June 1, 1948. J. A. OPENSHAW 2,442,661

APPARATUS FOR MAKING BRUSHES

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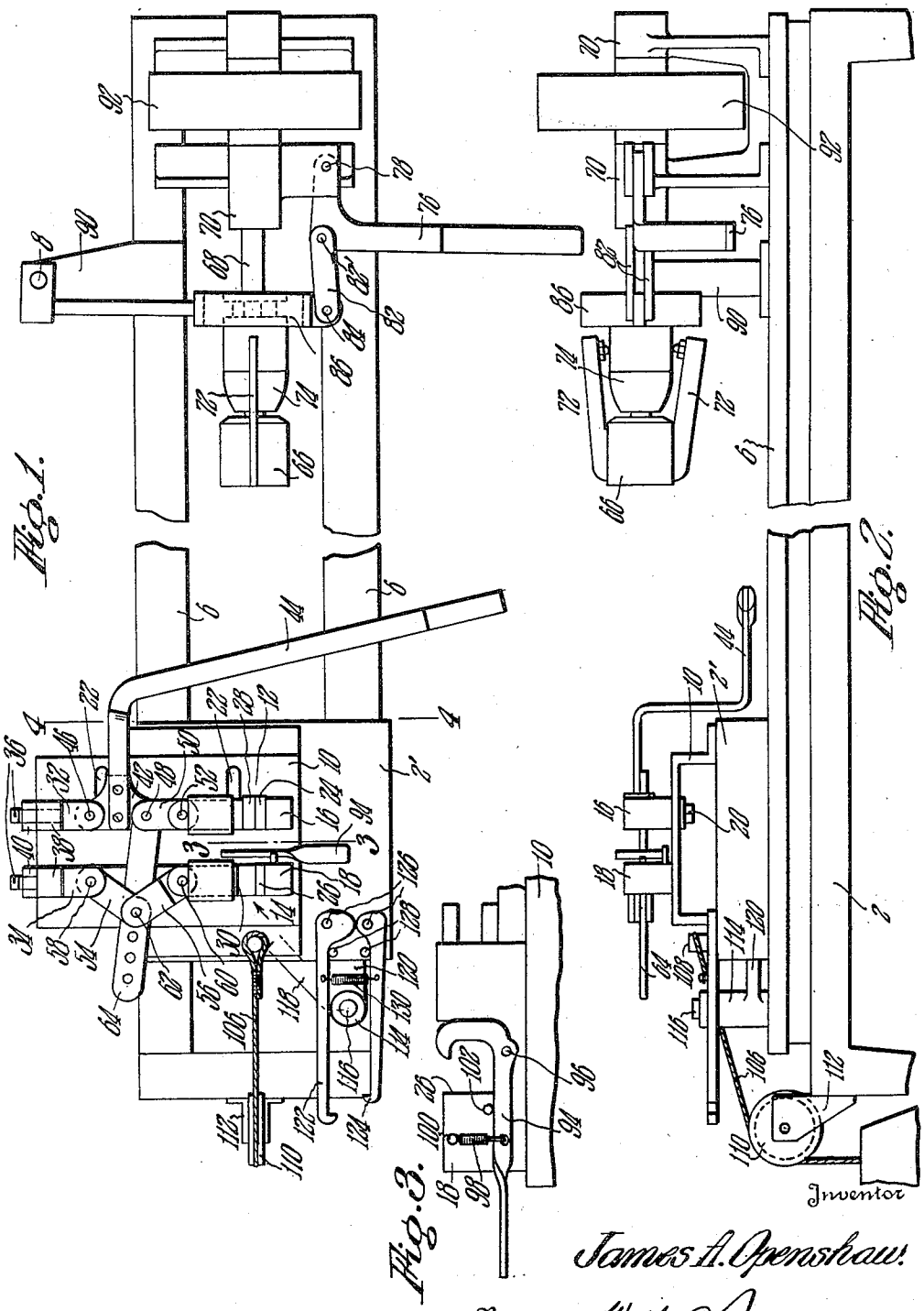


Fig. 1.

Fig. 2.

Fig. 3.

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Fig. 6.

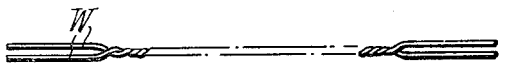


Fig. 7.



Fig. 8.

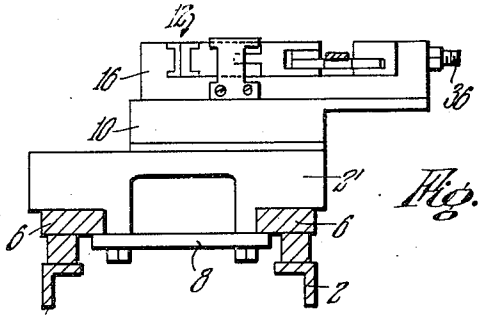


Fig. 4.

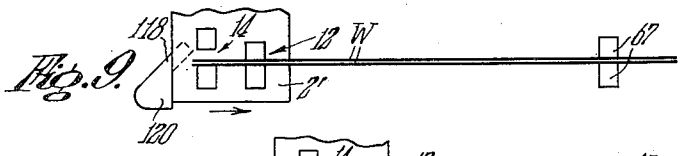


Fig. 9.

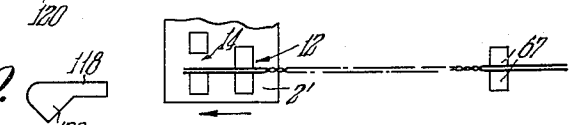


Fig. 10.

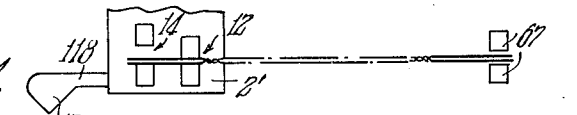


Fig. 11.

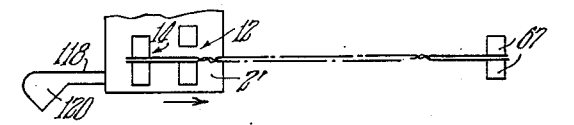


Fig. 12.

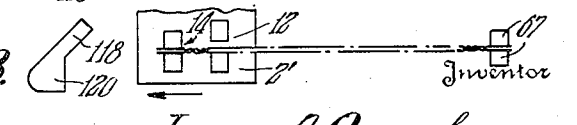


Fig. 13.

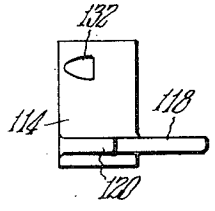


Fig. 5.

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APPARATUS FOR MAKING BRUSHES

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Application December 23, 1946, Serial No. 717,860

4 Claims. (Cl. 140—96)

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This invention relates to improvements in apparatus for making brushes and more particularly those brushes which include plural wires that are relatively twisted and grip bristles therebetween.

The principal object of the invention is the provision of apparatus for twisting wires to grip bristles therebetween which is constructed and arranged to engage opposite ends of the wires and twist them with the bristles therebetween to form a brush having its opposite ends spaced inwardly from the ends of the wires then to release the wires and grip them at the extremities thereof and twist the said end portions.

By first twisting the wires and providing a brush of less length than the wires the ends of the wires may be subsequently twisted to provide ends for insertion in a handle or the like.

With the foregoing and various other novel features and advantages and other objects of my invention as will become more apparent as the description proceeds, the invention consists in certain novel features of construction and in the combination and arrangement of parts as will be hereinafter more particularly pointed out in the claims hereunto annexed and more fully described and referred to in connection with the accompanying drawings wherein:

Figs. 1 and 2 are plan and side elevational views respectively of apparatus embodying the novel features of the invention;

Figs. 3 and 4 are sectional elevational views on the lines 3—3 and 4—4 of Fig. 1;

Fig. 5 is a side elevational view of the stop member of the invention;

Figs. 6 to 8 inc. are plan views showing a pair of wires as they are twisted by the apparatus; and

Figs. 9 to 13 are diagrammatic views to explain the operation of the apparatus.

Referring now to the drawings more in detail, the invention will be fully described.

A bed is shown at 2 on which a slide 2' is reciprocable back and forth. This may be accomplished by rails 6 which the slide is supported and guided with a plate 8 secured to the slide beneath the rails as shown in Fig. 4.

A base 10 is secured to the slide by any suitable means and carries clamp mechanism indicated generally by 12 and 14 which include blocks 16 and 18 that extend upwardly from the base 10 and are disposed transversely of the machine.

In the form of the invention shown, the block 18 is fixed to the member 10 while the block 16 is adjustable relative thereto by means of bolts

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20 which extend through slots 22 in the member 10 and engage the said block 16.

The blocks 16 and 18 have stationary jaws 24 and 26 and jaws 28 and 30 slidable in the blocks relative thereto.

The jaws have flat adjacent inner faces which may be serrated in any manner desired and said faces are disposed in vertical planes. The jaw 28 cooperates with the jaw 24 to clamp the ends of wires therebetween while the jaw 30 similarly cooperates with the jaw 26.

Members 32 and 34 have screw parts 36 extending through the ends 38 of the bars 16 and 18 and nuts 40 are in engagement with the parts 36.

A plate 42 has a lever 44 fixed thereto and said plate is pivoted at 46 to the member 32 and at 48 to a link 50 which in turn is pivoted at 52 to the movable jaw 28. By swinging the lever in one direction or the other, the movable jaw 28 may be moved towards and away from the stationary jaw so as to cooperate therewith for clamping wires therebetween or releasing them.

Links 54 and 56 are pivoted at 58 and 60 to the member 34 and to the movable jaw 30 and inner ends thereof are pivoted at 62 to a link 64 which is connected to pivot 48.

The lever 44 through the link arrangement described moves jaw 30 relative to the stationary jaw 26. The parts are arranged so that with lever 44 in one position jaw 28 cooperates with jaw 24 to grip wires while jaw 30 is in non-gripping position and by swinging lever 44 to another position jaw 30 will cooperate with jaw 26. Either pair or set thereof may grip the ends of wires while the jaws of the other pair are apart.

The opposite ends of wires clamped by the jaws are releasably clamped by the jaws of a chuck 66 which is fixed to a shaft 68 that is rotatable in bearings 70 fixed to the bed.

The chuck will be of any well known form having jaws which are movable inwardly to clamp the ends of wires therebetween. Such a chuck has levers 72 pivoted therein and a cam 74 slidable on the shaft 68 as it moves forwardly spreads the levers 72 and moves the jaws to clamping position.

A lever 76 pivoted at 78 has links 82 pivoted thereto at 82' which are pivoted at 84 to a shifter 86. Said shifter is pivoted at 88 to a bracket 90 and operates cam 74.

A pulley 92 is secured to the shaft 68 which may be connected to any suitable source of power for rotating the shaft 68. Or the shaft may be rotated by a motor or any other means desired.

The lever 76 may be swung in one direction or

the other to cause the chuck to grip or release the ends of wires. With one end of wires clamped by either the clamp means 12 or 14 and the opposite ends clamped by the chuck as the shaft 68 rotates the wires are twisted between the clamp means at opposite ends thereof.

A chuck and operating mechanism suitable for the practice of the invention is shown and described in an application filed by me simultaneously herewith.

A lever 94 is pivoted at 96 to the block 18 and has an upper hooked end, as shown in Fig. 3. A spring 98 connected to the lever and to a pin 100 urges the lever upwardly against a stop 102. The lever may be swung counterclockwise so that the upper hooked end thereof may engage and move the ends of wires downwardly between the jaws 26 and 30.

A cable 106 is connected to a pin 108 of the slide, passes over a pulley 110 which is rotatable in a bracket 112 fixed to the bed and has a weight fixed thereto. The weight moves the carriage to the left against a stop device.

Said stop device includes a hub 114 oscillatable on a stud 116 fixed to the bed and said hub has a primary stop 118 and a secondary stop 120. The slide 2 is against the secondary stop in Figs. 1 and 2.

Pawls 122 and 124 are pivoted at 126 to the slide and are urged inwardly against stops 128 by a spring 130 having opposite ends connected thereto as shown in Fig. 1.

The hub 114 is provided with notches such as 132, as shown in Fig. 5, which the pawls engage as the slide moves to the right so that the hub is rotated to position one of the stops as will be described.

Before describing the operation of the machine reference will be made to Figs. 6, 7 and 8.

In Fig. 6 two wires W are shown. Opposite ends of the wires are clamped in the clamp device 12, a multiplicity of bristles are inserted therebetween and transversely thereof and opposite ends are clamped in the chuck. The wires are twisted so as to grip the bristles therebetween and provide a brush having ends spaced inwardly from the ends of the wires, having untwisted ends as in Fig. 7. Then the untwisted ends are twisted as shown in Fig. 8 providing ends which are adapted to be inserted in a handle or the like.

The operation of the apparatus will now be described with reference to Figs. 9 to 13.

The forward ends of the wires are inserted in the open jaws of the chuck indicated by 67 and the rear ends are clamped in the clamping device 12. The ends of the wires extend beyond the clamping means as indicated.

Bristles are placed between the wires and the chuck is caused to clamp the wires and as it rotates the wires are twisted to grip the bristles. As the twisting proceeds the slide 2' moves to the right away from stop 120 the twisting shortens the wires and the movement of the slide is against the action of the weight. As the slide moves to the right to the position of Fig. 10 the pawl 122 engages and rotates hub 114 to position stop 118 in its stop position behind the slide 2'.

When the wires are twisted between the points where they are engaged by the clamp means, the chuck 66 is operated by lever 76 so that the ends of the wires are released by the jaws of the chuck. The weight now moves the slide to the left against stop 118 as in Fig. 11 and positions the extreme ends of the wires in the clamping jaws 67 of the chuck 66.

The lever 44 is then operated so that clamp means 12 releases the wires, clamp means 14 clamps the ends of the wires and lever 76 is operated so that opposite ends of the wires are clamped by the chuck. As the chuck rotates, the ends of the wires outside the ends of the brush are twisted and during the twisting the slide moves to the right and pawl 124 rotates hub 114 so that stop 120 is in stop position.

When the twisting is accomplished opposite ends of the wires are released and the slide then moves back against the stop and the parts are in position for subsequent wire twisting operation.

The invention may be embodied in other specific forms without departing from the essential characteristics thereof. Hence, the present embodiments are therefore to be considered in all respects merely as being illustrative and not as being restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all modifications and variations as fall within the meaning and purview and range of equivalency of the appended claims are therefore intended to be embraced therein.

What it is desired to claim and secure by Letters Patent of the United States is:

1. Apparatus for twisting parallel brush forming wires comprising in combination, a support, forward clamp means at one end of the support adapted to clamp wires adjacent their forward ends or at said ends and to release the same, means to rotate said forward clamp means, a slide movable on said support towards and away from said forward clamp means and return means to move said slide away from said forward clamp means, primary clamp means on said slide operable to clamp wires adjacent their rear ends and to release the same, secondary clamp means on said slide operable to clamp wires at their rear ends and to release the same, operative means connected to said primary and secondary clamp means for simultaneously operating one of said means for clamping and the other of said means for releasing wires, and stop means movable into stop position by said slide as it moves forwardly for stopping rearward movement of said slide.

2. Apparatus for twisting parallel brush forming wires comprising in combination, a support, forward clamp means at one end of the support adapted to clamp wires adjacent their forward ends or at said ends and to release the same, means to rotate said forward clamp means, a slide movable on said support towards and away from said forward clamp means and return means to move said slide away from said forward clamp means, primary clamp means on said slide operable to clamp wires adjacent their rear ends and to release the same, secondary clamp means on said slide operable to clamp wires at their rear ends and to release the same, operative means connected to said primary and secondary clamp means for simultaneously operating one of said means for clamping and the other of said means for releasing wires, and stop means movable into stop position by said slide as it moves forwardly for stopping rearward movement of said slide, said primary and secondary clamp means each including stationary jaws and jaws movable towards and away therefrom.

3. Apparatus for twisting parallel brush form-

ing wires comprising in combination, a support, forward clamp means at one end of the support adapted to clamp wires adjacent their forward ends or at said ends and to release the same, means to rotate said forward clamp means, a slide movable on said support towards and away from said forward clamp means and return means to move said slide away from said forward clamp means, primary clamp means on said slide operable to clamp wires adjacent their rear ends and to release the same, secondary clamp means on said slide operable to clamp wires at their rear ends and to release the same, operative means connected to said primary and secondary clamp means for simultaneously operating one of said means for clamping and the other of said means for releasing wires, and stop means movable into stop position by said slide as it moves forwardly for stopping rearward movement of said slide, said operative means including an operative lever and link connections between said lever and movable jaws.

4. Apparatus for twisting parallel brush forming wires comprising in combination, a support, forward clamp means at one end of the support adapted to clamp wires adjacent their forward ends or at said ends and to release the same, means to rotate said forward clamp means, a slide movable on said support towards and away from said forward clamp means and return means to move said slide away from said forward clamp means, primary clamp means on said slide operable to clamp wires adjacent their rear ends and to release the same, secondary clamp means on said slide operable to clamp wires at their rear ends and to release the same, operative means connected to said primary and secondary clamp means for simultaneously operating one of said means for clamping and the other of said means for releasing wires, and stop means movable into stop position by said slide as it moves forwardly for stopping rearward movement of said slide, said stop means including a rotatable member having a slide engaging part.

JAMES A. OPENSHAW.

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