Sept. 29, 1953 G. ANGIOLINO ET AL 2,653,439

BINDING AND STEMMING MACHINE

Filed Feb. 28, 1951 4 Sheets-Sheet 1

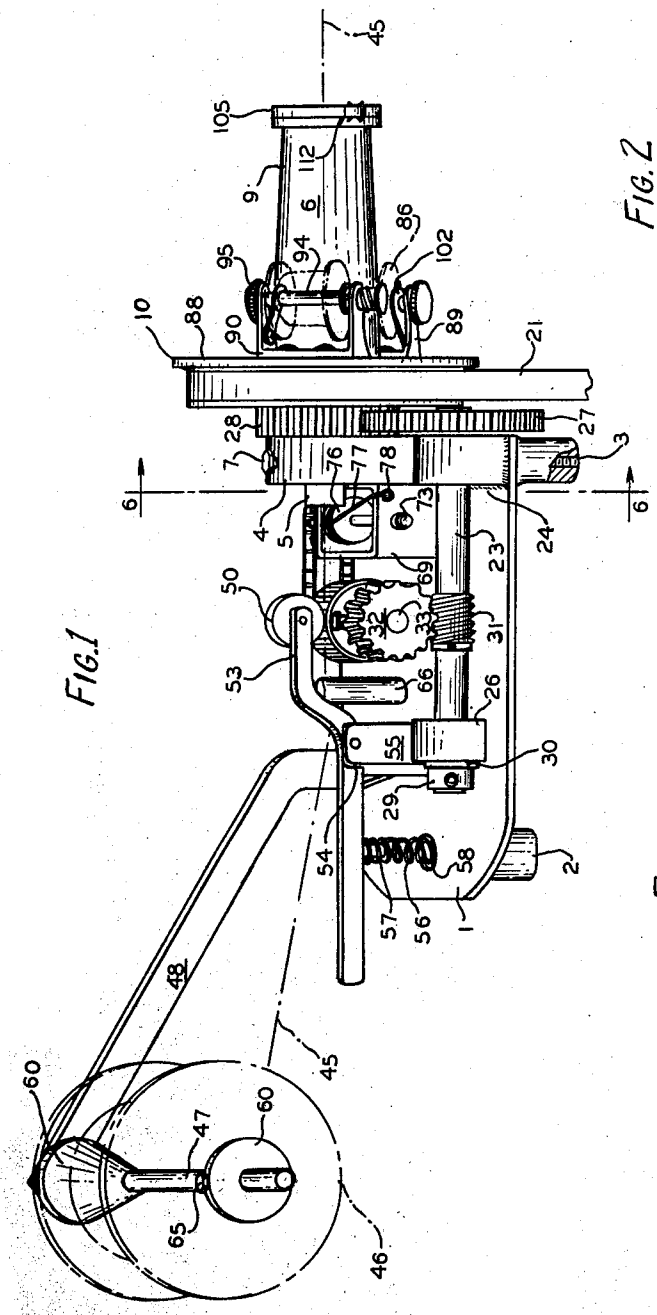

FIG. 1

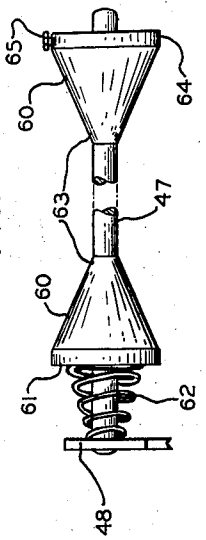

FIG. 2

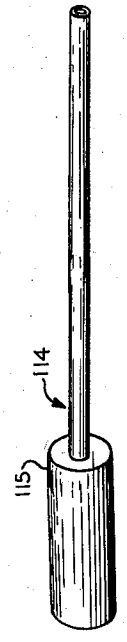

FIG. 3

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BINDING AND STEMMING MACHINE

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FIG. 4

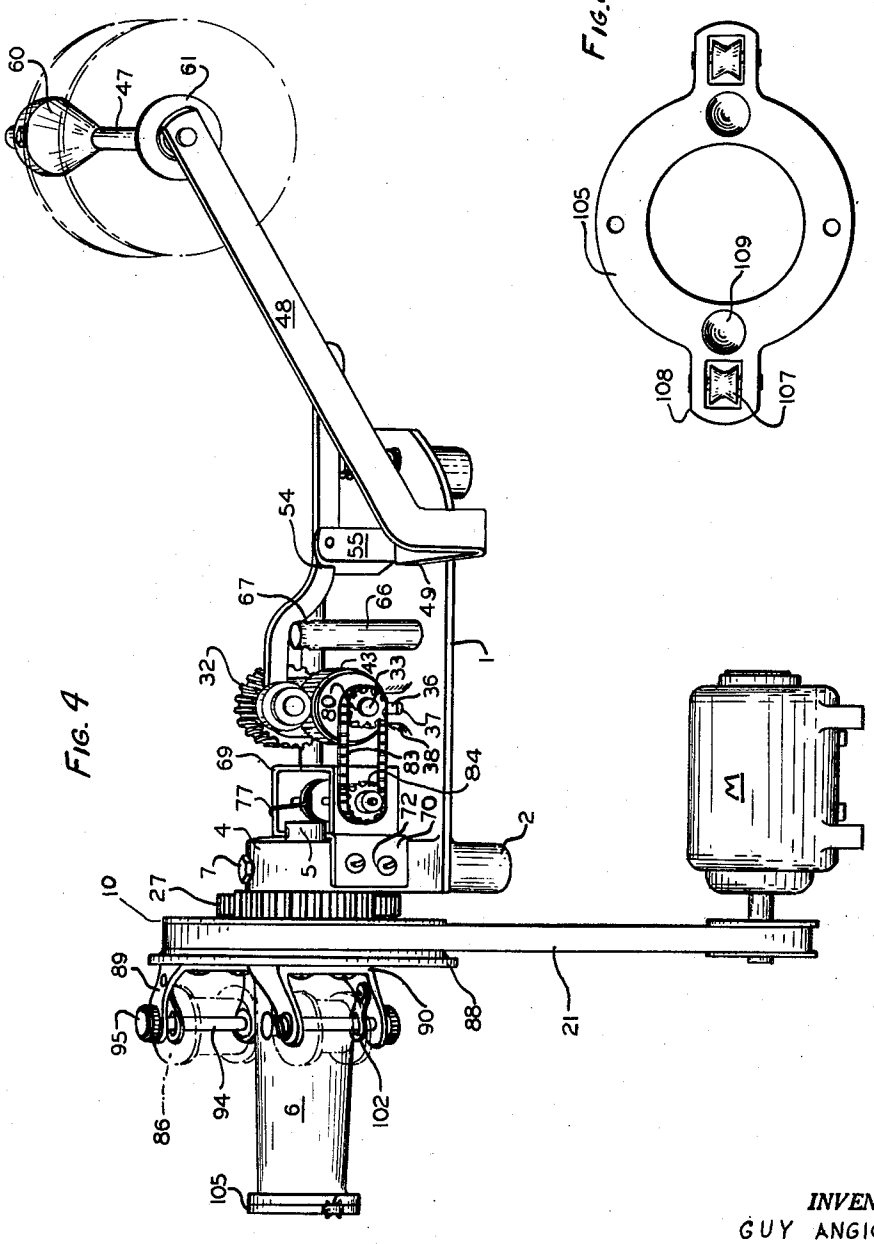

FIG. 5

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FIG. 6

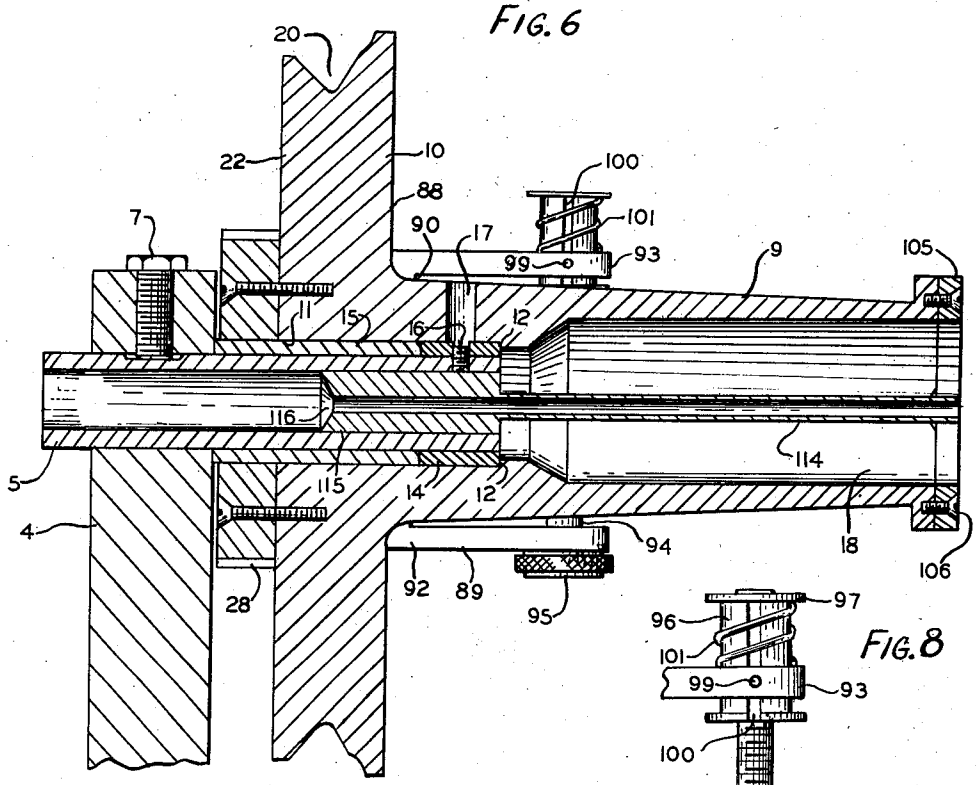
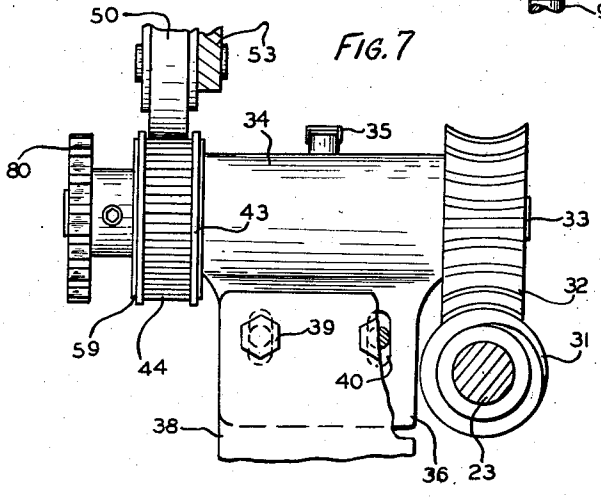


FIG. 8

FIG. 7



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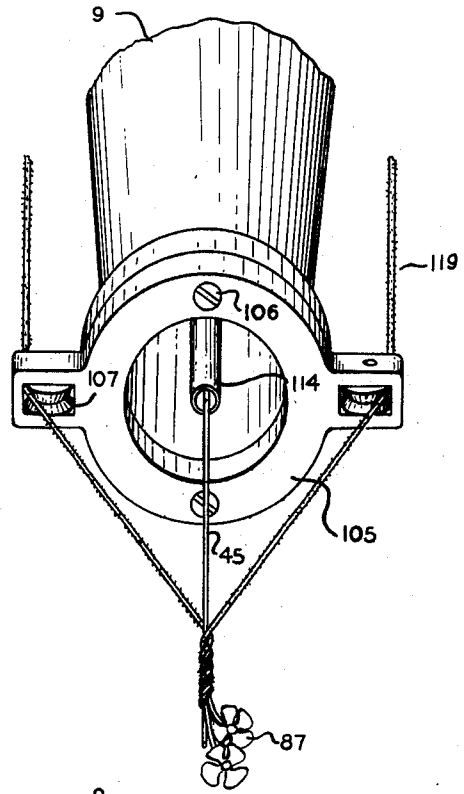

FIG. 9

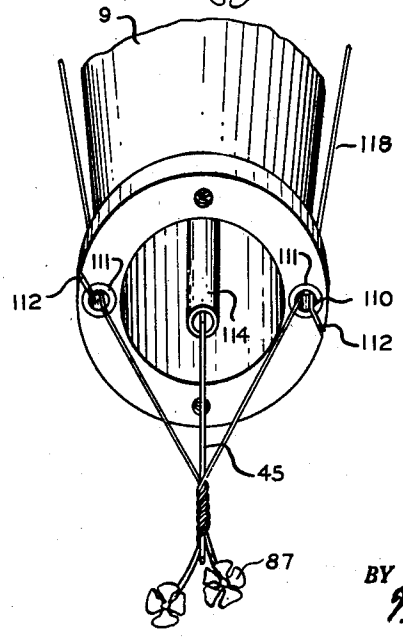

FIG. 10

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UNITED STATES PATENT OFFICE

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BINDING AND STEMMING MACHINE

Guy Angiolino and James Galuppo,
Brooklyn, N. Y.

Application February 28, 1951, Serial No. 213,253

4 Claims. (Cl. 57—7)

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This invention pertains in general to binding machines, and it particularly relates to a machine for use in the floral industry in the binding and stemming of artificial flowers. It is not, however, limited to this use, and it may be used in any industry to which its functions are adaptable.

The general object of the invention is a binding particularly serviceable in the stemming and binding of artificial flowers, and which is compact, light, and possessed of a high degree of efficiency and economy of operation.

A more particular object of the invention is a machine useful in stemming and binding artificial flowers with either, chenille cord, threading, or tie-wire as desired, and without breakage of the binding material during the process.

Another object of the invention is a binding machine having a highly efficient feeding arrangement.

A further object is the provision in a floral stemming and binding machine of a universal supply reel leveling and tensioning means.

A still further object of the invention is a stabilizing unit in a binding machine that will stabilize the wire feeding operation of the machine.

The invention lies not only in its various features, but also in the combination of its features and in the particular arrangement of its various parts, all of which results in a highly productive, efficient and light-weight machine with a minimum of parts to accomplish such results.

In general the machine of the present invention comprehends a nozzle head or spinner adapted for spinning action through suitable drive means connected to a motor. Spinning of the nozzle head effects through various gears and tensioning means automatic feeding through the nozzle head of suitable floral support means or stemming, such as wire. The stem wire is drawn from a supply reel into suitable guides through the nozzle head. Upon exit of the stem wire from the nozzle head artificial flowers and the like are manually fed to it. Suitable binding material, such as chenille cord, threading, or tie-wire, initially twisted to the stem wire issuing from the nozzle head to start the binding operation, is thereafter automatically drawn in the binding operation from supply spools bracketed on the spinning nozzle head. Stabilizer means, such as an elongated tube in the nozzle head centers and steadies the stem wire as it issues from the nozzle head and thereby facilitates the feeding of floral sprays to it. As the nozzle head spins and the stem wire automatically issues forth from the elongated tube, the binding material is automatically drawn from its spools as it wraps itself about the stem wire, and in the wrapping process it binds to the stem wire any floral sprays placed upon the wire. Suitable means is also provided in the machine to permit automatic coating of the stem wire with glue before the wrapping or sheathing operation, the effect of which results in securely holding the binding material thereon. Suitable guide means is provided at the mouth or exit end of the nozzle head serving to guide the binding material to the stem wire and to prevent its entanglement with the nozzle head. The guide means is of particular importance in that it enables the machine to uilize either thread, tie-wire, or chenille cord as binding material, and particularly chenille cord without breakage.

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The foregoing objects, as well as others, together with the various advantages of the machine, will become apparent as this specification unfolds in greater detail and as it is read in conjunction with the accompanying drawings wherein a specific embodiment of the invention is illustrated.

In the drawings, wherein corresponding reference characters designate like parts in the various views,

Fig. 1 is a view in perspective showing the top and left side of the machine. The nozzle portion is considered as the front of the machine.

Fig. 2 is a detail of the reel shaft assembly.

Fig. 3 is a view of the stabilizer tube.

Fig. 4 is a view in perspective showing the top and right side of the machine.

Fig. 5 is a plan view of the disc ring guide from the bottom.

Fig. 6 is a vertical longitudinal section through the nozzle head taken on the lines 6—6 of Fig. 1.

Fig. 7 is a detail view of the feed wheel assembly.

Fig. 8 is a detail of the spool bracket bobbin.

Fig. 9 is an enlarged detail of the nozzle employing chenille cord in a binding operation.

Fig. 10 is an enlarged detail of the nozzle with the disc ring guide removed and thread being employed in a binding operation.

In the detailed description to follow, reference is directed to the various views of the drawings so as to permit a clear understanding of the invention.

The various parts of the machine are supported upon a base or casting 1, which is provided with bosses 2 on its undersurface. These are provided with internal thread 3 adapted to receive bolts, not shown, whereby the machine may be secured to a workbench. Extending upright from the

forward end of the base is a frame member 4 adapted to carry a tubular stub shaft 5 on one end of which is suitably mounted for axial rotation a nozzle head or spinner member 6. Shaft 5 is rigidly secured at one end by a set screw 7 in the frame member 4. Release of the set screw permits ready removal of the stub shaft 5 with its associated nozzle head.

The nozzle head, preferably of a light metal such as aluminum, comprises a snout portion or nozzle 9, about one end of which and an integral part thereof extends a circular flanged portion or disc member 10. Extending axially into the nozzle head through the flanged end for a short distance is a bore 11 at the interior end of which is a shoulder 12. Bore 11 is adapted to accommodate a short sleeve piece 14 that abuts against the shoulder 12. The forward end of shaft 5 is press fitted into the sleeve piece 14. The shaft and sleeve piece are heremade up in separate parts for economy of manufacture only. A suitable bearing or bushing 15 force fitted into the bore and abutting lightly against the short sleeve piece 14 serves to secure the shaft 5 in the nozzle head and also acts as a bearing for the nozzle head as it spins about the shaft. The arrangement and fit of the shaft 5 and bearing 15 in the bore 11 is such as to permit rotation of the nozzle head upon the shaft without any unnecessary loose movement. A set screw 16 serves to further secure the short sleeve piece 14 and the shaft 5 together, and it is adapted to be set from a hole 17 in the nozzle portion 9.

The bore 11 in the nozzle head communicates with a larger bore 18 extending through the nozzle portion 9. The larger bore 18 tapers down at its inner end so as to form the shoulder 12. This enlarged bore is uniformily wide throughout and serves to materially lighten the metal nozzle head.

Drive and feed

The flange circular portion 10 of the nozzle head is provided with a pulley groove 20 in its periphery that is adapted to carry a belt 21 connected to a suitable motor M. Upon actuation of the motor the drive belt serves to rotate or spin the nozzle head.

The machine is provided with stem wire feed mechanism which is geared in suitable manner to the nozzle head, so that spinning of the nozzle head automatically causes the feed mechanism to function.

Extending rearwardly on the left side of the machine in Fig. 1 is a rotatable drive shaft 23, the foreward end of which is suitably carried in a short upright portion 24 of the casting along side of the upright member 4. The rearward end of the drive shaft is suitably carried in a lug 26 integral with the base casting. On the forward end of the drive shaft which extends through the upright 24 is mounted fast a large drive gear 27 which is in constant mesh with a smaller gear 28 mounted fast and concentrically upon the rear face 22 of the nozzle head (Figs. 1, 6). Gears 27, 28 are preferably of fibre material. A stop 29 tightened on the rearward end of shaft 23, which end extends through the lug 26, not only maintains the proper meshing of the gears 27, 28, but also upon its release permits a ready disassembly of the several associated parts, a suitable washer bearing 30 separates the stop 29 from the lug 26.

Mounted intermediately of shaft 23 is a worm gear 31 constantly in mesh with a gear 32 whose peripheral surface is concaved to insure a greater surface meshing with the worm 31. Gear 32 is mounted fast upon the left end of a cross shaft 33 that is carried for rotatable movement in a housing 34. An oil cup 35 serves in keeping the shaft 33 lubricated. Housing 34 is provided with a depending tongue piece 36 which fits in a trough 37 (Figs. 4, 7), formed by a pair of lateral uprights 38 extending from the surface of the base 1. Housing 34 is held fast in a horizontal position by a pair of bolts 39 through the upright members 38 and a pair of slots 40 in the intermediate tongue piece 36. Slots 40 are desired in the tongue piece as they permit the housing 34 to be adjustably raised or lowered to insure a suitable meshing of gear 32 with its worm at all times.

The right end of cross shaft 33 extends somewhat through the housing 34. On this end there is rigidly carried for rotatable movement with the shaft a thick disc or feed wheel 43, the peripheral surface 44 of which is knurled or notched. Upon rotation of cross shaft 33, consequent with the turning of the nozzle head 6 and the intermediate gearing, feed wheel 43 is adapted to revolve and draw, in combination with suitable tensioning means, stem wire 45 from a supply reel 46, the wire and reel being shown in outline in Fig. 1. The supply reel is carried for rotation on a shaft 47 fixed in and projecting from the upper end of a rearwardly and upwardly extending bar 48, the forward and lower end of which bar is secured to the surface of the casting 1.

Stem wire 45 from the supply reel is adapted to be carried over the knurled wheel 43, through the tubular nozzle head shaft 5 and out of the nozzle head mouth. Tensioning means serves to constantly press the stem wire into contact with the knurled surface 44 of the feed wheel, so that with the rotation of the feed wheel the stem wire will be gripped by it and carried over it to the nozzle head.

The tensioning means, Figs. 1, 4, 7, comprises a thick wheel 50 having a smooth peripheral surface and pivoted at the side of the forward end of a bar lever 53. Lever 53 pivots or fulcrums between the forked arms 54 of an upright casting member 55. A heavy spring 56 is compressed between the rearward portion of the lever bar and the casting. The spring is held from slipping its position by a lug 57 of the lever bar extending axially for a short distance into the spring, and by a recess 58 in which the lower end of the spring is contained.

The heavy spring constantly tensions lever 53 clockwise, Fig. 1, so as to keep the tensioning wheel 50 constantly pressed down against the periphery of the feed wheel. In this arrangement the stem wire 45 when intermediately of the feed and tension wheels will be constantly gripped by the knurled surface 44 and enabled to be drawn forward as the feed wheel rotates.

The right and left side faces 59 of the feed wheel are slightly raised above the intermediate knurled portion as in a bobbin, so as to prevent the stem wire from escaping over the sides. The tension wheel is adapted to be contained between the raised sides 59 and pressed upon the knurled periphery 44. Downward pressure upon the rearward portion of lever 53 permits raising the tension wheel from the feed wheel for adjustment of the stem wire and other purposes.

Supply reel leveling and tensioning means

Stem wire is automatically unwound from the supply reel in the process of being drawn through

the tension and feed wheels. It often happens that different manufacturers provide reels with varying size axial openings, so that for good results the reel support shaft 47 would ordinarily have to be changed each time to one of a proper diameter in order to properly carry the reel. A loose or unleveled reel would interfere with the proper operation of the machine through snagging and entanglements. The reel must be properly leveled upon its shaft and tensioned only to that extent required to permit it to rotate with the pull of the stem wire being drawn from it by the feed wheel. To accomplish this effect, universal reel leveling and retaining means is provided on the reel shaft 47 whereby any difficulty associated with oversize reels is eliminated, and reels of various axial openings may be properly carried.

Axially slideable upon reel shaft 47 is a pair of conical members 60, carried on the shaft in opposed relation to one another with their tapered portions 63 facing each other. Between the support bar 48 and the broad face 61 of the nearest conical member is a compression spring 62. It is to be noted that the conical members taper downwardly directly to the reel shaft 47. In this construction, representing an important feature of the invention, reels with axial openings of various sizes may be suitably carried. In the assembling process a reel is placed upon the shaft with the tapered ends 63 of the conical members extending from either side into its axial opening thereby leveling the reel. The outer conical member 64 is drawn up against the reel to compress the spring 62 until the reel is at its desired tension. A set screw 65 in the outer conical member is then tightened so as to secure it to the reel shaft, and thereby retain the adjusted position of the several parts on the shaft.

To properly conduct the stem wire 45 from the supply reel to the tension and feed wheels, a suitable guide is provided in the form of an elongated piece 66 mounted vertically upon the casting 1 and provided with an eye or guide hole 67 for the passage therethrough of the stem wire to the tension and feed wheels immediately ahead (Figs. 1, 4).

The glue box

Suitable means is here provided for coating the stem wire with glue after it leaves the feed wheel and before it enters the nozzle head tubular shaft. The means provided here (Figs. 1, 4), is in the form of a receptacle or box 69 adapted to hold glue, and provided at its right with a flange 70 by which it is bolted at 72 to the side of the upright frame member 4, and whereby the box is rigidly held in position by the feed wheel 43 and the entrance to the nozzle head tubular shaft 5. The glue box carries for rotatable movement between its side walls a cross shaft 73 intermediately of which there is rigidly mounted a pulley wheel 76, the groove of which is adapted to receive the stem wire as it travels from the feed wheel to the nozzle head. A firm spring wire 77 fixed at 78 to a side of the glue box serves to hold down and retain the travelling stem wire in the groove of the wheel. The arrangement is such that as the glue wheel is rotated it dips in the glue of the box and carries the glue up to the overhead stem wire, the latter picks it up, automatically coating itself with glue as it travels through the groove of the glue wheel.

The glue wheel is carried about by its shaft 73 which is automatically driven by a sprocket and chain arrangement connected with an extension beyond the feed wheel at the right side of the cross shaft 33. A sprocket 80 is rigidly mounted on the extended shaft 33. Sprocket 80 is linked by a chain 83 to another sprocket 84 secured fast upon a projecting end of the glue wheel shaft 73. The arrangement is such that rotary motion of the shaft 33 is automatically conveyed by the sprockets and chain to the glue wheel shaft.

As the glue coated stem wire issues from the nozzle head it is ready for stemming with artificial decorations, such as floral sprays 87 (Figs. 9, 10). These are bound to the stem wire by suitable means, such as chenille cord, thread, or tie-wire. To enable this the flat marginal face 88 on the forward side of the flanged portion of the nozzle head 6 is provided with a pair of brackets 89 adapted to carry spools 86, shown in outline in Figs. 1 and 4, of the binding material.

Spool brackets

Spool brackets 89 are a feature of this invention, and greatly add to the general efficiency of the machine. This is due primarily to the peculiar tensioning means associated with the bracket whereby a spool may be adjusted upon the bracket and resiliently held thereon with the proper amount of tension. This floating resilience of the binding material spool is vitally important, in that it serves to eliminate breaking of the binding material issuing from the spool in the process of sheathing the stem wire. It also permits a sheathing or wrapping of the binding material about the stem wire that is not too tight. Where this resilience is lacking the stem wire becomes tightly bound, resulting in distortion and frequent breaking of the binding material during the sheathing process.

Each spool bracket 89, Figs. 1, 4, 6, 8, has a frame portion 90 whereby the bracket is bolted to the forward face 88 of the nozzle head disc portion 10. A pair of opposed arms 92, 93 extend substantially at right angles from the opposite ends of the frame portion. Slideable in arm 92 of each bracket is a bolt or shaft 94 which is limited in the extent of its sliding movement by its knurled head 95. The bolt serves as an axial support for a spool of binding material. The other end of the bolt 94 is threadedly received in the core of a spool member 96. This member is carried for slideable movement in the opposite arm 93 of each bracket, and is limited in its sliding movement by its flanged sides 97. A pin 99 through the arm 93 and playing in a slot 100 of the spool acts as a guide for the spool in its sliding movement and also prevents rotation or loosening of the spool on the bolt.

A spring 101 helically contained on the spool and compressible between the bracket arm 93 and a side 97 of the spool serves to tension the spool at all times outward. An angularly disposed leaf spring 102 fixed at one end to the inner side of bracket arm 92 is provided with an enlarged hole in its free end through which the bolt 94 passes. The arrangement is such that spools shown in outline 86 of varying lengths may be accommodated on the bolts 94 in floating resiliency. After a spool is axially contained upon the bolt, the bolt is manually threaded into the core of the bobbin 96. This action draws the bobbin against the tension of its spring toward the spool, and in so doing also draws the spool up against the opposed tension-

ing of the leaf spring 102. In this manner all loose play of the spool is taken up and the spool is contained upon its shaft in floating resiliency, permitting it full freedom to unwind as the binding material is drawn from it in the binding operation.

Disc ring guide

In the operation of the machine, after the binding material leaves the spools 86 it is guided to prevent its entanglement with the nozzle or snout 9 of the nozzle head. In Figs. 1, 4, 5, 6, 9, 10, the guide means here is in the form of a disc ring 105 removably secured over the exit end of the nozzle 9 by suitable screws 106.

To eliminate breakage of the binding material through friction a pair of pulley rollers 107 are mounted in ears 108 at opposite sides of the disc ring. The pulley groove of the rollers is substantially V-shape. By means of the rollers and due to their peculiar form friction of the binding material is virtually eliminated at this point, and the binding material is readily drawn from the spools in the binding operation by the stem wire.

The disc ring is an important feature of this invention, and is of decided advantage in the binding operation, particularly where chenille cord 119 or tie wire is used.

Thread material 118 conventionally used in the binding of floral sprays may also be used with the disc ring 105, but because of its greater strength the disc ring may be removed as appears in Fig. 10. In this case in lieu of the disc ring, a pair of holes 110 are provided on opposed sides of the nozzle end. To reduce friction here in the passage of the thread through the holes grommets 111 are provided. This arrangement, however, would not suffice in the case of chenille cord or tie-wire, as it would through the excessive friction created with the movement of the binding material result in constant breakage of the binding material. A slot 112 from the outside of the nozzle 9 through to the hole 110 facilitates threading of binding material in the hole.

The indentions 109 in the rear face of the disc ring 105 are adapted to accommodate the grommets 111 so as to provide a flush fit of the disc ring over the nozzle end.

Operation of the machine

In the operation of the machine a reel of conventional floral stem wire is first properly tensioned upon the reel shaft 47. The wire is then passed through the eye of the guide 66 and drawn between the feed and tension wheels. From here it is carried beneath the spring wire 77 and through the groove of the glue wheel 76 and into the tubular shaft 5, from where it is carried through the nozzle head and out of its exit end.

Upon energization of the motor M, pulley belt 21 spins the nozzle head, and through the gearing 27, 28 the drive shaft 23 is rotated. The latter through the worm 31 and gear 32 rotates the feed wheel 43, and through the sprockets and chain 83 drives the glue wheel 76. Upon turning, the knurled feed wheel in combination with the tension wheel 50 grips and draws the stem wire from the supply reel and automatically feeds it through the tubular shaft 5 and out of the nozzle 9.

Upon issuance of the stem wire from the nozzle 9 the free ends of the binding material from the spools are first manually twisted about it. Thereafter, spinning of the nozzle head causes

the binding material to automatically wrap itself about the stem wire and to automatically unwind from the spools 86. The automatic travelling of the stem wire during the wrapping process causes a uniform sheathing along the length of the stem wire. While this wrapping of the stem wire with binding material is going on, floral sprays 87 are placed at intervals upon the issuing stem wire and are bound to it in the wrapping process.

Feed stabilizing mechanism

Due to the spinning of the nozzle head there would be a natural tendency of the stem wire in passing through the enlarged nozzle passage 18 to veer toward the walls of the passage and to issue out of the nozzle 9 in a wide erratic circle. Under such conditions it would be very difficult to feed floral sprays to it as it whirls erratically, and the resulting sheathing of the binding material about the stem would be poor and irregular. Further, the irregular motion of the issuing stem wire would cause constant breaking of the binding material. This difficulty is eliminated in this machine by an elongated tube 114 that serves to stabilize and center the stem wire as it issues from the nozzle. With a stabilized and centered travel of the stem wire floral sprays can be readily fed to it, and the binding operation will be smooth, regular and without breakage.

The stabilizer tube extends substantially the full length of the nozzle passage 18. Its rear end is adapted to be removably contained in the forward end of the tubular shaft 5, and it is provided with an enlarged portion 115 for this purpose. A set screw 16, which is the same set screw that secures the short sleeve piece 14 to the tubular shaft 5, is adapted upon further threading in its socket to press against the enlarged portion 115 and secure it within the tubular shaft. The enlarged portion 115 is sufficient in length to permit the stabilizer tube to be adjusted, if desired, further into or slightly out of the nozzle. The opening into the stabilizer tube 114 is flared at its rear end 116 so as to eliminate any possible obstruction to the stem wire as it is initially threaded through the nozzle head.

Having described a specific embodiment of our invention, it is our intent to claim not only the specific form but also all its features, and such forms thereof as may reasonably be constructed to be within the spirit of the invention and within the scope of the appended claims.

We claim:

1. In a machine of the character described, useful in the stemming and sheathing of artificial flowers and the like, including a supporting casting, a motor, a stem wire feed means, a spinner including a pulley disc member, a tubular shaft projecting axially from the disc member and mounted in the supporting casting, bearing means facilitating rotation of the spinner upon the tubular shaft, belt means for connecting the pulley disc member to the motor, the spinner having an enlarged axial passage therethrough in communication with the tubular shaft, an elongated tube secured in the tubular shaft and extending substantially the length of the axial passage, the stem wire feed means of the machine being adapted to feed stem wire through the tubular shaft and the elongated tube, the elongated tube serving to steady and center the stem wire as it issues therethrough and out of the spinner, a pair of opposed brackets upon the spinner, and tensioning means on the brackets for resiliently holding spools of sheathing mate-

rial, a guide ring secured over the exit end of the spinner serving as a guide for the movement of sheathing material from the spool to the stem wire, the sheathing material being automatically drawn from the spools to the stem wire with the rotation of the spinner, rollers in the guide ring to facilitate passage of the sheathing material to the stem wire and to materially eliminate friction in the travelling of the sheathing material from the spools to the stem wire.

2. The combination, in a machine of the character described useful in the stemming and binding of artificial flowers, of a supporting casting, a rotatable spinner mounted on the casting, the spinner having an axial bore therethrough, motor means for rotating the spinner, drawing means for drawing stem wire from a supply reel and feeding it through the axial bore of the spinner, means operatively connecting the drawing means with the spinner whereby the drawing means is caused to operate with the rotation of the spinner, gluing means operatively connected to the spinner for coating the stem wire with glue immediately prior to its passing through the axial bore of the spinner, and wire sheathing means operatively connected with the spinner for sheathing the stem wire with binding material as the stem wire issues from the spinner, the means for drawing the stem wire from the supply reel comprising a gripping wheel having knurls in its peripheral surface for gripping the stem wire, a disc constantly tensioned against the peripheral surface of the gripping wheel for pressing the stem wire into gripping contact with the knurled surface of the gripping wheel, and a shaft secured to the gripping wheel and adapted for rotation with the spinner.

3. The combination as in claim 2, wherein the gluing means comprises in combination a glue receptacle, a rotatable pulley wheel adapted to guide the stem wire over it to the spinner and to pick up glue from the receptacle and carry it up to the stem wire, a spring adapted to hold the stem wire in the pulley, and chain and sprocket means operatively connecting the said shaft to the pulley.

4. The combination in a machine of the character described and useful in the stemming and binding of artificial flowers, of a supporting casting, a rotatable spinner mounted on the casting, the spinner having an axial bore therethrough, motor means for rotating the spinner, drawing means for drawing stem wire from a supply reel and feeding it through the axial bore of the spinner, means operatively connecting the drawing means with the spinner whereby the drawing means is caused to operate with the rotation of the spinner, gluing means operatively connected to the spinner for coating the stem wire with glue immediately prior to its passing through the axial bore of the spinner, and wire sheathing means operatively connected with the spinner for sheathing the stem wire with binding material as the stem wire issues from the spinner, the gluing means comprising in combination a glue receptacle, a rotatable pulley wheel adapted to guide the stem wire over it to the spinner and to pick up glue from the receptacle and carry it up to the stem wire, a spring adapted to hold the stem wire in the pulley wheel, a shaft adapted for rotation by the spinner, and chain and sprocket means operatively connecting the shaft to the pulley wheel.

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