Feb. 22, 1955 H. A. HENDRICH ET AL 2,702,428

MATRIX PLATE FOR WIRE PRINTERS

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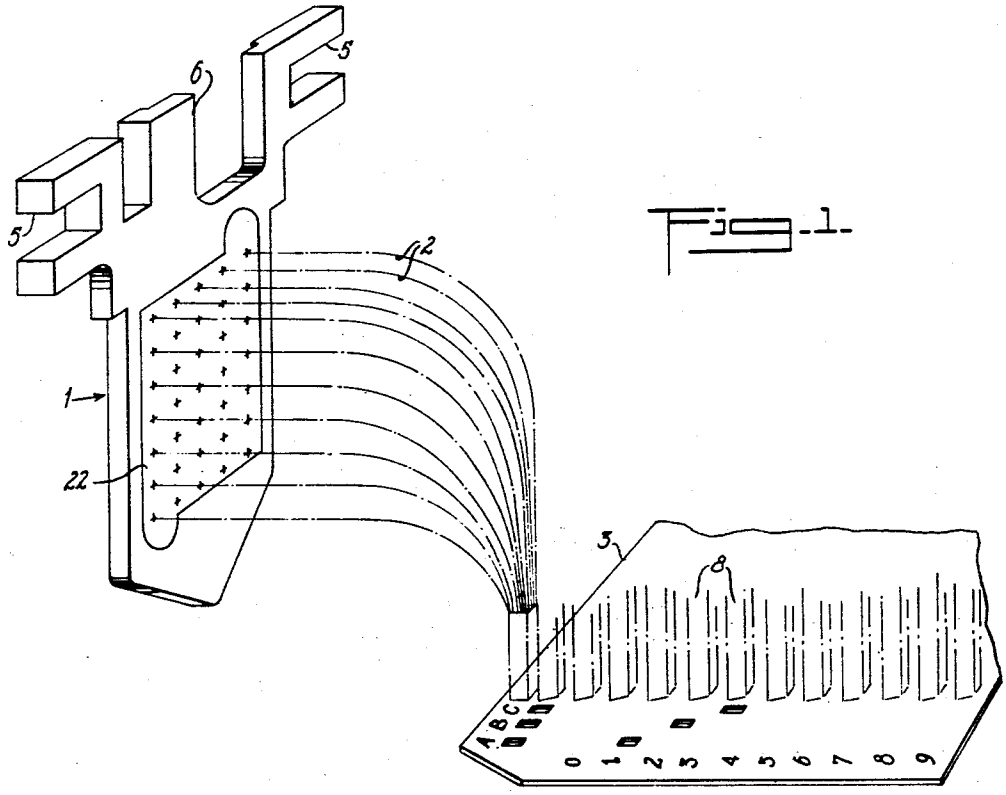


Fig. 1.

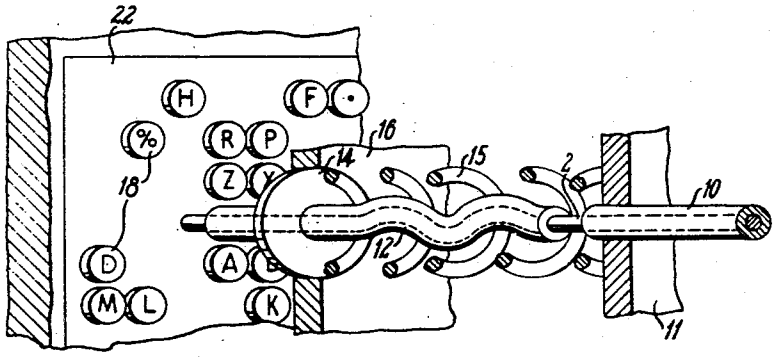


Fig. 2.

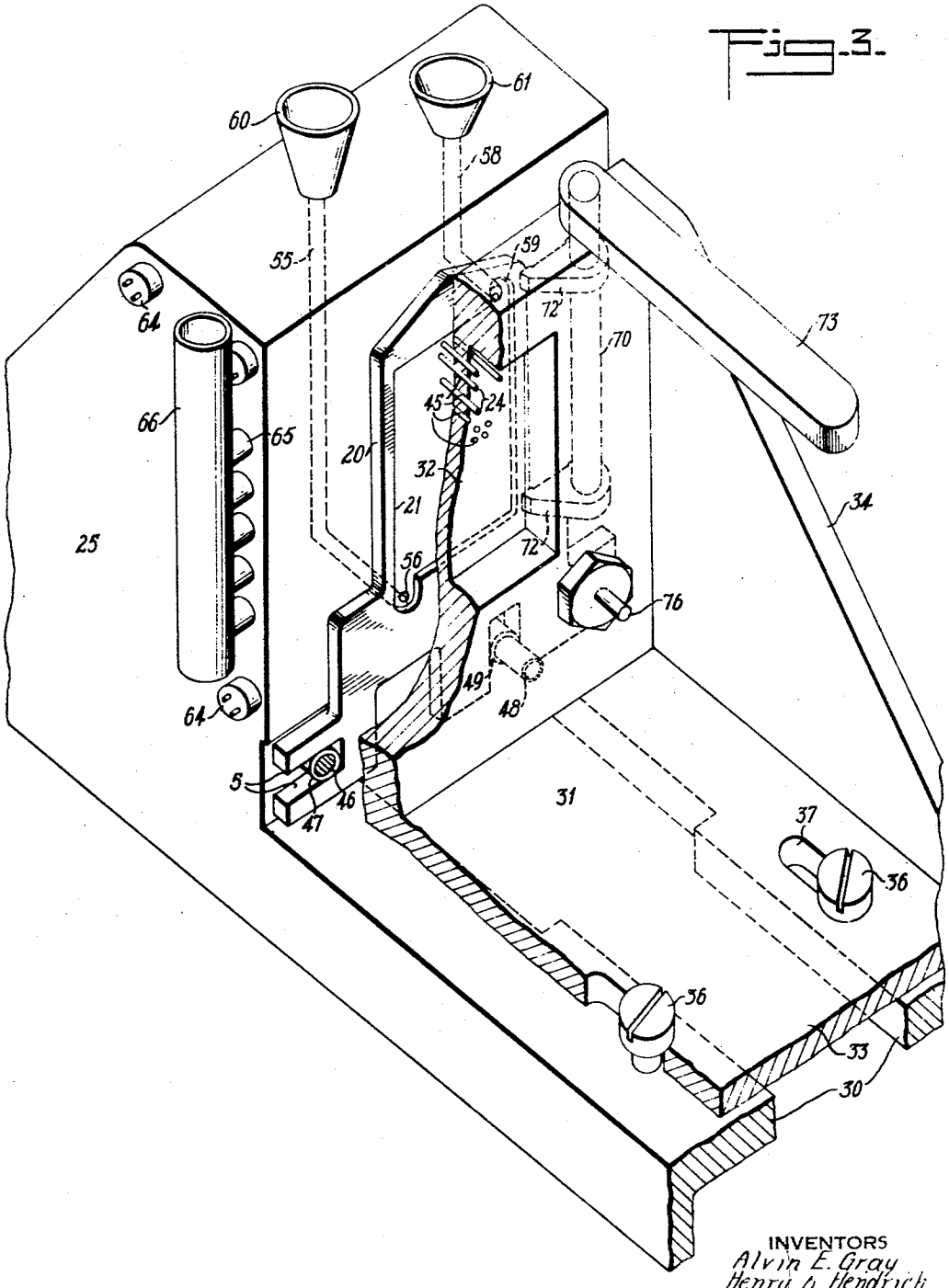
Inventors
Alvin E. Gray
Henry A. Hendrich
BY
Ralph C. Dustin
Attorney

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Fig. 3.



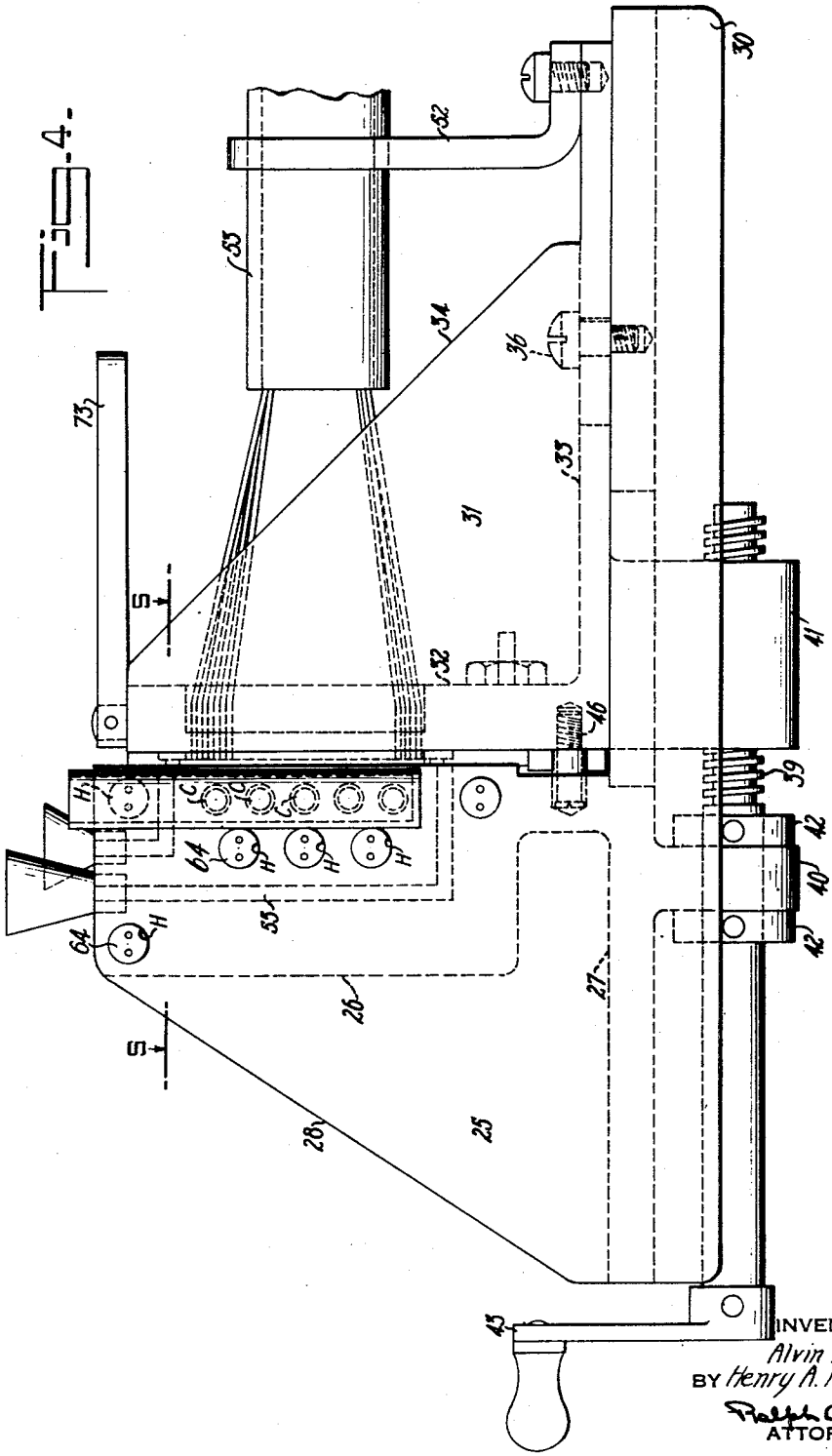
INVENTORS
Alvin E. Gray
Henry A. Hendrich
BY Ralph C. Dustin
ATTORNEY

Feb. 22, 1955 H. A. HENDRICH ET AL 2,702,428

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Fig. 4.



INVENTORS
Alvin E. Gray
BY Henry A. Hendrich
Ralph C. Dustin
ATTORNEY

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Fig. 5.

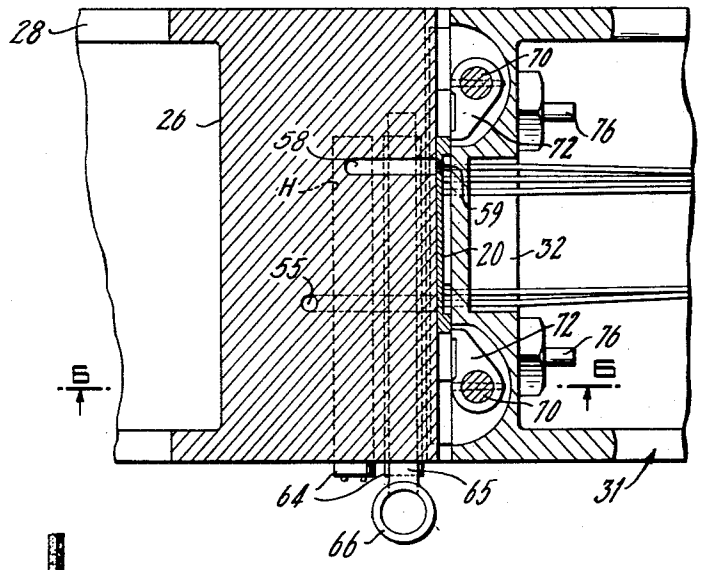
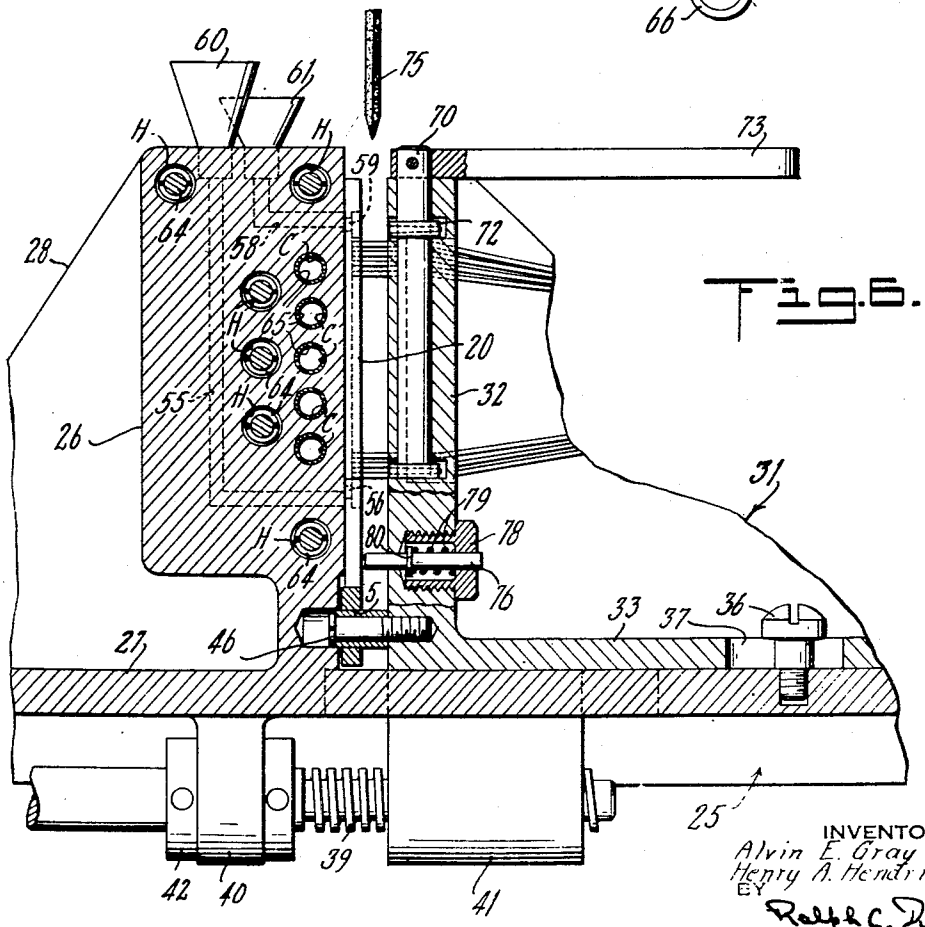


Fig. 6.



INVENTORS
Alvin E. Gray
Henry A. Hendrich
BY
Ralph C. Dustin
ATTORNEY

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MATRIX PLATE FOR WIRE PRINTERS

Henry A. Hendrich, Endicott, and Alvin E. Gray, Binghamton, N. Y., assignors to International Business Machines Corporation, New York, N. Y., a corporation of New York

Application August 25, 1949, Serial No. 112,273

1 Claim. (Cl. 29—464)

This invention relates to apparatus adapted for use with wire printers, and more particularly to plates employed in selecting and actuating wires of a wire printer, and to the method and apparatus for making such plates.

An application by R. B. Johnson, Serial No. 708,163, filed November 6, 1946, now Patent No. 2,524,127, discloses a wire printer having a plate with high and low portions that are adapted to cooperate with the ends of wires for determining their actuation to effect a printing of different characters. The high and low portions are formed in the desired pattern by etching, and the plate is adapted to be positioned so as to present high portions to the ends of different combinations of wires. After the plate is positioned, it is pressed toward the wires so that the high portions actuate the wires in line with them to effect printing on a record. It has been found that the etching of a plate forms high portions with inclined sides which tend to deflect the ends of the printing wires and produce unsatisfactory operation. To obtain the most satisfactory operation, the sides of each high portion should be as nearly perpendicular to the face of the plate as possible, and the remainder of the portion should be provided with a surface which lies in a plane extending parallel to the face of the plate.

It is, therefore, an object of this invention to provide an improved plate having high portions adapted to engage the ends of wires in a wire printer.

Another object is to provide a plate having high portions with their sides substantially perpendicular to the face of the plate and arranged in a predetermined pattern.

Still another object of the invention is to provide an improved method for making a plate having high portions adapted to cooperate with the wires of a wire printer.

Another object is to provide a plate having a portion made of solder in which members are embedded and project from the face of the plate to provide high portions at predetermined points.

Yet another object is to provide an improved apparatus for molding a plate portion having members projecting therefrom in some desired pattern.

Other objects of the invention will be pointed out in the following description and claim and illustrated in the accompanying drawings, which disclose, by way of example, the principle of the invention and the best mode, which has been contemplated, of applying that principle.

In the drawings:

Fig. 1 is a perspective view of the improved plate cooperating with the wires of a printer to effect a printing of characters on a record.

Fig. 2 is an enlarged perspective view of a portion of the plate with projecting portions arranged to cooperate with the end of a printing wire.

Fig. 3 is an enlarged perspective view, with parts sectioned, of improved apparatus for molding a portion of the plate with projecting portions embedded therein at predetermined points.

Fig. 4 is a side elevational view of the molding apparatus shown in Fig. 3.

Fig. 5 is a sectional view taken on the plane of the line 5—5 of Fig. 4.

Fig. 6 is a vertical section taken on the plane of the line 6—6 of Fig. 5 and showing parts of the molding apparatus separated to present the embedded wires to a cutting tool.

The wire printer described in the Johnson application referred to above includes a code plate 1 (Fig. 1) having high portions arranged in a predetermined pattern on its face for effecting operation of wires 2 to print characters on a record card 3. Formed in the plate are notches 5 adapted to receive arms, not shown, for positioning the plate in a vertical direction. Another notch 6 in the plate is adapted to receive an arm, not shown, for changing its position in a horizontal direction. The wires 2 are arranged in the form of a rectangle across the face of the plate and are slidably supported so that a movement of the plate toward the wires will cause some combination of them to be moved by the projecting portions in a printing direction. The combination of wires actuated depends, of course, on the position of the plate, and the different positions that the plate may assume is sufficiently great to print all of the desired characters. The printer described in the application includes mechanism for actuating punches 8 (Fig. 1) to punch holes in the record card representative of the printed character. This mechanism forms no part of the present invention and is, therefore, not shown or described herein.

As shown in Fig. 2, each of the wires 2 extends through a tube 10 which is anchored at one end in a plate 11. Crimped on the wire is a sleeve 12 carrying collar 14, and a spring 15 acts between the plate 11 and the collar 14 for holding the latter in yielding engagement with a stationary plate 16. Extending from the face of the plate 1 are projecting portions 18 which are adapted to be aligned selectively with the wire 2 shown for effecting a printing of the characters marked at the ends of the portions. It will be appreciated, of course, that other wires will also be actuated in printing each character. In order that the wires may not be deflected or bent when actuated, it is necessary that the entire end of each projecting portion lie in a plane which is normal to the axes of the wires. The projecting portions have been shown in Fig. 2 much larger in diameter than they are in practice only to facilitate illustration. Actually, the transverse dimensions of the projecting portions 18 and the wires 2 are substantially the same, and a slight misalignment may result in an engagement between only a part of the surface near the edge of a projecting portion with the end of a wire. If the sides of the projecting portions are inclined relative to the face of the plate, the misalignment may be such as to cause engagement between the inclined surfaces and the end of the wire, thereby causing a deflection and possible bending of the wire.

To obtain projecting portions having sides perpendicular to the face of the plate and end surfaces lying in planes parallel to its face, there is provided a plate member 20 (Fig. 3) having a recess 21 formed in its face. This plate member forms all the structure of the plate 1 except for a portion 22 (Figs. 1 and 2) which supports the projecting portions 18. The portion 22 consists of a solder which is introduced to the recess 21 while wires 24 project into the recess at the desired points. The wires are then cut off and ground down to provide portions projecting the desired distance from the face of the plate.

For introducing solder to the recess 21 while the wires 24 are supported therein, there is provided an improved apparatus which combines the features of a molding template and a means for positioning the plate member relative to the wires. This apparatus includes a member 25 having a block portion 26 (Fig. 4) projecting upwardly from the edge of a plate 27, and formed integral with the block portion and the plate are reinforcing webs 28. Extending from the right hand edge of the plate are spaced guide portions 30 slidably supporting a member 31 having integral plate portions 32 and 33 extending at right angles to each other and reinforced by web portions 34. For guiding the member 31 on the guide members 30 there are provided shoulder screws 36 extending through elongated slots 37 in the plate portion 33 and threaded into openings in the guide members. Movement of the member 31 relative to the member 25 is effected by a screw 39 journaled in a lug 40 on the lower side of the plate 27 and threaded through an opening in

a lug 41 formed on the lower side of the plate portion 33 and projecting downwardly between the guide portions 30. Collars 42 are pinned to the screw at opposite sides of the lug 40 for holding it against longitudinal movement, and a crank 43 is connected to one end of the screw so that it may be operated manually for adjusting the position of the member 31.

The plate member 20 is arranged between the members 25 and 31 as shown in Fig. 3 with the recess 21 facing the plate portion 32. Formed in this plate portion are openings 45 through which the wires 24 may be inserted so that they project into the recess of the plate member. Guide studs 46 project from the face of the plate portion 32 through the notches 5 in the plate member 20, and sleeves 47 fit over these studs and engage the sides of the notches for supporting the plate member in such a position that vertical columns of the wires 24 are normal to a plane cutting the notches 5 at points midway between their edges. A stud 48 projects from the face of the plate portion 32 through the notch 6, and a sleeve 49 fits over this stud and engages the sides of the notch for positioning the plate member horizontally so that all of the wires 24 may be received in the recess 21.

Connected to the plate portion 33 is a bracket 52 carrying sleeve 53 through which the wires 24 are extended loosely. These wires are threaded through the openings 45 in the plate portion 32 a sufficient distance to extend to the bottom of the recess 21. With the plate member 20 arranged on the studs 46 and 48, the screw 39 is rotated by the crank 43 to move the member 31 to the left in Fig. 4 for clamping the plate member between the block 26 and the plate portion 32. The sleeve 53 and the wires 24 move with the member 31 and any of the wires that have been threaded too far through the openings 45 are forced back selectively as they engage the bottom of the recess during the clamping of the plate member.

For introducing solder to the recess 21 after the plate member has been clamped, there is provided a passage 55 extending through the block portion 26 and having partial registration with an opening 56 extending through the plate member into an offset portion of the recess 21 at the lower end of the latter. Another passage 58 extends through the block portion 26 into partial registration with an opening 59 which extends through the plate member into an offset portion of the recess 21 at its upper end. Molten solder is introduced through a funnel 60 to the passage 55, and air is vented from the recess 21 through the passage 58 and a funnel 61. As soon as the recess is filled and solder appears at the funnel 61, the introduction of solder to the funnel 60 is discontinued.

In order to maintain a melting temperature along the passages 55 and 58 during casting, openings H are provided in the block portion 26 for receiving heating elements 64 which may be energized from any suitable source of electric power, not shown. For cooling the plate after casting has been completed, conduits 65 are extended into openings C in the block 26 and are connected to a container 66 to which a coolant may be supplied. After the solder has hardened sufficiently, the screw 39 is rotated to move the member 31 to the right. The combined urging of the wires 24 causes a breaking of the solder at the points of partial registration with the passages 55, 58 and a movement of the plate member to the right with the member 31.

For moving the plate 20 away from the member 31 after the latter has been moved to the right, there are provided two shafts 70 which are rotatably supported within openings extending through the plate portion 32 as shown, and fixed to these shafts are cams 72 having engagement with the plate member 20 at opposite sides of the recess 21. A handle 73 is connected to each of the shafts so that it may be rotated manually to move the

cams 72 against the plate member for forcing the latter to the left away from the member 31, as shown in Fig. 6. The wires are pulled with the plate member, thereby providing a check on the bond between each wire and the solder as well as providing space for the movement of a cutting wheel 75 to cut the wires at the face of the plate. The cams 72 are, of course, moved out of the path of the cutting wheel at this time. In order that the plate may be held stable as the last of the wires are being cut, two pins 76 are extended through openings in the plate portion 32 at points to engage the plate member 20 below the recess 21. A cap 78 is threaded into an enlarged opening in the plate portion 32, and a spring 79 acts between the cap and a collar 80 on the pin 76 for holding the latter in yielding engagement with the plate member 20. After the wires have been cut, the portions projecting from the face of the plate are ground by any suitable means, not shown, to the desired length.

The wires 24 are made of a comparatively hard material having good wearing qualities and are coated with a material, such as cadmium, to provide a good bond with the solder. The composition of the solder is such that its temperature when in a molten form is not high enough to reduce the hardness of the wires 24. A commercial solder having a composition of 50% lead and 50% tin has been found to be satisfactory. The members 25 and 31 are made of a material, such as stainless steel, to which the solder does not adhere. The clearances between the wires and the openings 45 in the plate portions 32 are very small and the temperature of the plate portion is low enough to chill the solder so that it does not escape at these points to a harmful degree.

While there have been shown and described and pointed out the fundamental novel features of the invention as applied to a preferred embodiment, it will be understood that various omissions and substitutions and changes in the form and details of the apparatus illustrated and in its operation may be made by those skilled in the art, without departing from the spirit of the invention. It is the intention, therefore, to be limited only as indicated by the scope of the following claim.

What is claimed is:

The method of making a plate adapted for use with a wire printer comprising the steps of supporting wires in front of a plate member so that the wires extend into a recess in the plate member and perpendicular to the latter, filling said recess with solder for holding said wires in place, cutting off said wires between said plate member and the points at which the wires are supported on a plane parallel to the face of said plate member so as to form projecting portions having end surfaces adapted to act against the ends of print wires, and grinding the ends of the projecting wire portions to obtain the desired projection from the face of said plate member.

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