a suitable length of conduit indicated at 10 in Figure 1 and, after suitably preparing the bottom face 11 (see Figure 9) of the conduit 10, in a manner depending upon the kind or character of adhesive to be employed, I lay the length of conduit 10 down on any suitable support 22 (Figure 1), such as the floor or a table, or the like, but with the bottom face 11 of the conduit directed upwardly; in other words, the section of conduit 10 is laid down on the support 22 upside down. The conduit 10 is now in condition to have the adhesive applied thereto.

The adhesive itself may assume any suitable or desired form or composition and in so far as the broader aspects of my invention are concerned, I do not wish to be limited in that respect. Depending upon various conditions met with in practice, such as the place of application of the conduit, the character of the supporting surface which is to carry the conduit, and other conditions, the adhesive may, for example, be of the nature of glues made of animal substances, it may be a pyroxylin cement, it may be a rubber cement, it may be an adhesive of the colloid type; there is a wide range of adhesive materials which may be employed. Most of these and the preferred forms have relatively low viscosity, particularly the heavier and almost plastic types of adhesives, included in which are some of the so-called rubber cements. Preferably, I make the adhesive that I propose to employ, and which may be any suitable one of the above-mentioned adhesives, available in a suitable container 23 (Figures 1 and 2), preferably in the form of a so-called "collapsible" tube preferably made of a suitable sheet metal, having, therefore, a threaded neck or discharge opening 24 to which I apply an applicator generally indicated at 25, the container 23 thus serving as a convenient handle for grasping and controlling the applicator 25, as is more fully set forth hereinafter.

The applicator 25, made of a suitable material, preferably metal, or even phenolic condensation product, or the like, is provided with an interior chamber or passage 26 whose uppermost end (see Figures 1 and 2) is threaded to receive the neck 24 of the adhesive container 23.

Preferably and conveniently the applicator 25 is curved or shaped, as better seen in Figure 1, so that the container 10, serving as a handle as above-mentioned for grasping by the hand, extends at a convenient angle to the line or plane of the conduit 10 along which the applicator 25 and container 23 are to be moved or drawn in carrying out the process of my invention. The applicator, however, might also be devoid of the above-mentioned curvature and hence might take the form shown on a smaller scale in Figure 10.

In cross-section, transversely of the direction in which the inner channel 26 extends, the device 25 may be of a generally circular cross-section, thus presenting a lower or end face for coaction with the conduit 10 and having certain coacting features of construction and action. If, as in the illustrative form, the above cross-section is generally circular, the diameter or width of the device is preferably greater than the width of the conduit 10 (see Figure 2) and this lower end face of the device 25 has cut into it or is otherwise shaped or machined to provide a channel in which the conduit 10 is partially received, as is indicated in Figure 1 and as is better shown in Figure 3. More specifically, the conduit-receiving channel, indicated at 27 in Figures 1, 3, and 4, thus formed, provides two laterally spaced downwardly directed guiding flanges 28 and 29, between which the inverted conduit 10 is snugly received and which (see Figures 1 and 4) are of adequate length in the direction of the length of the conduit 10 so as dependably to guide the applicator 25 along the inverted conduit 10 as it is drawn along the latter; to avoid digging into the sides of the conduit 10, these lateral guides 28—29 (see Figure 4) are preferably rounded over at their leading edges, as at 28^a and 29^a, but inasmuch as the preferred embodiment of device 25 is preferably reversible, these guiding flanges 28—29 are also rounded off at their other edges, as at 28^b and 29^b, respectively. These rounded leading edges act to insure nicety and smoothness of guiding action as the device 25, as viewed in Figures 1 and 2, is moved in a direction to the right or left.

The bottom face of the conduit-receiving channel 27, as viewed in Figure 4, is indicated at 27^a and contacts with the substantially flat bottom face of the conduit 10 (see Figure 3) and is drawn along the latter as the applicator 25 is moved lengthwise of the conduit 10 (Figures 1 and 2); its end portions are beveled off or suitably curved as at 27^b and 27^c (Figures 1 and 4), thus avoiding sharp corners or edges that might dig into the bottom face of the conduit 10 as the applicator is moved along, either to the right or left, as viewed in Figures 1 and 2. Preferably, also, this face 27^a of the conduit-receiving channel 27 is of adequate expanse or length in a

direction lengthwise of the conduit 10 (see Figure 1) in order, among other things, to aid the operator in maintaining the applicator 25 in proper contact with the bottom face or base 11 of the conduit 10 as the applicator moves along, aiding also in preventing tilting of the applicator 25 relative to the conduit 10 and thus aiding the operator in properly holding the applicator as it is moved along the conduit.

Extending lengthwise of the face 27a of the conduit-receiving channel 27, is what I shall term an orifice channel 30 (Figures 3, 4, and 1); this orifice channel 30 is alined along the longitudinal center line of the channel face 27a and, as is well shown in Figures 3 and 4, it is of less width than the width of the channel face 27a or of the channel 27 itself; accordingly, it is of less width than the width of the base 11 of the conduit 10. Substantially at the midpoint along its longitudinal axis the orifice channel 30 is in communication with a passage or orifice 31 (Figures 3, 4, and 1), communicating with the passage or chamber 26 (Figure 1) which is in communication with the source of supply of adhesive, namely, the container or reservoir 23. Preferably the orifice 31 (Figure 4) extends entirely across the orifice channel 30; its dimension in the direction of the length of the orifice channel 30 may vary, as hereinafter pointed out, in accordance with the type or kind of adhesive employed and, more particularly, its viscosity.

As is better shown in Figures 3 and 4, the orifice channel and the orifice 31 act virtually to sub-divide the face 27a of the conduit-receiving channel 27 into laterally displaced marginal portions that contact, along their length, with the marginal portions of the base 11 of the conduit 10, as the device 25 is moved along the conduit; inasmuch as, while the device 25 is moved along the conduit, the device 25 is securely pressed against the conduit, the contacts between the marginal portions of the face 27a and the marginal portions of the bottom face 11 of the conduit form and maintain seals between the device 25 and the conduit 10, thus causing the central portion of the conduit face 11 (see Figure 3) to form virtually a bounding face for the orifice channel 30, a bounding face between which, however, and the walls of the orifice channel 30, relative movement takes place. It is, therefore, to this middle portion of the conduit face 11 that is exposed to the orifice channel 30, that the adhesive, coming down through the passage 26 (Figure 1) and the orifice 31, is to be applied.

The width of the orifice channel 30 (Figure 3) determines the width of the ribbon or streak of adhesive that is laid centrally along the conduit base 11; the thickness of this ribbon or streak of adhesive is determined, in part at least, by the vertical dimension (as viewed in Figure 3) of the orifice channel 30. Coacting to determine the appropriate depth of this band or streak of adhesive are the dimensions and shape of the orifice 31 (Figures 3 and 4) and also the length, in the direction of drawing movement of the device 25, of that portion of the orifice channel 30 on the trailing side of the orifice 31, that portion, with the base 11 of the conduit 10 forming a relatively long and narrow closed channel one wall (the conduit base 11) of which is in motion relative to the remaining parts and receives the band of adhesive of appropriate thickness and width.

The operator, as he draws the applicator 25 along the conduit 10, places the adhesive in the passage or chamber 26 (Figure 1) under appropriate pressure, by squeezing the collapsible tube 23 which, as above already pointed out, serves as part of the handle and is in the operator's grasp. Drawing the applicator along the conduit 10, at a suitable rate, while pressing it against the bottom face 11 of the conduit, at the same time maintaining an appropriate pressure of the adhesive entering the orifice 31 and the orifice channel 30. In Figures 1 and 2 it has been assumed that the applicator is drawn in a direction toward the right, though, as will be clear in view of what has been above stated, the applicator is constructed to be reversible in action and, if desired or more convenient, the movement of the parts may be carried on in a direction toward the left, as viewed in these two figures. The band of adhesive indicated at A in Figures 1 and 2 is thus applied and laid down onto the base 11 of the conduit 10, leaving marginal band portions 11a and 11b (Figure 2) of the base 11 of the conduit free or devoid of adhesive. The adhesive is laid down in a band of uniform width and thickness so long as the adhesive in the applicator 27 is kept under suitable pressure. In this connection, it is to be noted that the action of the orifice 31 and the orifice channel 30 is such that the rate of flow of the adhesive, particularly where the adhesive is of low viscosity and is virtually plastic in constituency, is substantially limited even though the pressure under which the adhesive is placed by the operator may not be uniform so long as it exceeds the minimum necessary to effect movement of the adhesive into contact with the conduit base 11.

Thus, exceptional skill or meticulous regulation of pressure on the adhesive is not required of the operator and he may concentrate his attention on properly holding and drawing the device along the conduit and at a suitable or convenient rate of movement.

The width and thickness of the band or streak A of adhesive thus applied to the base 11 of the conduit are determined by such factors as the width of the base of the conduit itself and the properties of the adhesive material itself, such as its viscosity or deformability after initial application. The parts of the applicator 25 are accordingly proportioned to lay onto the conduit 10 a band or ribbon A of adhesive, as shown in Figures 1 and 2, so that, when the thus prepared conduit 10 is about to be applied to the wall 32 (see Figure 8), the relation of the conduit base, adhesive, and supporting surface of the wall is in general as indicated or shown in Figure 8, it being noted that there exist along the two sides of the streak or band of adhesive A lateral or marginal portions of the base 11, as indicated at 11a and 11b, which are free from adhesive. If, then, the conduit 10 is pressed against the supporting face of the wall 32, the adhesive A is deformed and flows laterally into the space between the supporting surface of the wall 32 and the marginal portions 11a—11b of the base of the conduit, just about filling these spaces, and the parts assuming the relation shown in Figure 9, where the band or streak of adhesive will be seen to have been uniformly spread over and between the two faces to be joined.

Thus, the conduit may be accurately and neatly applied to the supporting surface and the portions of the latter not juxtaposed to the base

11 of the conduit and the sides of the conduit itself remain substantially free from extrusions of adhesive. This is an important feature or advantage, particularly when it is considered that some of these adhesives, and particularly the preferred adhesives that I employ, are of such a character as to make difficult or troublesome the cleaning off of surplusage. Moreover, where the conduit is applied to an already finished or decorated wall or surface, messing up of such surface is thus avoided.

From the foregoing, the practice of my invention will be clear and readily understandable. It might be noted, however, as further illustrative of certain features of my invention, that, where the adhesive to be employed is one of the plastic rubber cements of very low viscosity, I have obtained excellent results with the applicator parts above described having dimensions substantially as follows:—

(a) Width of conduit-receiving channel 27 about ½".

(b) Width of orifice channel 30 (as viewed in Figure 3) about $\frac{5}{16}$".

(c) Depth or vertical dimension of orifice channel 30 (as viewed in Figure 3) somewhat less than $\frac{1}{32}$".

(d) Dimensions of orifice 31 (as viewed in Figure 4) $\frac{5}{16}$" x $\frac{7}{32}$".

With such a construction, employing such a plastic cement or adhesive, and referring to Figures 8 and 9, I have been enabled to lay down on the conduit 10 just the right amount of adhesive to cause it to flow or deform or spread over the areas of the surfaces to be joined without lateral extrusion or discharge of adhesive.

I have above pointed out how the applicator 25, where it coacts with the conduit 10, is constructed to be reversible as to the direction of movement thereof lengthwise of the conduit, the orifice channel 30 (see Figures 4 and 5) having thereby portions to either side of the central orifice 31, that portion which happens to be on the trailing side of the orifice 31 being active, as above described, while the other portion (the portion on the leading side or edge of the orifice 31) being preferably inactive in so far as laying down the band or streak of adhesive is concerned. I may, however, construct the device 25 to be uni-directional in action in which case the active portions of the applicator 25 may take the form shown in Figures 6 and 7 which are views similar to those of Figures 4 and 5, respectively, excepting that that portion of the orifice channel 30 which extends to one side of the orifice 31 (for example, that portion that extends to the right as viewed in Figures 4 and 5) being eliminated and the device being thereby adapted to be moved in the direction toward the right, as viewed in Figures 6 and 7, relative to the conduit base.

The above described method of applying the adhesive to the conduit is the preferred method where only one operator is available or is concerned with preparing the conduit. I may, however, effect relative movement between the applicator and the conduit 10, in the direction of the length of the latter, in any other suitable or desirable manner; for example, I may hold the applicator stationary, while controlling the pressure on the adhesive as above described, while the conduit 10 is moved in a direction to the left, as viewed in Figure 1 (or even to the right), by any suitable means. For example, I may achieve speedy preparation of the conduit by having one operator pull the conduit along while another operator holds the device 25 relatively stationary, maintaining appropriate pressure on the adhesive as gaged by the rate of movement of the conduit under the action of the other operator.

It will thus be seen that there has been provided in this invention an apparatus and method in which the various objects hereinbefore stated, together with many thoroughly practical advantages, are successfully achieved. The conduit may thus be quickly and efficiently prepared and secured in place and, moreover, such results may be achieved not only expeditiously but also cleanly. It will be understood, of course, that the dimensions above given by way of illustration are not to be interpreted in a limiting sense and are merely illustrative and that it is to be understood that the shape and dimensions of the various parts may be widely varied depending particularly upon the characteristics of the adhesive to be employed. It will further be seen that the device is inexpensive and of rugged construction and is well adapted to meet the conditions of hard practical use.

As many possible embodiments may be made of the mechanical features of the above invention and as the art herein described might be varied in various parts, all without departing from the scope of the invention, it is to be understood that all matter hereinabove set forth or shown in the accompanying drawing is to be interpreted as illustrative and not in a limiting sense.

I claim:

1. In a device for applying a band of adhesive to the supporting face of a conduit, in combination, means adapted to be grasped in the hand and having an adhesive reservoir with means responsive to the pressure of grasping for causing flow of adhesive out of said reservoir, said first-mentioned means having a substantially flat face for engagement with the face of the conduit as the device is drawn along the latter, there being laterally displaced guiding means for engaging the sides of the conduit and guiding said flat face along the latter, said flat face being provided with an orifice of less width than the width of the conduit and in communication with the adhesive flowing out of said reservoir, said flat face having therein a channel extending from the trailing edge of the flat face to said orifice, said channel having dimensions substantially equal to the dimensions of the band of adhesive desired to be laid down on the conduit.

2. In a device for applying a band of adhesive to the supporting face of a conduit, in combination, means adapted to be grasped in the hand and having an adhesive reservoir with means responsive to the pressure of grasping for causing flow of adhesive out of said reservoir, said first-mentioned means having a substantially flat face for engagement with the face of the conduit as the device is drawn along the latter, there being laterally displaced guiding means for engaging the sides of the conduit and guiding said flat face along the latter, said flat face being provided with an orifice of less width than the width of the conduit and in communication with the adhesive flowing out of said reservoir, said flat face having therein a channel extending from the trailing edge of the flat face to said orifice, said channel having a width less than the width of the conduit and being alined substantially with the longitudinal center line of the latter.

3. In a device for applying a band of adhesive to the supporting face of a conduit, in combination, means adapted to be grasped in the hand and having an adhesive reservoir with means responsive to the pressure of grasping for causing flow of adhesive out of said reservoir, said first-mentioned means having a substantially flat face for engagement with the face of the conduit as the device is drawn along the latter, there being laterally displaced guiding means for engaging the sides of the conduit and guiding said flat face along the latter as said device is drawn along the conduit, said flat face having a channel extending lengthwise thereof and open at the trailing edge of the face, the channel being of less width than the width of the conduit and receiving the flow of adhesive from said reservoir.

4. In a device for applying a band of adhesive to the supporting face of a conduit, in combination, means adapted to be grasped in the hand and having an adhesive reservoir with means responsive to the pressure of grasping for causing flow of adhesive out of said reservoir, said first-mentioned means having a substantially flat face for engagement with the face of the conduit as the device is drawn along the latter, there being laterally displaced guiding means for engaging the sides of the conduit and guiding said flat face along the latter, said flat face having a discharge opening therein in communication with said reservoir and having oppositely disposed portions for contacting with the marginal portions of the conduit face and being pressed there against as said device is drawn along said conduit, thereby to seal said marginal portions from access thereto of adhesive flowing out of said discharge opening.

5. In an adhesive applicator, in combination, a device capable of being drawn along the lengthwise extending surface of a conduit and having a passage therethrough, said passage being provided at one end with means for securing thereto a collapsible adhesive-containing tube, said device having laterally spaced means for engaging the conduit laterally and guide said device as it is moved along said conduit surface, and having laterally spaced shoulders for engaging and for being pressed against the surface to which the adhesive is to be applied as said device is drawn therealong and said passage terminating at its other end intermediate of said shoulders, whereby the pressure of contact between said shoulders and said surface insures sealing the portions of said surface engaged by said shoulders against access thereto of adhesive.

6. In an adhesive applicator, in combination, a device capable of being drawn along the lengthwise extending surface of a conduit and having a passage therethrough one end of which is provided with means for supplying the passage with an adhesive, said device being in vertical cross-section substantially of inverted U-shape, the spaced legs of which receive said conduit therebetween and guide the device along the conduit, the underface that extends between said two legs being substantially U-shaped for engagement with the surface to which the adhesive is to be applied as the device is drawn along and pressed against the surface with the open end of the U-shaped face trailing, there being a discharge opening connecting said passage with said U-shaped face but within the confines of the latter.

7. A device for applying adhesive along a conduit or the like and adapted to be drawn along the latter, said device comprising, in combination, a pair of spaced members between which the conduit is received and by which the movement of the device lengthwise of the latter is guided, an adhesive-discharging opening intermediate of said spaced guiding members, and means for confining the application of adhesive to a certain area of the conduit as the device is drawn along the latter.

8. In a device for applying a ribbon of adhesive to the face of a conduit, in combination, a member having a wall adapted to engage the conduit face and provided with means whereby said member with its side wall may be pressed against said conduit face, said member having means for preventing relative lateral displacement between said member and the conduit as relative movement therebetween in the direction of the length of the conduit takes place while said wall is pressed against said conduit face, said wall having orifice means exposed toward the conduit face for controlling the quantity of adhesive laid down on the conduit face as said relative motion in a direction lengthwise of the conduit takes place.

CHARLES W. ABBOTT.