Aug. 10, 1971 J. E. BUTLER ET AL 3,598,683

APPARATUS FOR INSTALLING TAPE

Filed June 30, 1969 2 Sheets-Sheet 1

Fig. 1.

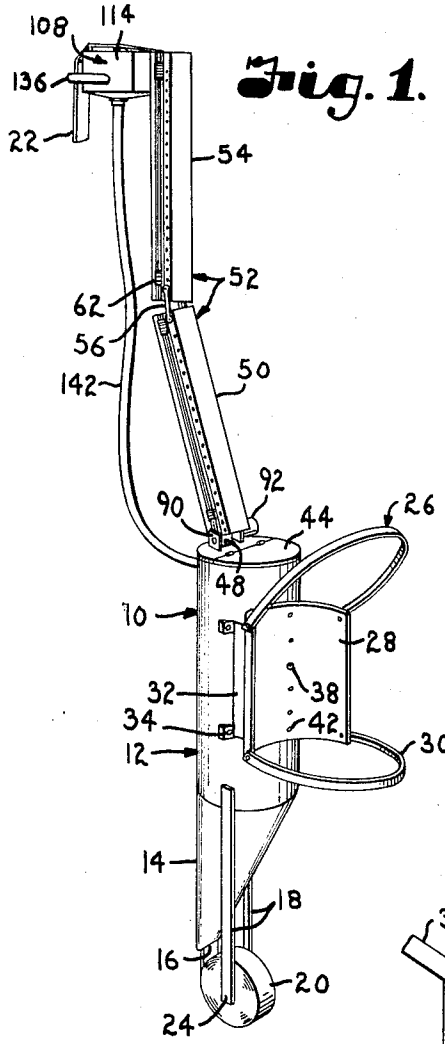


Fig. 2.

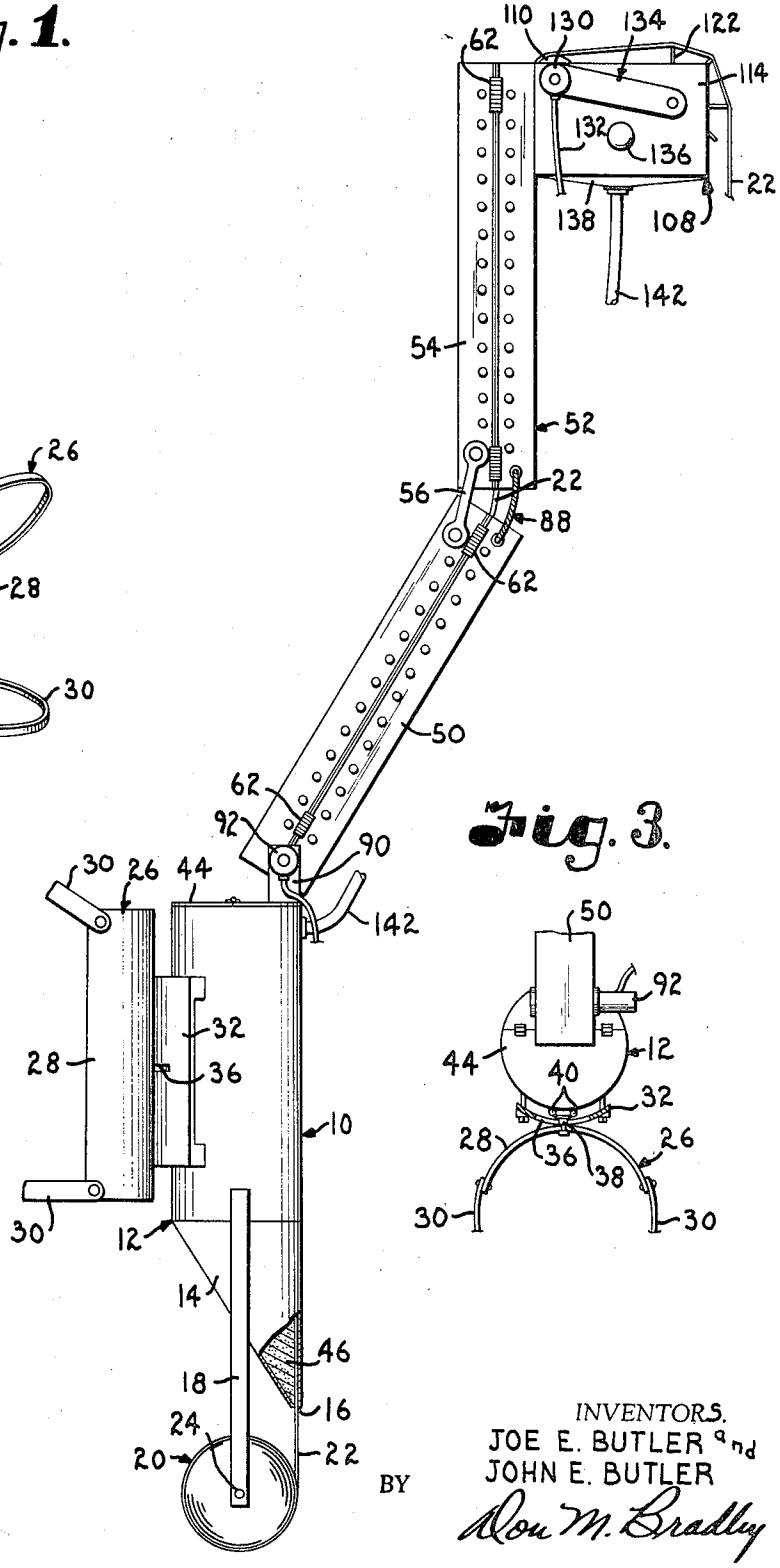


Fig. 3.

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Filed June 30, 1969 2 Sheets-Sheet 2

Fig. 4.

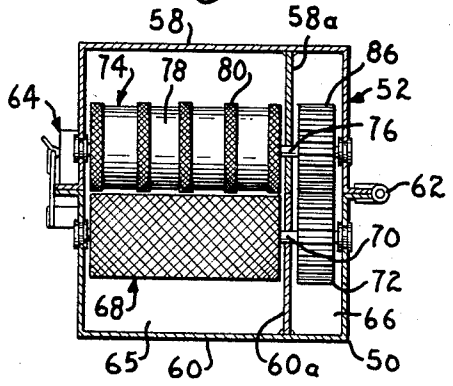


Fig. 5.

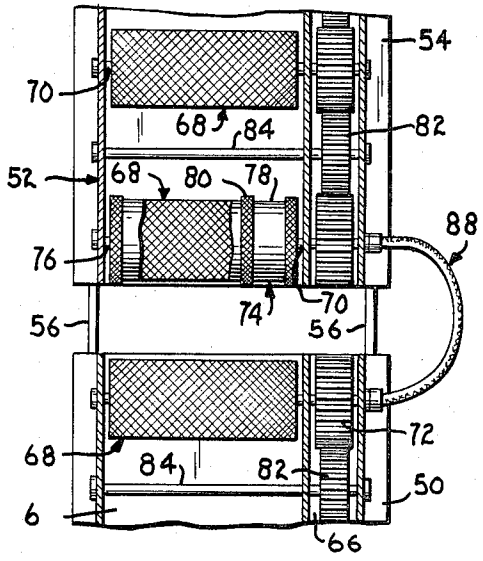


Fig. 8.

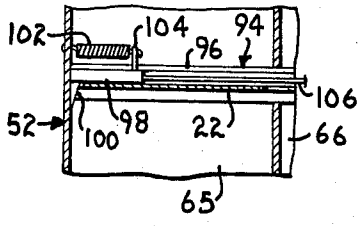


Fig. 6.

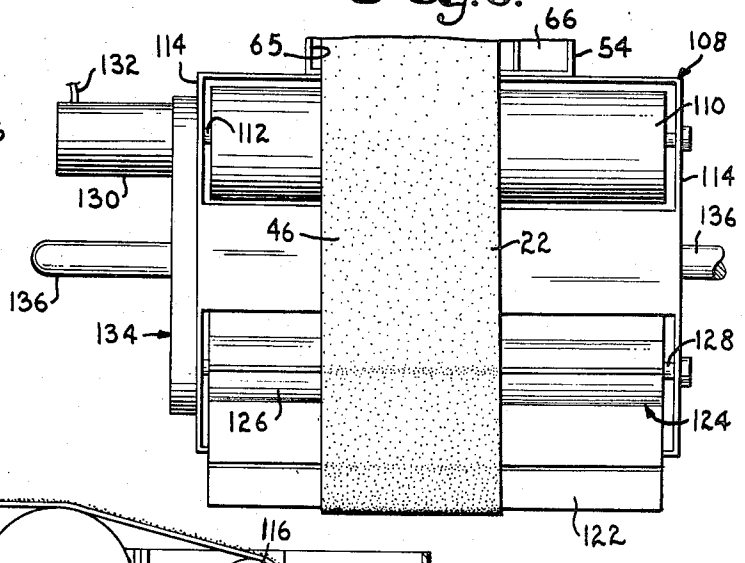
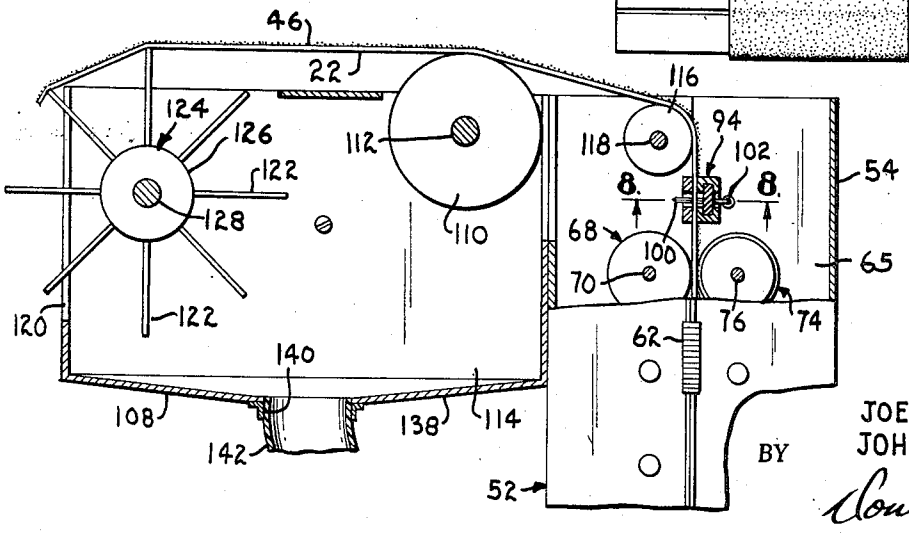


Fig. 7.



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APPARATUS FOR INSTALLING TAPE

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U.S. Cl. 156—527 6 Claims

ABSTRACT OF THE DISCLOSURE

A machine for applying tape to dry wall construction comprising a plaster container supported from a harness worn by a workman. An endless tape is drawn by a plurality of cogged rollers in a tubular, jointed arm through the plaster and delivered to a rotatable, flexible vaned trowel operated by an electric motor. The trowel smooths the tape onto the wall and excess plaster may gravitate through a conduit into the container. A spring return cutting member operated from a draw string is provided for cutting the tape.

This invention relates to construction finishing work, and more particularly, to a machine for applying seam covering tape to the joints between panels of sheet rock, gypsum board or the like.

The cracks between abutting panels of building material of this type are conventionally sealed with a paper tape which is coated with plaster or spackling material. The latter serves as an adhesive and as a medium for imbedding the tape to present a perfectly smooth surface at the joint. The tape and plaster also cover the heads of nails used to secure the panels to the building studs.

Heretofore, the application of tape to walls of this type has been a tedious, laborious process which requires considerable manual skill. Apparatus have been proposed for applying the tape from a continuous roll, but these have been largely unsuccessful because of the inability of such apparatus to adequately perform the various operations which must be carried out in the production of joints which are smoothly sealed by tape. Among the problems encountered with these apparatus has been the inability to prevent twisting of the tape, little effective control over the amount of plaster carried by the tape to its point of application to the wall and inadvertent tearing of the tape during use of the apparatus.

Accordingly, it is a primary object of the present invention to provide a tape applicator machine which is highly reliable and is capable of providing all of the essential operations for producing smooth joints for walls of this type.

It is another very important object of the present invention to provide a machine which may be readily carried and which is easily manipulated by a workman carrying out the taping operation.

Still a further object of the invention is to provide a machine which utilizes a readily controllable power drive for transporting the tape through the machine to avoid inadvertently tearing the tape.

Another object of this invention is to provide a tape applying machine having pairs of rollers configured to automatically control the amount of plaster carried by the tape to its point of application on the wall.

Still another object of this invention is to provide a machine provided with a highly reliable troweling device capable of smoothly installing the tape to hide the presence of the joint in the wall from visual detection.

Other objects of the present invention reside in the provision of dependable means for returning any excess plaster to the supply container, and the utilization of relatively inexpensive construction for the machine to

effect economies in both the fabrication and the operation of the machine.

These and other important objects of this invention will be further explained or will become apparent from the specification, claims and drawings.

In the drawings:

FIG. 1 is a perspective view on a reduced scale of a machine embodying the principles of this invention;

FIG. 2 is a fragmentary, side elevational view of the machine, parts being broken away and shown in cross-section to reveal details of construction;

FIG. 3 is a fragmentary, top plan view of the machine, parts being broken away and shown in cross-section to reveal details of construction;

FIG. 4 is an enlarged, transverse, cross-sectional view through the arm of the machine;

FIG. 5 is an enlarged, fragmentary, longitudinal cross-sectional view through the arm illustrating the joint of the arm;

FIG. 6 is an enlarged, fragmentary top plan view of the applicator head of the machine;

FIG. 7 is an enlarged, fragmentary side-elevational view of the applicator head, parts being broken away and shown in cross-section to reveal details of construction; and

FIG. 8 is a fragmentary, detailed cross-sectional view taken along line 8—8 of FIG. 7.

A machine embodying the principles of this invention is broadly designated by the reference numeral **10** and comprises an elongated, cylindrical container **12** having a tapered end portion **14** integral with container **12** and provided at its lowermost end with an elongated relatively narrow inlet opening **16**. Portion **14** is in communication with the remainder of container **12**. A pair of elongated rigid straps **18** are secured as by welding or the like to the outermost surface of container **12** and project downwardly below the latter to provide a support for a roll **20** of endless tape **22**. The roll **20** is mounted on a transversely extending axle **24** stabilized in straps **18** by suitable bearing means (not shown) and shaft **24** may be removed for installation and removal of rolls of tape.

Machine **10** is adapted to be carried by a workman and, to this end, machine **10** includes a harness **26** comprising a substantially rigid semi-cylindrical chest plate **28** and a pair of body straps **30** adapted to be worn by the workman. A curved mounting bracket **32** is secured to container **12** in outwardly spaced relationship therefrom by bolt means **34**. A horizontally extending slot **36** in bracket **32** receives a projecting stub shaft **38** mounted on a pair of rollers **40** (FIG. 3). Shaft **38** projects through one of a series of vertically spaced aligned holes **42** in chest plate **28** as illustrated in FIG. 1. Thus, shaft **38** and rollers **40** provide a swivel connection between the chest plate and container and slot **36** permits limited relative rotation of container **12** about its vertical axis with respect to chest plate **28**. Manifestly, container **12** may also be rotated about the axis of shaft **38**.

The lid **44** for container **12** may be hinged to permit introduction of the plaster or Spackle material **46** (hereinafter merely called plaster) into container **12**. The tape **22** is fed through opening **16** and passes in intimate contact with the plaster **46** as it travels to an outlet opening **48** (FIG. 1) located adjacent one end of an elongated rigid tubular member **50** comprising one section of a movable arm **52**. Arm **52** includes a second member **54** which is substantially similar to member **50** and is hingedly secured to the latter by an elongated connector **56** pivotally coupled at its opposite ends to the respective members **50** and **54**. Manifestly, there is provided a connector **56** for each side of arm **52** as shown best in FIG. 5.

Referring now to FIG. 4, it may be seen that the members **50** and **54** are transversely squared and comprise a

pair of sections **58** and **60** interconnected along one marginal edge by hinge means **62** and releasably secured together at the opposite marginal edge by releasable latch means **64**.

Each of the sections **58** and **60** is provided with an intermediate wall **58***a* and **60***a* respectively. The walls **58***a* and **60***a* meet along their outermost projecting edges to separate the members into respective chambers **65** and **66**. A plurality of cylindrical rollers **68** are mounted on shafts **70** journalled in the side walls of member **50** as illustrated in FIGS. 4 and 5. The rollers **68** extend transversely of chamber **65** and substantially span the distance across the latter. Each shaft **70** has a gear **72** mounted thereon and disposed in chamber **66**.

Similarly, rollers **74** are mounted on shafts **76** journalled in the side walls of section **58**, are substantially cylindrical and span the distance transversely across chamber **65**. It should be noted, however, that the substantially smooth outer surface **78** of rollers **74** is interrupted at longitudinally spaced intervals along the rollers by radially outwardly extend-portions **80** which are knurled as shown in the drawing. It should also be pointed out that the outer surface of each roller **68** is knurled and is devoid of any outwardly extending bands. The rollers **68** and **74** are disposed in pairs along the members **50** and **54**, there being a pair comprised of a roller **68** and a roller **74** disposed in relative close proximity with one another as shown in FIG. 4. All of the gears **72** are coupled together by idler gears **82** which are disposed in compartment **66** and which are mounted on transversely extending shafts **84**. The gears **86** for the respective rollers **74** are disposed in chamber **66** and engage with the corresponding gears **72** of the rollers **68** which are paired with the respective rollers **74**.

It is readily apparent that all of the rollers **68** for each member **50** or **54** rotate together as a unit and in identical directions. It is also apparent that the rollers **74** rotate with the rollers **68** but in opposite directions thereto.

The shafts **70** proximal the abutting ends of the members **50** and **54** are interconnected by means of a flexible coupling **88** to permit articulation of the members **50** and **54** without interrupting the power drive throughout the entire length of arm **52**. The latter is mounted on the upper end of container **12** by upwardly projecting brackets **90** and an electric motor **92** is operably coupled with the shaft of the first roller **68** at the lowermost end of arm **52**. Motor **92** is adapted to be coupled with a source of electrical energy and is provided with a control switch (not shown) accessible to the operator so that the rollers may be power driven when desired by the operator.

The tape **22** emerging from opening **58** is fed between the pairs of rollers **68** and **74**. The rotation of the rollers draws the tape from roll **20** upwardly through each successive pair of rollers **68** and **72**. Immediately outboard of the last pair of rollers **68** and **72**, the tape **22** passes through a manually operable cut-off device **94** which is mounted adjacent the outermost end of member **54** but within the tubular confines of the latter. As shown in FIGS. 7 and 8, device **94** includes a slotted, elongated rigid body **96** containing a shiftable member **98** upon which is mounted a blade **100**. A spring **102** has opposite ends mounted in the side wall of member **54** and an outwardly projecting arm **104** integral with member **98**. Spring **102** serves to hold the member adjacent one end of its path of travel. An elongated resilient element **106** such as a string, cable or the like is secured to member **98** and is adapted to extend exteriorly of arm **52** so that the operator may pull the blade **100** along a rectilinear path of travel. The bias exerted by spring **102** draws the member **98** and its blade **100** back to its initial position when the spring is released. Tape **22** is fed past body **96** as illustrated in FIG. 7 so that the tape is cut by blade **100** along the line of path of travel of the latter when the spring is pulled.

An open top, hollow applicator head **108** is mounted on arm **52** adjacent the outermost end of the latter and includes a roller **110** mounted on a shaft **112** which is journalled between the side walls **114** of the head **108**. It should be noted that the outermost periphery of roller **110** projects upwardly beyond the uppermost edge of head **108**. The uppermost edges of head **108** are aligned with the outermost end edges of member **54** and a relatively small roller **116** is rotatably mounted on a shaft **118** which is parallel with the shafts **70** and **76** for the rollers **68** and **72** respectively.

The end of head **108** remote from arm **52** is provided with an opening **120** for accommodating the rotary movement of a plurality of generally planar relatively flexible vanes **122** forming a part of a rotatable troweling means **124**. The latter comprises a cylindrical roller **126** mounted on a shaft **128** which is journalled in the side walls **114** of head **108**. The vanes **122** are integrally mounted to roller **126** in circumferentially spaced relationship thereabout and project radially outwardly therefrom as shown in FIG. 7.

An electric motor **130** is operably coupled to shaft **112** and is adapted to be coupled with a source of electrical energy. Again, the line **132** for conducting electrical energy to motor **130** is provided with switch means (not shown) accessible to the operator so that the operation of the motor **130** is under the operators control at all times. Shaft **112** for roller **110** is operably coupled with shaft **128** for the rotatable trowel means **124** by means of a power drive **134** mounted on a side wall **114** of the applicator head **108**. Accordingly, power from motor **130** is transferred through drive **134** for rotating trowel means **124**.

A pair of handles **136** secured to proximal side walls **114** project outwardly therefrom to permit manual manipulation of the applicator head **108**, and consequently, arm **52**. Manifestly, handles **136** are removable so that the applicator head may be utilized in close proximity to wall surfaces if desired.

The bottom **138** of head **108** tapers into an opening **140** which communicates with an elongated flexible conduit **142**. The other end of conduit **142** communicates with container **12** for returning by gravity any excess plaster which is carried to applicator head **108** by the tape **22**.

In operation, the weight of machine **10** is supported by the workman through the harness **26** which he wears during the tape applying operation. He manually manipulates the applicator head by means of one or the other of the handles **136**. The pivotal connection of member **50** of arm **52** to container **12** and to member **54** permits a wide range of articulation of the applicator head during the operation. This range of movement of head **108** is further enhanced by the ability to swivel container **12** with respect to chest plate **28** and also by the ability to rotate container **12** about its longitudinal axis with respect to chest plate **28**.

The operator controls motor **92** for drawing the tape through the plaster **46** at whatever rate is required. Motor **92** is of the variable speed variety and the transfer of tape through the machine may thereby be carefully controlled.

The tape emerging from container **12** is thoroughly coated with the paste or plaster material and excess material is squeezed from the tape by the operation of the pairs of rollers. The banded construction of rollers **74**, however, insures that the tape **22** arrives at the point of application thereof to the wall with sufficient plaster adhering to the tape for smooth troweling onto the wall surface. The operator may also control motor **130** by virtue of the variable speed available from this motor. This permits the rotation of trowel means **124** at whatever speed is found necessary for smoothing the tape and plaster which has adhered to the tape onto the wall surface to provide a perfectly smooth joint. The vanes or blades **122** are somewhat resilient to avoid tearing of the

tape and to enhance the tape and plaster smoothing operation.

The excess plaster which is carried by the tape to the applicator head is returned to the container **12** through tube **142**. When the operator reaches the end of the seam which is to be covered by the tape, he merely pulls the cut-off blade **100** across the tape to sever the tape applied to the wall from that which is retained within the machine. Subsequent operation of motor **92** returns the tape to the applicator head for installation of another strip of tape at another location.

It is contemplated that many of the metallic components of machine **10** will be constructed from relatively light weight aluminum or alloy materials. Further, the tubular construction of arm **52** admits to fabrication from relatively light weight and inexpensive sheet material to further reduce the weight and cost of the machine. The arm may be quickly and easily opened for cleaning at the end of the tape applying operation by virtue of the hinged together construction of the arm members.

The construction of head **108** is particularly well suited for applying tape to joints between panels of sheet material comprising a wall. Should it be necessary to utilize the machine for applying tape to corners, head **108** may be constructed with pairs of rollers **110** and troweling means **124** disposed at right angles with one another. Manifestly, the respective rollers and troweling means are adapted to operate on corresponding wall surfaces which merge to form the corner. The operation is otherwise identical to that described above.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. A machine for supplying tape for application to a wall comprising:

a container for a supply of plaster;

a holder on the container for a supply of endless tape, there being spaced apart openings in the container for receiving the tape therethrough as the latter moves through the plaster;

an elongated jointed arm comprising a pair of rigid, tubular, hingedly interconnected sections mounted on the container above said openings for articulation relative to the latter;

roller means disposed within said arm and adapted to frictionally engage the tape for drawing the latter through the plaster; and

power means operably coupled with the rollers for rotating the latter.

2. An applicator for applying plaster-coated tape to a wall comprising:

a housing;

a rotatable trowel member mounted on said housing and projecting from the latter;

said trowel member including a roller, and a plurality of planar, flexible vanes projecting radially from and extending longitudinally of the roller for providing a wiping movement when said trowel member is operated in close proximity to said wall;

a roller member mounted on said housing and coupled with said trowel member for rotation therewith; and

power means coupled with one of said members for rotating the same whereby a length of tape overlying said members is smoothed onto said wall.

3. A machine for supplying tape for application to a wall comprising:

a container for a supply of plaster;

a holder on the container for a supply of endless tape, there being spaced apart openings in the container for receiving the tape therethrough as the latter moves through the plaster;

an elongated jointed arm mounted on the container above said openings for articulation relative to the latter;

roller means carried by the arm and adapted to frictionally engage the tape for drawing the latter through the plaster;

power means operably coupled with the rollers for rotating the latter; and

applicator means carried by the arm at the outer end of the latter;

said applicator means including a housing, rotatable trowel means journaled in the housing and adapted to receive said plastered tape from the roller means and to smooth the tape onto the wall, and conduit means extending between the housing and the container for the return of excess plaster to the container.

4. The invention of claim **3**, wherein is provided a motor operably coupled with the trowel means for rotating the latter.

5. The invention of claim **3**, wherein said trowel means includes a shaft, a plurality of circumferentially spaced, radially extending vanes carried by the shaft, and motor means operably coupled with the shaft for rotating the latter, said vanes being constructed of yieldable material for providing a wiping movement when said trowel means is operated in close proximity to said wall.

6. The invention of claim **3**, wherein is provided a harness including a relatively rigid chest plate adapted to be worn by the operator of said machine, and swivel means secured to the chest plate and to the container respectively whereby the machine may be selectively manipulated to any of a variety of positions during operation of the machine by the workman wearing the harness.

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