W. R. BURROWS.

FILAMENT MOUNTING MACHINE.

APPLICATION FILED DEC. 29, 1906.

989,549.

Patented Apr. 11, 1911.

4 SHEETS—SHEET 1.

Fig. 1.

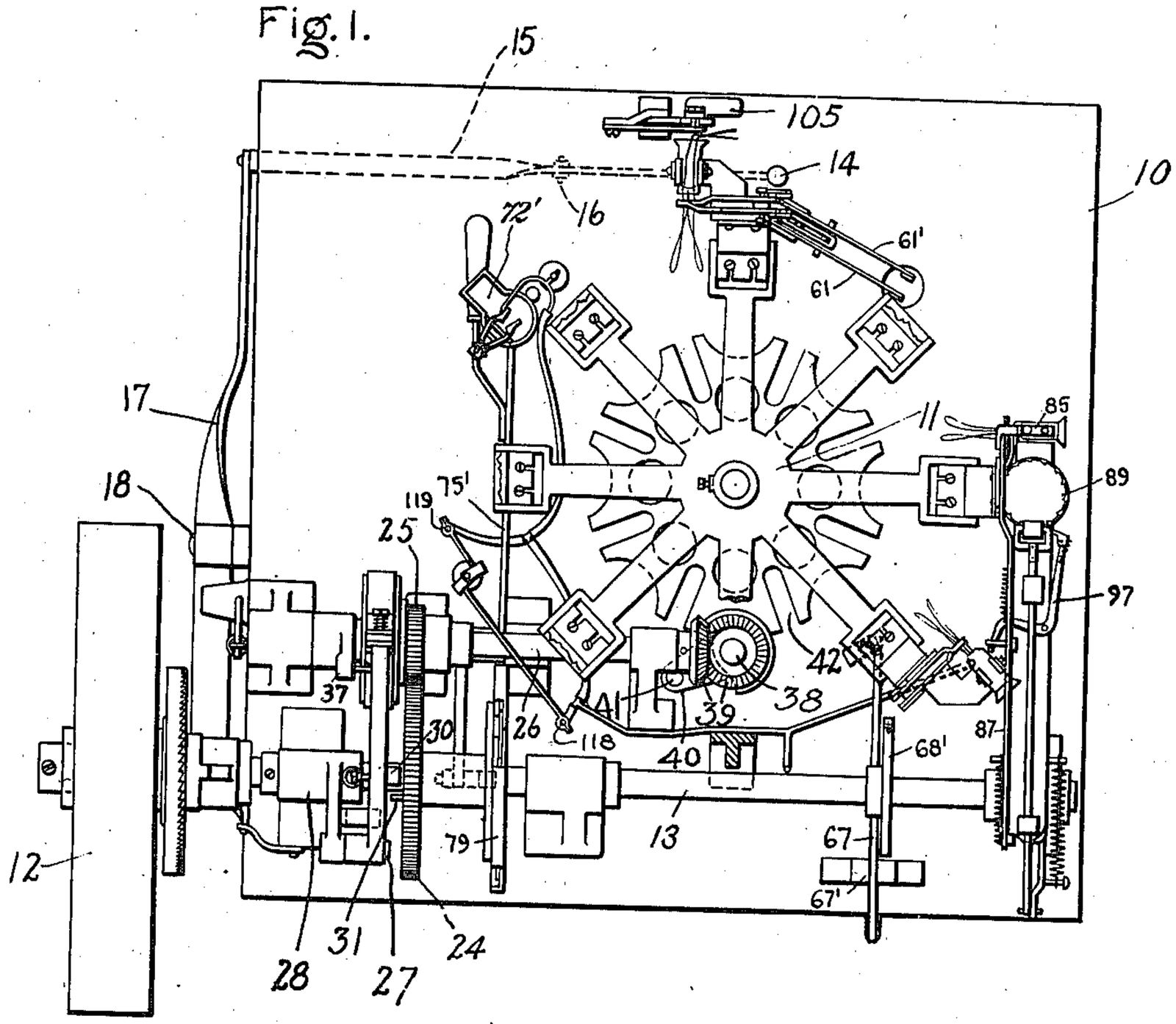
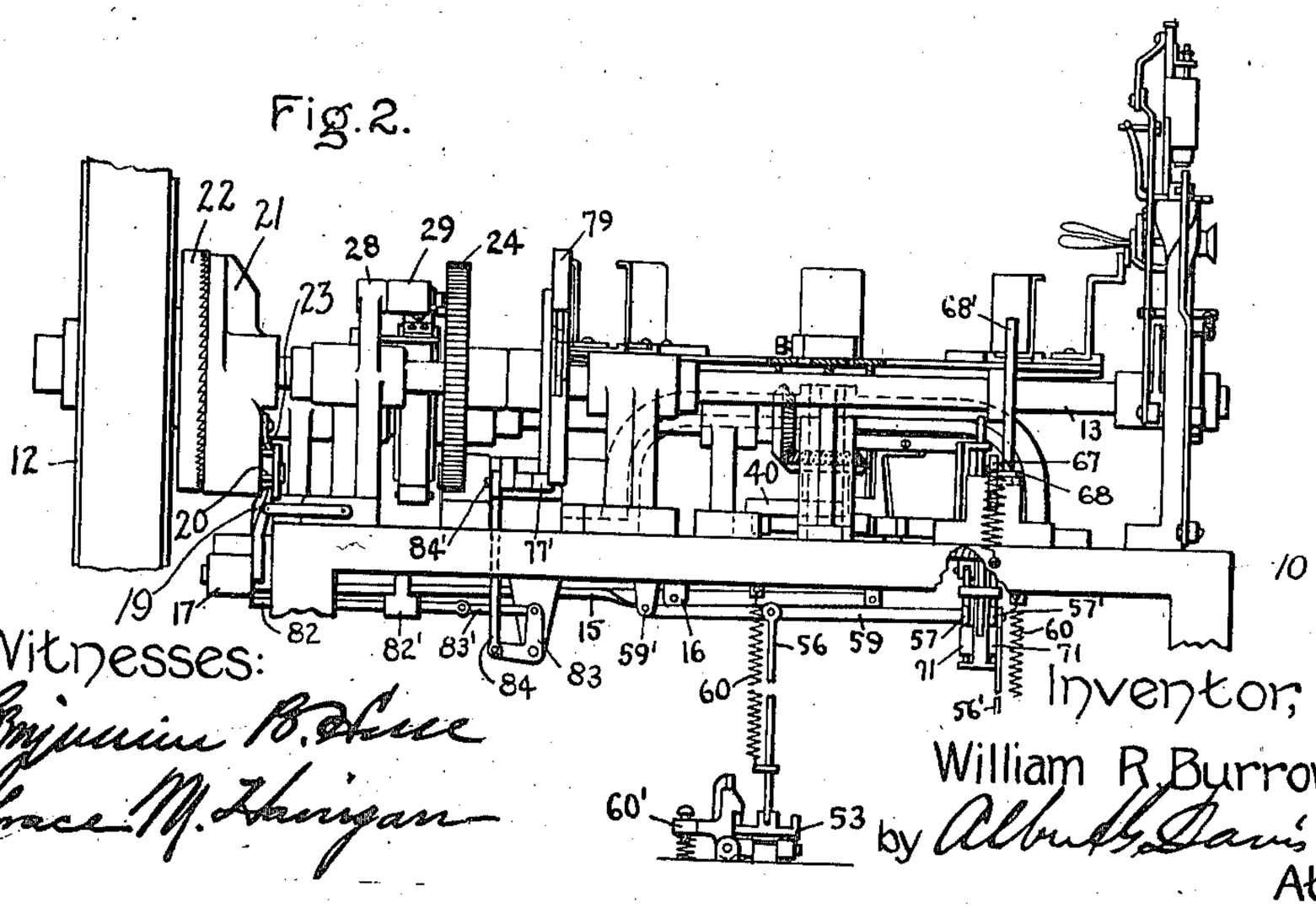


Fig. 2.



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4 SHEETS—SHEET 2.

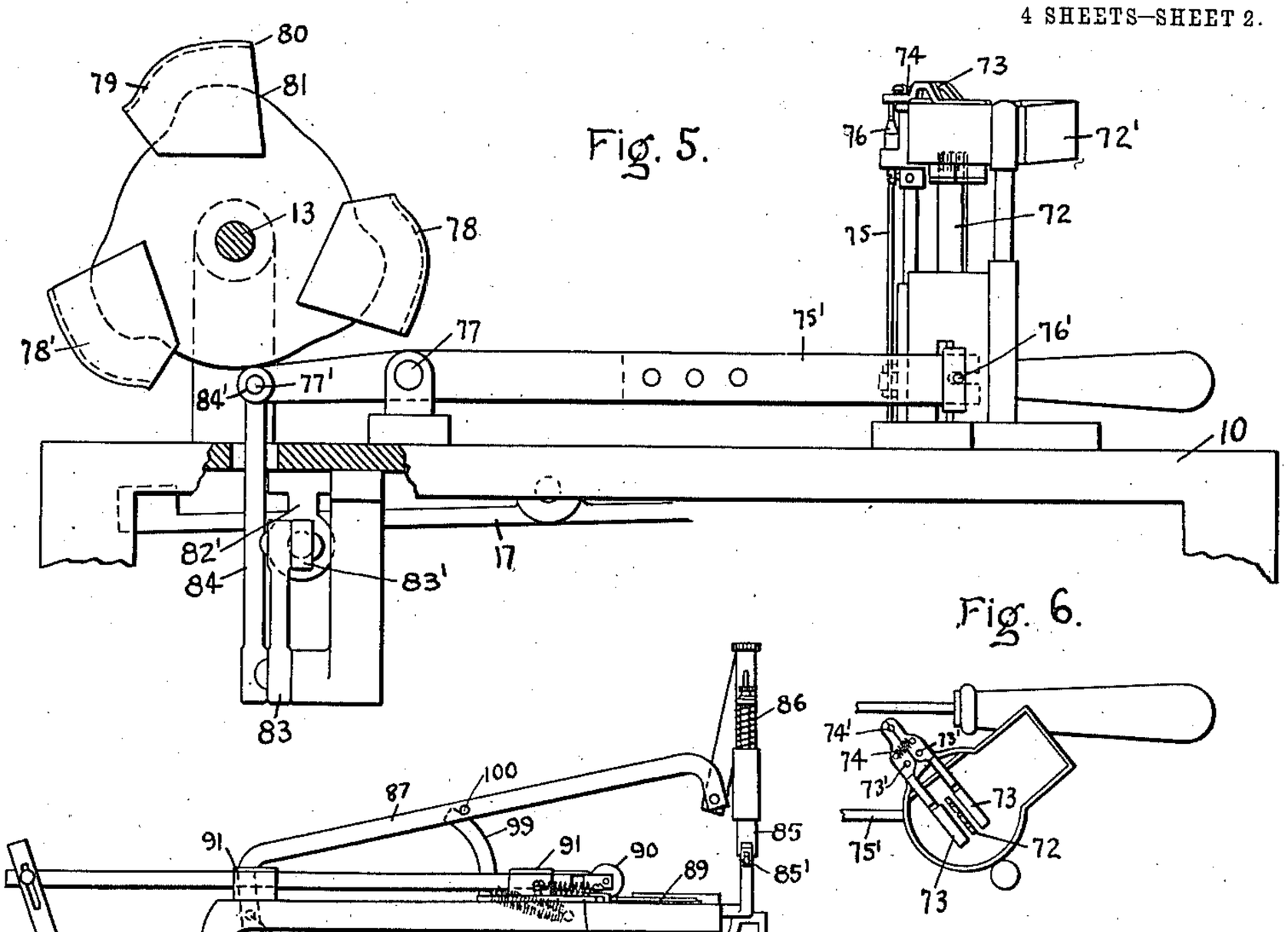

Fig. 5.

Fig. 6.

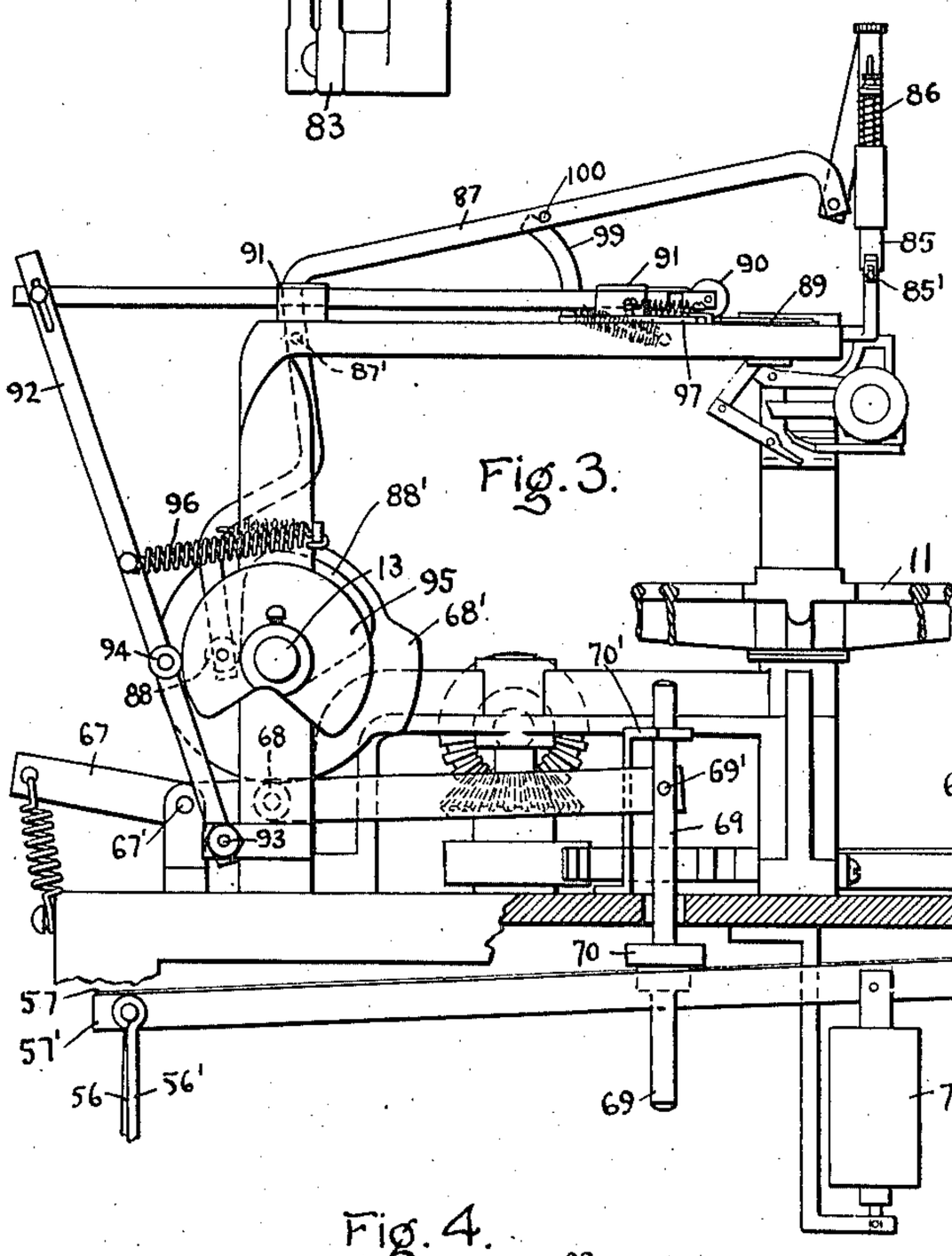

Fig. 3.

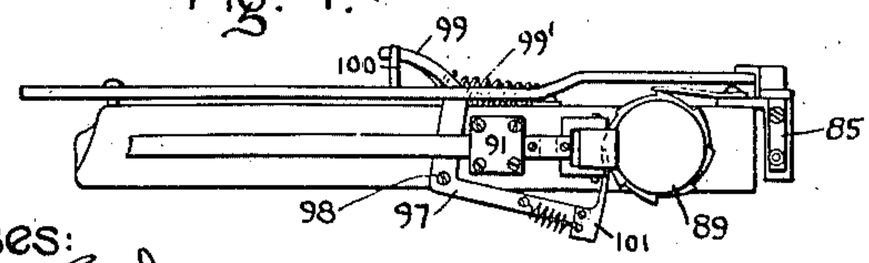

Fig. 4.

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4 SHEETS—SHEET 3.

Fig. 7.

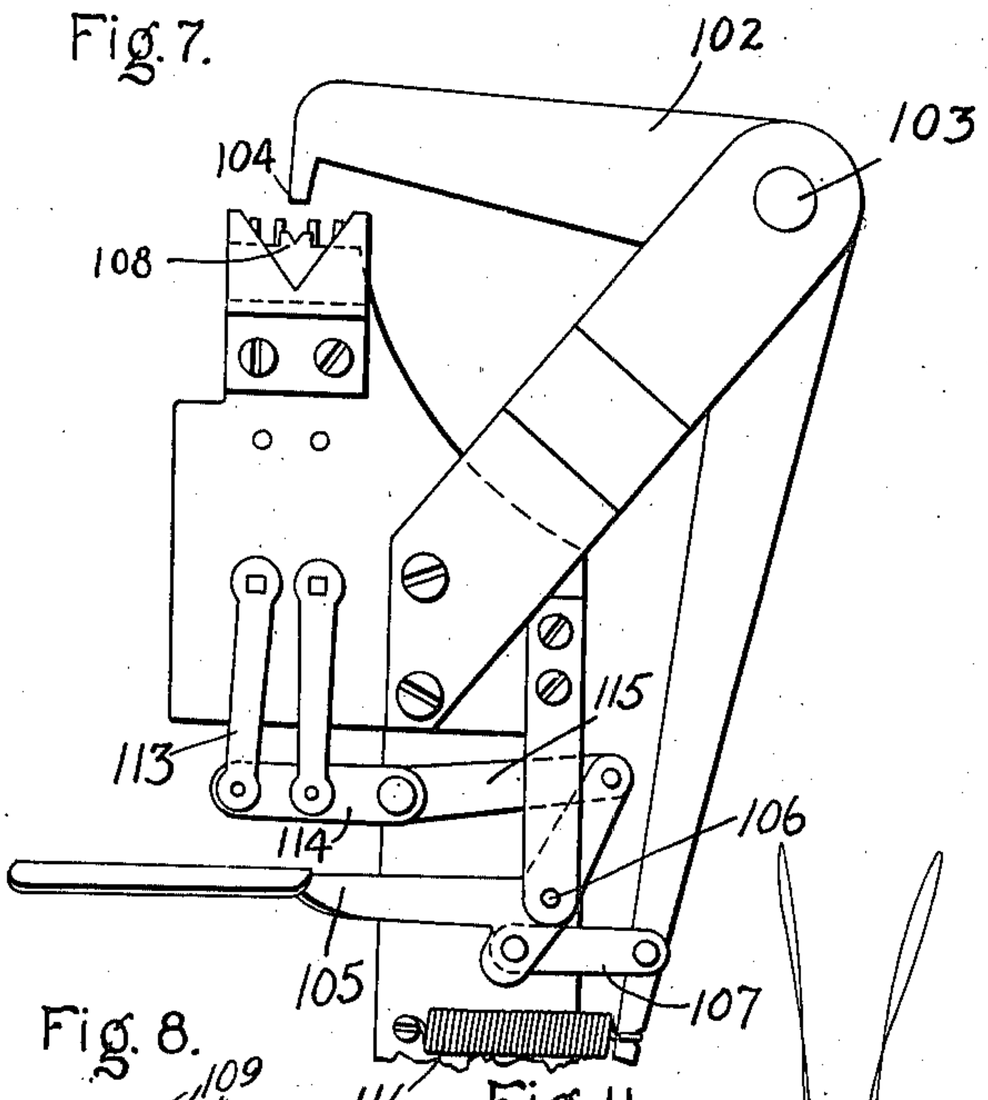


Fig. 8.

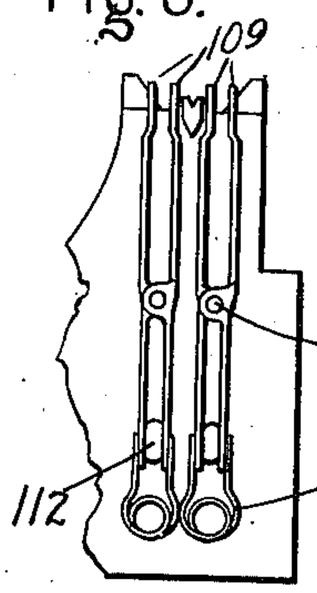


Fig. 9.

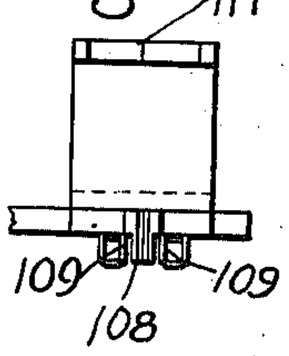


Fig. 11.

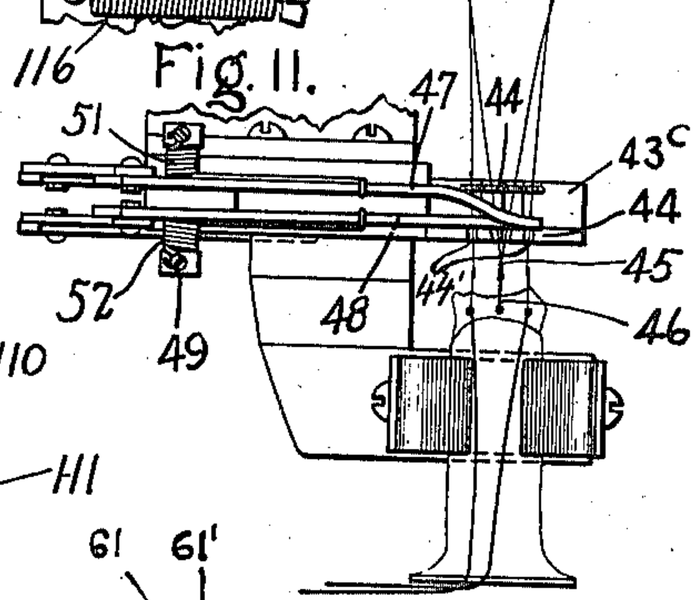
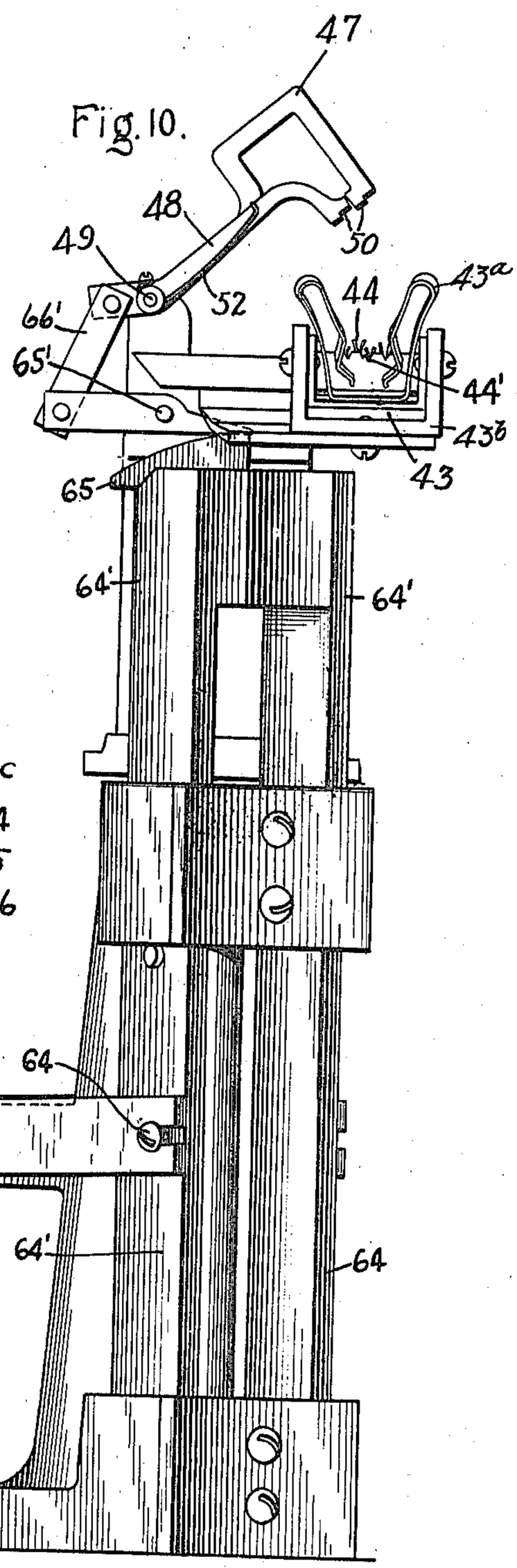


Fig. 10.



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4 SHEETS—SHEET 4.

Fig. 12.

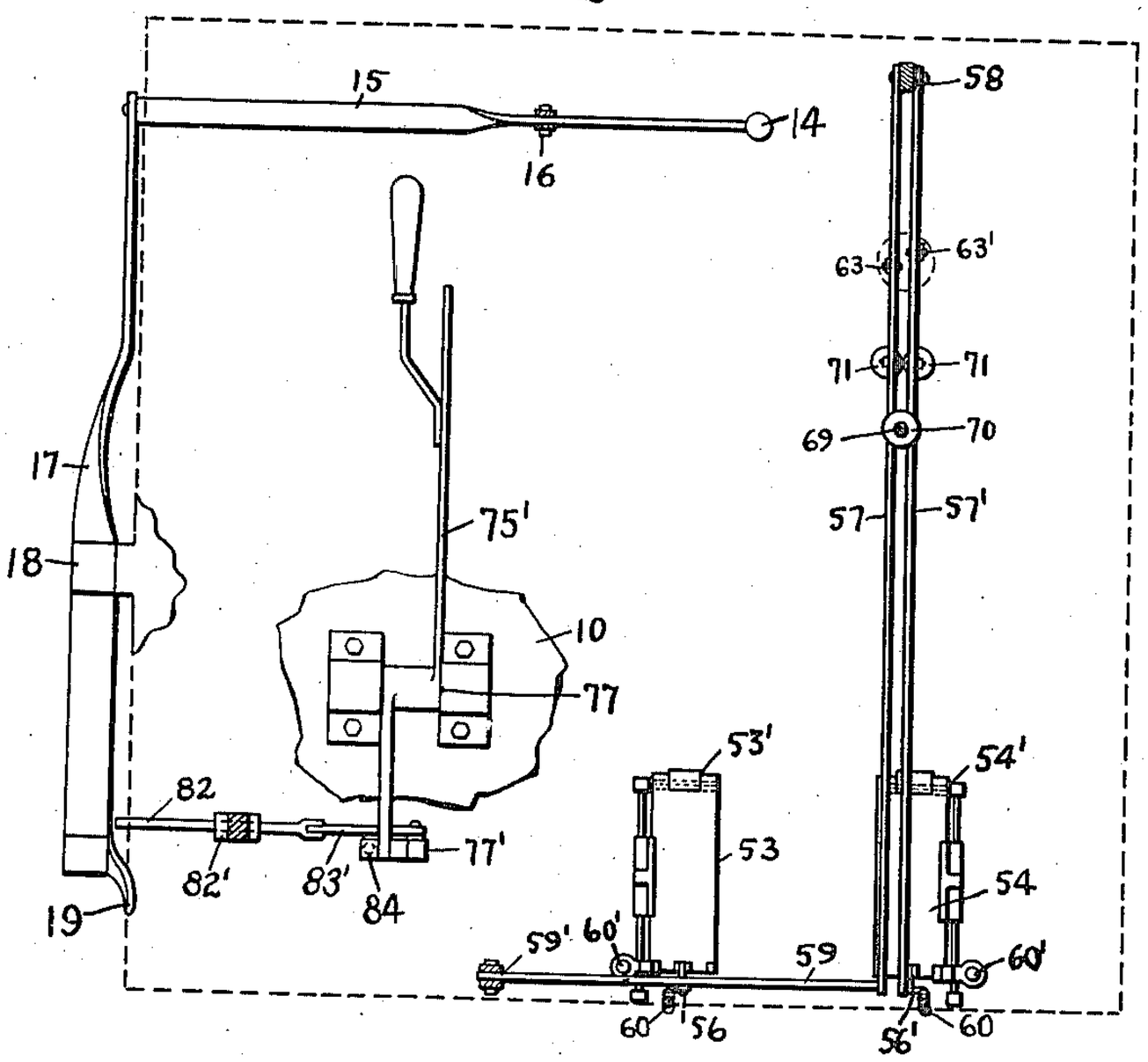


Fig. 13.

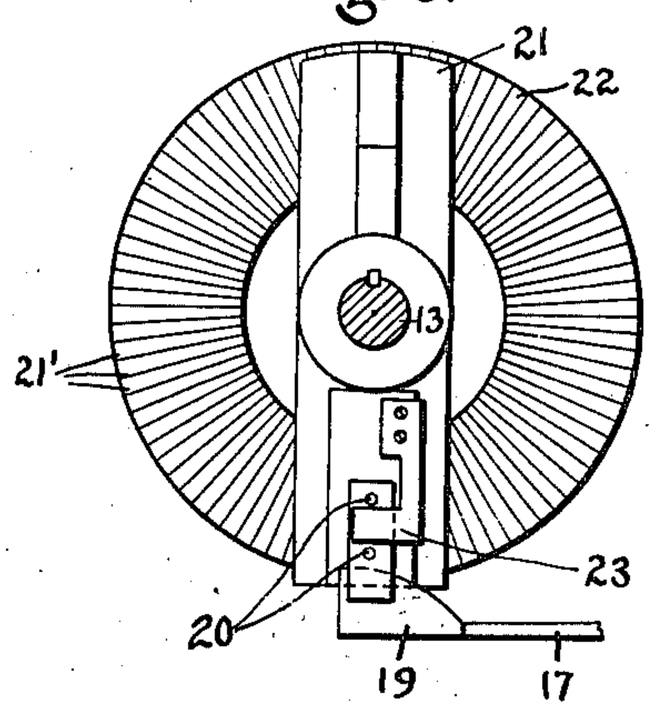
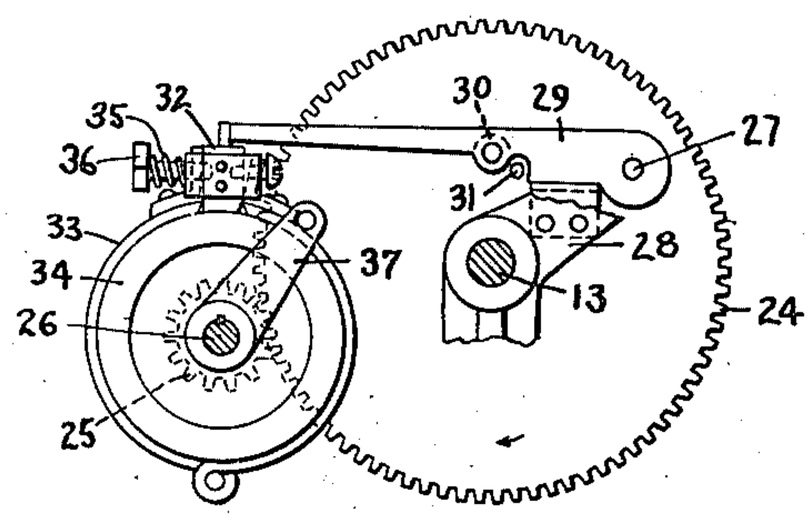


Fig. 14.



Witnesses

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UNITED STATES PATENT OFFICE.

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FILAMENT-MOUNTING MACHINE.

989,549. Specification of Letters Patent. Patented Apr. 11, 1911.

Application filed December 29, 1906. Serial No. 350,016.

To all whom it may concern:

Be it known that I, WILLIAM R. BURROWS, a citizen of the United States, residing at Newark, county of Essex, State of New Jersey, have invented certain new and useful Improvements in Filament-Mounting Machines, of which the following is a specification.

This invention relates to devices for mounting incandescent lamp filaments, and has for its object the provision of means whereby the filaments may be secured to leading-in wires by means of automatic devices in a simple and efficient manner.

In the securing of incandescent lamp filaments to leading-in wires it has been the practice to mount the stem carrying the leading-in wires and to bring the filament by hand in proper relation so that the ends of the filament may be brought in contact with the leading-in wires and the graphitic paste applied by hand.

In carrying out my invention, I provide a machine in which the stems and filaments are mounted in proper relation on a moving carrier, and arrangements made whereby the paste is automatically applied. Provision is also made for hardening of the paste and for stamping the rating on the stem. I also provide means for cutting off anchor wire and shaping the leading-in wires to the proper width for mounting. My invention therefore consists of a machine for mounting filaments in which the several steps are carried on automatically and the several characteristic structural features will be definitely set forth in the claims.

In the drawings in which I have shown one embodiment of my invention, Figure 1 is a plan view of the machine; Fig. 2 is an elevation of the same with certain parts broken away; Fig. 3 is a side view of the same with parts broken away; Fig. 4 is a detail of the mechanism for inking the printing roll; Fig. 5 is a side elevation of the paste carrying mechanism as a whole; Fig. 6 is a detail plan view of paste pot; Fig. 7 is an elevation of the device used for trimming anchor wire and shaping leading-in wires; Fig. 8 is a detail of shaping arrangement; Fig. 9 is a plan view of same; Fig. 10 is an enlarged view showing filament clamping and stem holding mechanism in position to be loaded; Fig. 11 is a detail showing stem and filament clamped in position; Fig. 12 shows the general arrangement of operating levers in plan view; Fig. 13 is a detail of main clutch mechanism; and Fig. 14 is a detail of the clutch for intermittently rotating the carrier.

Referring to the drawings in which like reference numerals refer to like parts, 10 is a table or platform upon which the working parts are mounted, consisting of a carrier which is intermittently rotated by means of a continuously moving drive pulley and intermediate clutches controlled by the operator. The rotating head or carrier 11 is mounted upon a vertical shaft and has a number of arms, in this case eight, at the outer extremity of which are mounted the devices for clamping the stems and filaments in proper relative position. This head is rotated by means of a drive pulley 12 which is constantly rotating and which is clutched to the shaft 13 by the operator pressing the button 14. This button actuates the lever 15 pivoted at 16, which in turn operates the lever 17 pivoted at 18, to depress the end carrying the cam-shaped portion 19 which actuates the clutch. The particular construction of this clutch forms no part of my invention.

For purposes of illustration, I have shown a clutch in which the pins 20 are forced inward to lock member 21 to member 22, by means of a spring 23, so that when the operator presses the button 14, the cam 19 will be lowered and allow the pins 20 to engage the teeth 21′ and clutch the two members together, thereby driving the shaft 13. Secured to shaft 13 is a gear 24 meshing with a gear 25 loosely mounted on shaft 26. Between these two gears is a band clutch which is so arranged that at every revolution of the gear 24 a single revolution is given to shaft 26. The details of this clutch are shown in Fig. 14, although there are other forms of clutches that may be substituted without departing from the spirit of my invention. Pivotally mounted at 27 to a bracket 28 secured to the platform is a lever 29, having a roller 30 adapted to be engaged by a pin 31 on gear 24. The free end of this lever engages a projecting finger on block 32 which is interposed between the ends of a strap brake 33. This block 32 may be somewhat wedge-shaped and is so arranged that normally it allows the ends of the band brake to come together so as to clutch the

sheave 34. A spring 35 and a bolt 36 force the ends of the brake together until the finger on the block 32 is forced by engagement with the lever 29 to the position shown in Fig. 14. The ends of the brake are thus spread and the brake released.

It will be seen that when the gear 24 rotates, it drives the gear 25 and sheave 34. When the pin 31 rotating with the gear 24 reaches the roller on lever 29, the latter is raised, allowing the ends of the brake to come together in response to the tension of spring 35 to grip the sheave. The brake strap is thereupon carried around by the sheaves 34 and rotates the shaft 26 by means of an arm 37, keyed to the shaft and having its outer end bearing on the brake strap. Shaft 26 drives shaft 38 by means of beveled gears 39, and on the lower end of the shaft 38 is an arm 40, carrying a pin 41 adapted to engage slots 42 in the rotating head. In this manner, by the pressure of the button 14 shafts 13 and 26, each make a complete revolution, the latter causing the rotating head to move one step, the distance between two successive notches, in this case one-eighth of a revolution.

Mounted on the outer end of each of the arms of the head is a support or clamping device for holding the stem and the filament in proper relation to each other, the details of said device being shown in Figs. 10 and 11. In the specific form of device shown in the drawings there is mounted on the end of each arm a stem support comprising a base 43 provided with spring clips 43^a for holding the stem with the leading-in wires in position to register with the ends of the filament, the stem support being mounted in a yoke 43^b by means of two screws mounted in opposite arms of the yoke in alinement with each other. The filament is held with its ends in position to overlap and form a joint with the leading-in wires by means of any suitable filament support such as that shown in the drawings, in which the table 43^c carries a series of guides 44 and grooves 44′ adapted to receive the ends of the filament. The form of filament shown in Fig. 11 comprises two loops which are placed in the clamping device one at a time, the two inner ends being lapped and attached to the anchor wire 46 at 45 and the remaining two ends being connected to the leading-in wires. The particular arrangement of the clips for holding the filament will depend upon the type of filament to be mounted, and may, of course, be varied at will. For holding the filaments in the clips, I provide a pair of clamps 47 and 48 pivoted at 49, to be movable independently of each other, the former being offset so as to bring its holding face in line with clamp 48. These clamps are provided with rubber tips 50 for causing a good frictional engagement with the filament without injuring the same. The clamps are normally pressed down on to the table by means of springs 51 and 52, and each one may be raised at will by means of a treadle arrangement in control of the operator. The operation of these two treadle mechanisms for the two clamps is substantially the same, and the details of their construction are shown in Figs. 2, 3, 10 and 12. This mechanism comprises treadles 53 and 54 pivoted respectively at 53′ and 54′ and having their free ends pivoted to the vertical rods 56, 56′. These two rods operate the bars 57, 57′ pivoted at 58. The treadle rod 56′ is pivoted directly to the bar 57′ so that the treadle will come directly under the bar, while the rod 56 moves the bar 57 by means of the link 59 which, as shown in Fig. 12, is pivoted at 59′ and has its middle point connected to the rod 56, so that the treadle 53 is located to one side of the treadle 54. The treadle is so arranged that it will be raised by spring 60, but when forced downward it will be locked in normal position by a spring-pressed latch 60′. The bars 57 57′ are connected with the bars 61 61′ pivoted at 62 by links 63 63′, and the other ends of these bars are slotted for engagement with pins 64 on a vertical reciprocating bar 64′. The upper end of this bar carries a projection 65 which engages a lever of the filament clamping mechanism pivoted at 65′, the outer end of which is connected by a link 66′ to the outer end of the clamps. The treadles are forced downward to normal position by means of a spring pressed lever 67 pivoted at 67′ and provided with an anti-friction roller 68 which is engaged by the cam 68′ on the shaft 13. When the cam 68′ engages the roller 68, the lever 67 is forced downward, carrying with it a push rod 69 to which the lever 67 is pivotally connected by the pivot 69′. The upper end of push rod 69 is steadied by a guide 70′ and the push rod carries a collar 70 which engages the bars 57, 57′, forcing them downward until the treadles connected to the bars are caught by the latch 60′. A dash pot 71 is connected to the bars 57 and 57′ and does not interfere with the downward movement of the bars, but is arranged to retard the upward movement of the bars and treadles after the treadles have been released from the latch 60′.

The arrangement for applying the paste is shown in Figs. 5 and 6, and consists of a forked brush 72 arranged to reciprocate in the receptacle 72′, so as to intermittently embrace the joints of the wire and the filament. In this case the brush is provided with three slots, one for each joint, and provision is made for wiping the paste from the sides of the brush, and leaving it only in the slots. This arrangement consists of wipers 73 pivoted at 73′ and forced apart by

means of a spring 74. The outer ends of the wipers normally come together and a perforation 74′ is provided at the junction while a rod 75 carried by the operating lever 75′ has a taper portion 76 which is forced into the hole and expands the parts so as to force the wipers in contact with the brush. The brush 72 is operated by having a pin 76′ engaging a slot in the operating lever 75′, which lever is pivoted at 77 and carries at its free end a roller 77′ for engagement with the cams 78, 78′, 79, each cam having two surfaces 80 and 81 between which the roller rides. These cams are rotated by means of the shaft 13, so that each revolution of the shaft causes the brush 72 to be moved up and down to apply the paste three times. In case this is not sufficient the lever 75′ is provided with a handle by which the operator may again apply the brush. In order to prevent the button 14 from being pressed to operate the machine while the brush 72 is in a raised position, I provide a stop rod 82 sliding through a guide 82′ and operated by means of a bell-crank lever 83 connected thereto by a link 83′. The bell-crank lever is operated by a link 84 pivoted at 84′ to the lever 75′. When the brush 72 is up, the rod 82 will be thrust outward under the end of the lever 17 so as to prevent its lowering to operate the clutch.

For the purpose of stamping the characters upon the stem, such for instance as the rating of the lamp, I provide the arrangement shown in Figs. 1, 2, 3 and 4. This consists of a head 85 carrying type 85′, an adjustable spring 86 being provided to cushion the blow of the type. Pivoted to an arm on the head, is a bent lever 87 pivoted at 87′, having at its free end a roller 88 for engagement with a cam 88′ on shaft 13. The type will thus be forced downward onto the stem once in each revolution of the shaft 13. As a means for inking the type, I provide a rotatably mounted inking pad 89, having notches on its periphery. The inking roller 90 is mounted on a bar to reciprocate across the pad, the rod sliding through a guide 91 and engaging at its outer end with a rod 92 which is pivoted at 93 and carries a roll 94 for engagement with a cam 95, a spring 96 being provided to keep the roll against the cam surface. For rotating the pad so as to bring the roll over the fresh inking surface, I provide a bent lever 97 pivoted at 98, having an upwardly projecting curved portion 99 engaging with a pin 100 on the lever 87. As the latter descends, the pin riding on the curve surface 99 forces the same backward against the tension of the spring 99′. The opposite end of the lever carries a spring-pressed finger 101 which engages the teeth on the periphery on the pad, so that with each descent of the lever 87 it causes the pad to be rotated a step.

For spacing the ends of the leading-in wires to correspond to the spacing of the filament ends and for cutting the anchor wire to the proper length, I provide the mechanism shown in Figs. 7, 8 and 9. This consists of an angular lever 102 pivoted at 103 to an arm fixedly mounted on the base and carrying at its extremity a knife edge 104. The opposite end of the lever is connected with a pivoted finger lever 105 pivoted at 106 by a link 107. A V-shaped guide 108 is mounted adjacent to the knife edge, and has on each side a pair of fingers 109 adapted to be pressed together to straighten and to properly space the wires. These fingers are pivoted at 110 and forced apart by springs 111, while the elongated rods 112 are inserted between the ends of each pair and adapted to spread the fingers against the tension of the springs 111 and thereby force the opposite ends together. The rods 112 are turned by means of links 113 connected with the ends of the rods and pivoted to a rod 114 connected by means of a link 115 with a projection on the finger lever 105. It will be seen that when the lever 105 is depressed, the knife edge 104 will descend while at the same time the link 115 will be forced longitudinally, causing the rotation of the links 113 and the closing of the fingers 109. When the pressure is removed from the lever the knife is raised by means of the spring 116.

The operation of the machine is as follows: The operator is stationed at the side of the machine near the push-botton 14 and opposite the wire trimmer. She first takes a stem and inserting it in the V-shaped slot 117, lays the anchor wire 46 in the slot 108 forcing the end of the stem up against the end of the latter and placing the leading-in wires between the fingers 109. Lever 105 is then pressed, cutting the anchor wire to a proper length and straightening the leading-in wires. The operator then takes a section of the filament and placing the ends in the grooves 44′ and guides 44 adjusts them until the ends are in position to overlap the wires in the stem, the grooves and guides tending to give them their proper relation. Treadle 54 is now released by pushing the latch 60′ out of engagement therewith and clamp 48 is allowed to drop slowly, movement being regulated by dash-pot 71. The other section of filament is now placed and held by clamp 47 which is operated in the same manner as 48 by releasing treadle 53. The filament is now held with its ends projecting in a horizontal plane and the operator then places a stem with a spring clip 43ª of the stem support with the leading-in wires projecting toward the ends of the filament. The stem support is tilted while the operator is placing the stem in position so that there is no danger of striking and injuring the

ends of the filament. After the stem is in position in the stem support, it is turned back into the horizontal plane to bring the leading-in wires into position to overlap the ends of the filament and thereby form joints between the leading-in wires and the filament. The button 14 is then pressed, this starts machine and pedals are pushed down by shoulder 70 and locked in their normal position, the table is given one-eighth turn bringing another stem and filament device in position to be loaded and stopping the one just filled opposite the pasting device. In this position, the brush 72 is forced upward so that the joints between the wire and the filament enter the slots in the brush, the operation being performed three times, and if necessary repeated manually by the operator. In the meantime, the operator clamps another stem and filament in place and presses the button carrying the stem with the paste applied around, so as to give the paste an opportunity to dry. The drying portion may be hastened by means of gas burners stationed at points in the path of the carrier, as for instance at 119 and 118. When the stem has become quite dry, it arrives opposite the printing mechanism where the type descends upon the stem and prints the rating or other legend thereon, and when it finally again comes in front of the operator, she removes the same and inserts new parts as above described.

It will be of course understood that the particular construction and arrangement of parts herein shown may be greatly varied, and many changes will suggest themselves to those skilled in the art, all of which come within the spirit of my invention, in so far as they fall within the scope of the claims annexed hereto.

What I claim as new and desire to secure by Letters Patent of the United States, is—

1. A machine for mounting lamp filaments, comprising a fixed support for a stem, a support arranged to hold the ends of a filament in contact with the wires in said stem, and means for automatically forcing an adhesive into place around the engaging ends of the wires and filaments.

2. A machine for mounting lamp filaments, comprising a fixed support for a stem, a clamping device arranged to hold the ends of a filament in contact with the wires in said stem, means for automatically applying adhesive to the joints, and means for automatically printing a character on said stem.

3. In a machine for mounting lamp filaments, the combination of a traveling carrier, a plurality of clamping devices mounted thereon, each comprising a clamp for a stem, and means for holding the ends of a filament in contact with the wires in said stem, a member having a recess for adhesive and mounted to move relatively to said clamping device to bring the contacting ends of the wires and filaments into said recess, and means for automatically actuating said member to apply adhesive to the joints in succession.

4. In a machine for mounting lamp filaments, the combination of a traveling carrier, a plurality of clamping devices mounted thereon, each comprising a pair of oppositely arranged supports for holding the ends of the filaments in contact with leading-in wires in a stem and a device mounted adjacent to said carrier arranged to automatically operate between the supports, to apply adhesive to the joints successively.

5. In a machine for mounting lamp filaments, the combination of a traveling carrier, a plurality of clamping devices mounted thereon, each comprising a fixed support for a stem, a fixed support for a filament adjacent thereto, and a device mounted in the path of said carrier arranged to reciprocate between the supports, to apply adhesive to the joints successively.

6. A machine for securing incandescent lamp filaments to leading-in wires comprising a clamp for the stem, a fixed support adjacent said clamp having grooves opposite the wires of the stem, a member engaging the support to clamp the filament in said grooves with both ends in engagement with the wires, and means for automatically applying adhesive to the joints.

7. In a machine for mounting lamp filaments, the combination with devices for clamping a lamp filament and a leading-in wire in contact, of means for automatically applying adhesive to the joints, comprising a receptacle for the adhesive, a brush arranged to enter the same, and means for removing the excess adhesive from said brush.

8. In a machine for mounting lamp filaments, the combination with devices for clamping a lamp filament and a leading-in wire in contact, of means for automatically applying adhesive to the joints, comprising a receptacle for the adhesive, a forked brush arranged to enter the same, and means for automatically removing the excess adhesive from the outside surface of said brush.

9. In a machine for mounting lamp filaments, the combination with devices for clamping a lamp filament and a leading-in wire in contact, of means for automatically applying adhesive to the joints, comprising a receptacle for the adhesive, a forked brush arranged to be automatically reciprocated in and out of the receptacle, and a wiper arranged to automatically wipe the outside surface thereof, to remove the excess adhesive as it leaves the receptacle.

10. In a machine for mounting lamp filaments, the combination of a traveling carrier, a plurality of clamping devices mount-

ed thereon for holding a lamp filament and a leading-in wire in contact, means for automatically applying adhesive to the joints, comprising a receptacle for the adhesive, a forked brush arranged to enter the same, and a wiper arranged to engage said brush to remove the excess adhesive therefrom.

11. In a filament mounting machine, the combination with supports for holding a filament and a stem with the stem wires forming joints with the ends of the filament, of a brush having open ended slots therein, and means for moving said supports and said brush relatively to each other to bring said joints into and out of the slots in said brush.

12. In a filament mounting machine, the combination with supports for holding a filament and a stem with the stem wires forming joints with the ends of the filament, of a brush for applying cement to said joints, a reservoir for cement and operating means for said brush arranged to move said brush out of said reservoir into operative relation to said joints and to return said brush into said reservoir.

13. In a filament mounting machine, the combination with supports for holding a filament and a stem with the stem wires forming joints with the ends of the filament, of a slotted brush for applying cement to said joints between the stem wires and the filament, a reservoir for cement mounted between said supports and operating means for said brush arranged to normally maintain the brush below the level of the cement in said reservoir and to move said brush into operative relation to said joints.

14. In a filament mounting machine, the combination with supports for holding a filament and a stem with the stem wires forming joints with the ends of the filament, of a flat brush having longitudinal slots mounted to move transversely of the stem wires and filament to bring said joints into said slots, and wiping fingers arranged to engage the flat sides of said brush.

15. In a filament mounting machine, the combination with supports for holding a filament and a stem with the stem wires forming joints with the ends of the filament, of a flat brush having longitudinal slots mounted to move transversely of the stem wires and filament to bring said joints into said slots, wiping fingers mounted to engage with the flat sides of said brush, and operating means for positively moving said fingers into engagement with said brush.

16. In a filament mounting machine, the combination with supports for holding a filament and a stem with the stem wires forming joints with the ends of the filament, of a slotted brush for applying cement to the joints between the stem wires and filament, wiping fingers mounted to engage said brush on opposite sides, and common operating means for raising said brush and simultaneously moving said fingers into operative relation to the brush.

17. In a filament mounting machine, the combination with supports for holding a filament and a stem with the stem wires forming joints with the ends of the filament, a reservoir for cement mounted beneath said joints, a brush having open ended vertical slots and mounted to move vertically out of said reservoir to bring the joints between the stem wires and the filament into said slots, and operating means for automatically raising said brush out of said reservoir to apply the cement in the slots of said brush to the joints.

18. In a filament mounting machine, the combination with a movable carrier, a stem support mounted on said carrier, and a filament support comprising relatively movable clamping members mounted on said carrier, of an abutment for coöperating with one of said clamping members in a predetermined position of said carrier, said abutment being mounted to move into and out of the path of movement of said clamping member, and manually controlled means for moving said abutment.

19. In a filament mounting machine, the combination with a movable carrier, a stem support mounted on said carrier, and a filament support comprising relatively movable clamping members mounted on said carrier, of a cam mounted to engage and actuate one of said clamping members to release the filament, and means for moving said cam at will out of operative relation to said clamping member.

20. In a filament mounting machine, the combination with a movable carrier, a stem support mounted on said carrier, and a filament support comprising relatively movable clamping members, of an abutment mounted to normally remain stationary in a position to be engaged by one of said clamping members whereby said clamping members are actuated to release the filament, and means controlled by the operator for moving said abutment at will out of operative relation to said clamping members.

21. In a filament mounting machine, the combination with a movable carrier, a stem support mounted on said carrier, and a filament support comprising coöperating clamping members mounted on said carrier, of a cam mounted to engage one of said clamping members in a predetermined position of said carrier and thereby release the filament, manually controlled means for moving said cam at will out of operative relation to said clamping members, and means for automatically restoring said cam to operative position.

22. In a filament mounting machine, the

combination with supports for holding a filament and a stem with the leading in wires of the stem adjacent the ends of the filament, of means for straightening and adjusting the leading in wires to enable them to register with both ends of the filament.

23. In a filament mounting machine, the combination with supports for holding a filament and a stem with the leading in wires of the stem adjoining the ends of the filament, of grippers mounted to coöperate with said leading in wires and space said wires to register with the ends of the filament, and operating means whereby said grippers may be actuated at will.

24. In a filament mounting machine, the combination with supports for holding a filament and a stem with the leading in wires of the stem adjoining the ends of the filament, of movable coöperating fingers mounted to engage opposite sides of said leading in wires to straighten and space said wires, and manually controlled operating means for bringing said fingers into engagement with said wires.

25. In a filament mounting machine, the combination with supports for holding a filament and a stem with the leading in wires of the stem adjoining the ends of the filament, of a pair of pivoted coöperating fingers mounted to grip each leading in wire and separate said wires a distance equal to the distance between the ends of the filament, and means for actuating each pair of fingers.

26. In a filament mounting machine, the combination with supports for holding a filament and a stem with the leading in wires of the stem in juxtaposition with the ends of the filament, of a guide for the anchor wire of the stem, grippers mounted on each side of said guide to engage and space the leading in wires, and means for simultaneously operating said grippers.

27. A stem adjuster comprising means for holding a stem with the anchor wire and the leading in wires projecting, grippers mounted to straighten and space the leading in wires, a cutter for reducing the anchor wire to a predetermined length, and operating mechanism for simultaneously actuating the grippers and said cutter.

28. A stem adjuster comprising an anchor wire guide of definite length, spacing devices on each side of said guide for spacing the leading in wires, a cutting blade mounted to coöperate with one end of said guide to form an anchor wire cutter, and operating mechanism for said spacing devices and said cutting blade.

In witness whereof, I have hereunto set my hand this 27th day of December, 1906.

WILLIAM R. BURROWS.

Witnesses:
S. N. WHITEHEAD,
J. HARRY ELKINS.