

April 30, 1935.

H. D. RANDALL

1,999,617

MACHINE FOR SPOT WELDING ON METAL

Filed Nov. 14, 1931

3 Sheets-Sheet 1

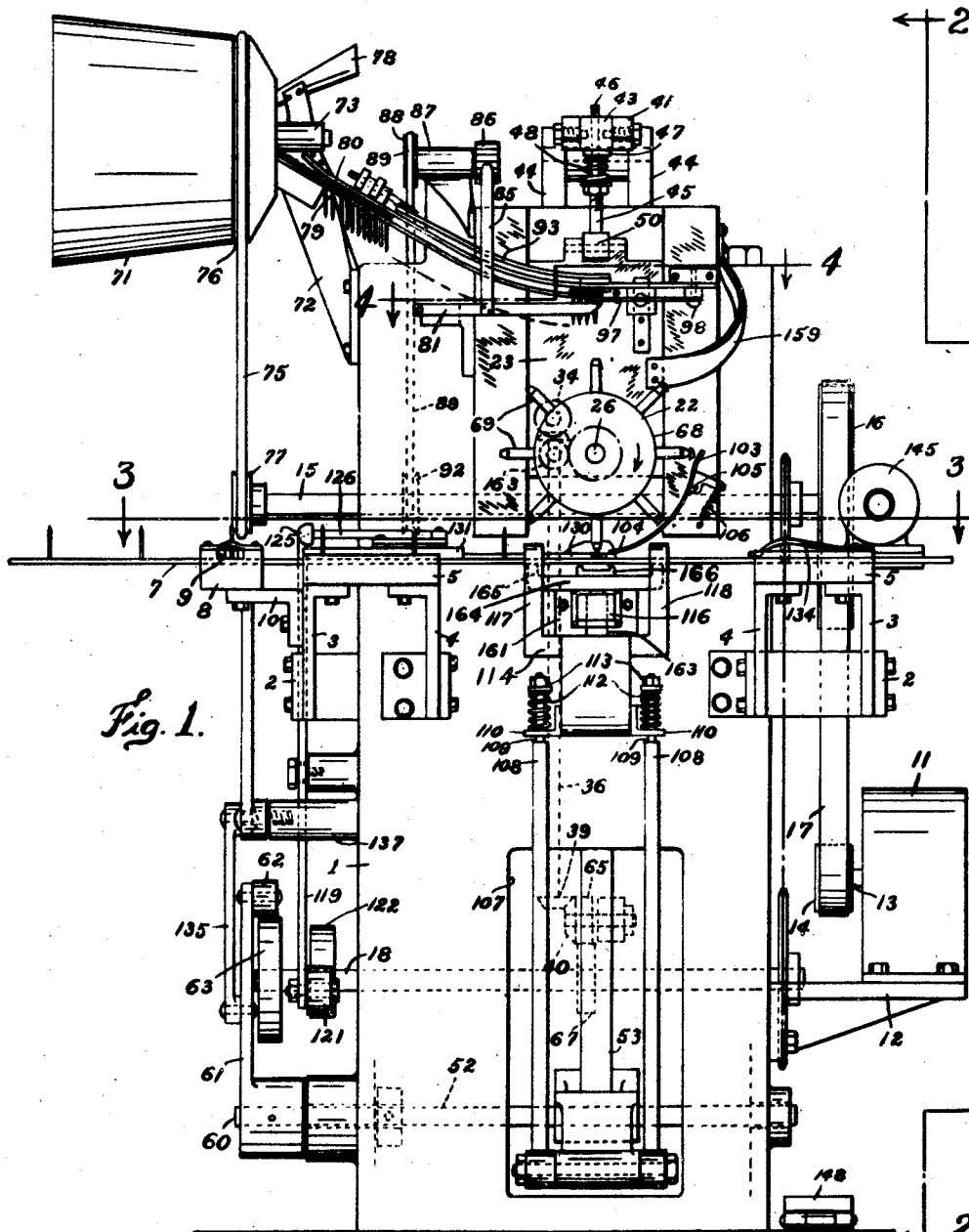


Fig. 1.

Inventor
Howard D. Randall

384 Murray and Zuglitz
Attorneys

April 30, 1935.

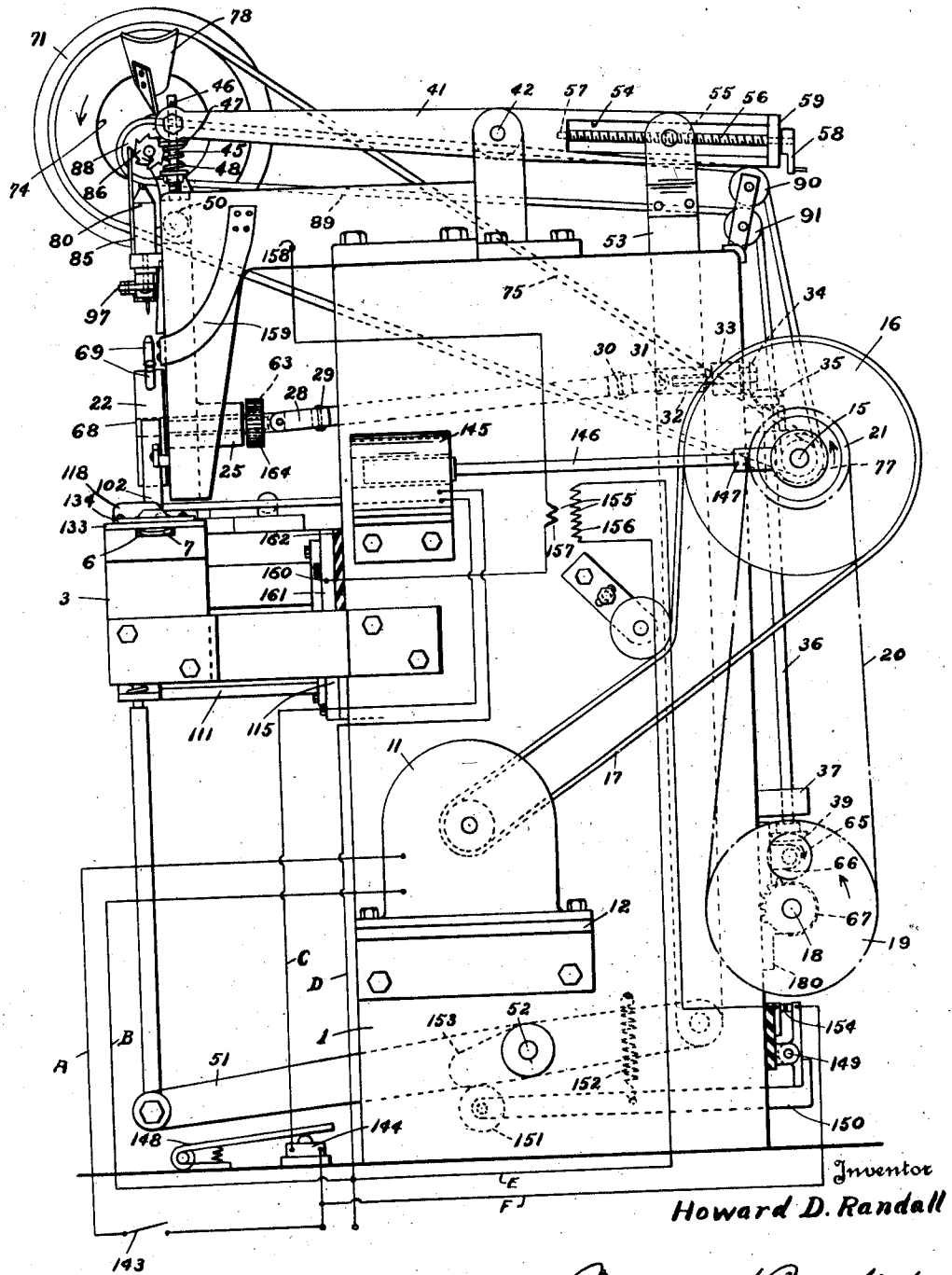
H. D. RANDALL

1,999,617

MACHINE FOR SPOT WELDING ON METAL

Filed Nov. 14, 1931

3 Sheets-Sheet 2



384 Murray and Zugel
Attorneys

April 30, 1935.

H. D. RANDALL

1,999,617

MACHINE FOR SPOT WELDING ON METAL

Filed Nov. 14, 1931

3 Sheets-Sheet 3

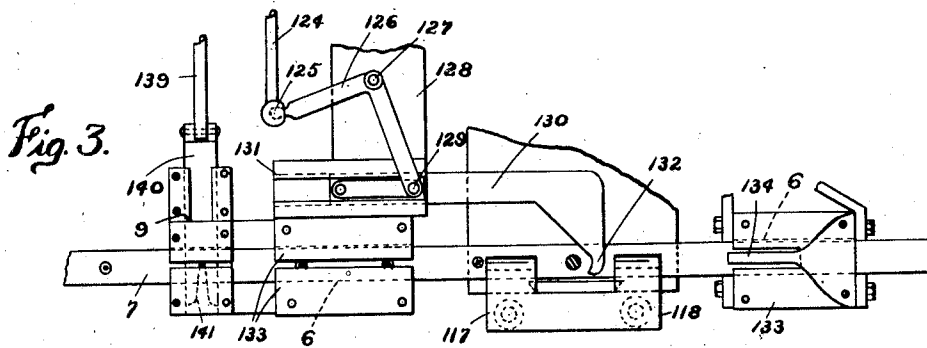


Fig. 4.

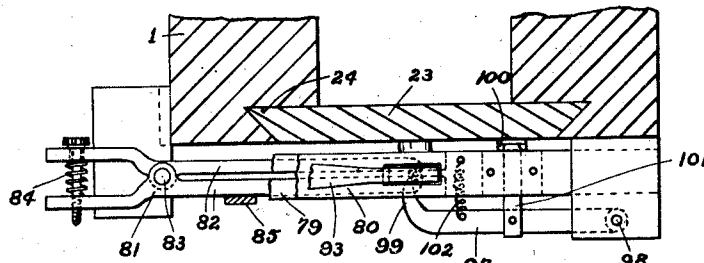
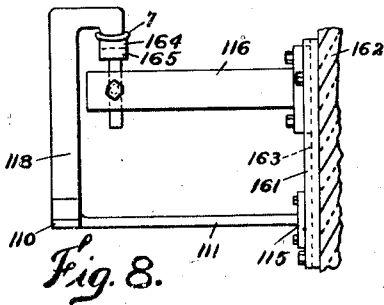
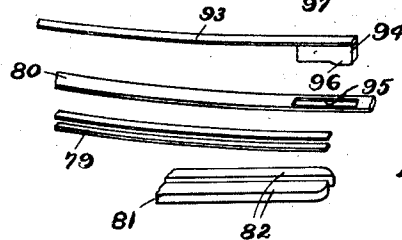


Fig. 5.

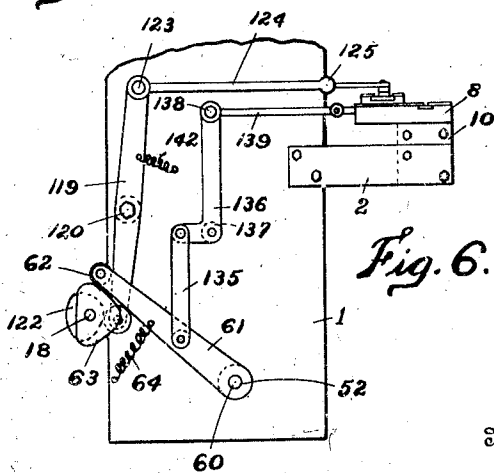
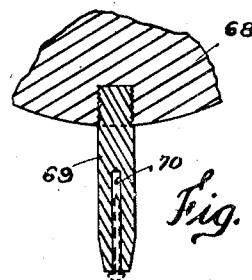


Fig. 7.

Inventor
Howard D. Randall

334 Murray and Zugel
Attorneys

UNITED STATES PATENT OFFICE

1,999,617

MACHINE FOR SPOT-WELDING ON METAL

Howard D. Randall, Cincinnati, Ohio, assignor to
The Randall Company, Cincinnati, Ohio, a corporation of Ohio

Application November 14, 1931, Serial No. 574,970

13 Claims. (Cl. 219-4)

This invention relates to a machine for spot-welding nails or the like to the surface of a metal sheet or to a metal strip such as a molding strip.

A principal object of the invention is to provide a machine which automatically accomplishes intermittent movement of the metal member through the machine and spaced spot-welding of nails to said member during the pauses in such movement. Other objects will appear in the course of the following description.

In the accompanying drawings illustrating the invention—

Fig. 1 is a front elevational view of the machine;

Fig. 2 is a side elevational view taken on line 2-2 of Fig. 1;

Fig. 3 is a cross sectional view taken on line 3-3 of Fig. 1, with parts broken away;

Fig. 4 is a cross sectional view taken on line 4-4 of Fig. 1;

Fig. 5 is a detail view of cooperating parts of the machine shown in separated relationship;

Figs. 6, 7 and 8 are detail views of parts of the machine, parts being broken away and parts shown in cross section.

The machine as described herein is adapted for spot-welding nails to strips of metal molding and comprises the hollow body 1 open at rear and provided laterally with arms 2 projecting forwardly of said body and having brackets 3 secured thereto. Similar brackets 4 (Fig. 2) are fastened upon the front of body 1 in alignment with brackets 3. Guide blocks 5 are secured upon the aligned brackets 3 and 4 and are provided with grooves 6 adapted to receive and guide metal molding strips 7 in a horizontal plane. The bracket 3 at the left hand side of body 1 in Fig. 1 also supports a bracket 10 having a guide block 8 secured thereon, which block is provided with a transverse guideway 9 above the guideway or groove 6.

The strips 7 are moved intermittently through the aligned guideways 6 by means operative upon each nail immediately after the latter is spot-welded to a molding strip. The means for effecting these operations will now be described. A single source of motive power is utilized for all the mechanical operations of the machine. This consists of an electric motor 11 positioned upon a suitable support 12 at the right side of body 1 adjacent the bottom. An armature 13 extends outwardly of the motor and has a pulley 14 secured thereto. A shaft 15 is journaled transversely of body 1 at the rear thereof and intermediate the top and bottom of said body. A large

pulley 16 is fixed at one end of said shaft in the same vertical plane as pulley 14 and connected therewith by means of a belt 17 whereby the shaft is driven. A second shaft 18 is journaled transversely of body 1 adjacent the bottom thereof and in bearings 180 at the rear of said body. A gear or pulley 19 is fixed upon this shaft in alignment with and connected by means of a chain or belt 20 to a gear or pulley 21 made fast upon shaft 15 adjacent pulley 16, whereby shaft 18 is driven.

Shaft 18 constitutes the driving means for the rotation of a rotary welding member 22 journaled upon a plate 23 (Figs. 1 and 4) vertically slidable in a dove-tail groove 24 in the front of body 1. A portion of the rear face of plate 23 is exposed to the interior of the body 1 and through this portion a short shaft 26 is journaled, the welding member 22 being fixed upon the front end of said shaft. The rear end of shaft 26 is connected to one end of a flexible shaft 28 (Fig. 2) which is formed as at 29 and 30 with universal joints. The opposite or rear end of shaft 28 is connected as at 31 to the inwardly-projecting end of a stub shaft 32 journaled at 33 in a plate extending across the open rear of body 1. The shaft 28, as shown herein, extends forwardly from the center of the rear of the body 1 at slight angle in order to accommodate adjacent parts of the machine. To compensate for the non-alignment of said shaft with the shaft 26 of welding member 22, a gear 33 may be secured upon the rear end of shaft 26 adapted to mesh with a gear 34 on the adjacent end of shaft 28, the latter being journaled in a suitable bearing 25. The outer end of stub shaft 32 has fixed thereon a bevel gear 34 which meshes with another bevel gear 35 fixed upon the upper end of a vertical shaft 36 journaled as at 37 at the rear of body 1. The lower end of shaft 36 has a bevel gear 39 (Figs. 1 and 2) fixed thereon. This meshes with a complementary bevel gear 40 secured laterally upon a plain gear 65. The latter two gears are mounted revolvably upon a bearing 66 above shaft 18. Upon said shaft is fixed a partially toothed gear 67 which meshes intermittently with gear 65, transmitting intermittent movement to vertical shaft 36 and flexible shaft 28 whereby intermittent rotation of welding member 22 is effected.

Welding member 22 likewise has vertical movement imparted thereto by means of sliding action of plate 23 in its groove 24, upon which plate the welding member is mounted. This is effected by operation of a rocker arm 41, pivotally mounted intermediate its ends, as at 42 (Fig. 2) upon

supports 44 projecting above body 1, said rocker arm extending from front to rear of said body. The front end of arm 41 is bifurcated and has journaled therein a block 43 in which a downwardly-extending rod 45 is mounted, the opposite end of said rod being pivotally connected as at 50 to the upper end of slide plate 23. Rod 45 has a floating connection with block 43 of rocker arm 41, being held between a pin 46 in the upper end of the rod and the coil spring 48 positioned beneath the block 43 and against the abutment washer 47 of which the block 43 is adapted to descend whereby the welding member 22 effects a resilient or yielding downward pressure.

The means for actuating and adjusting rocker arm 41 are illustrated in Figs. 1, 2 and 6. A second rocker arm 51 is mounted fixedly upon a shaft 52 journaled transversely of body 1 adjacent the bottom thereof. The rear end of arm 51 is connected to the rear end of arm 41 by a connecting member 53. The latter member is made adjustable relative to arm 41 whereby the rocking movement of said arm and the reciprocating movement of slide plate 23 may be controlled. For this purpose, the rear end of arm 41 is formed to provide a guideway 54 (Fig. 2) within which a slide block 55 may be reciprocated by means of a threaded rod 56 passing threadedly through said block and having its inner end 57 secured in the body of arm 41 and its outer end provided with a turning handle 58 bearing against a plate 59 on the rear end of the arm 41.

The shaft 52 of lower rocker arm 51 has one of its ends 60 projecting outwardly beyond body 1, said end having fixed thereon a rearwardly-extending arm 61 on the free end of which a cam follower 62 is revolvably mounted. Follower 62 is adapted to ride upon the periphery of a cam 63 fixed upon the adjacent projecting end of the driving shaft 18. A spring 64 retains the cam follower against the cam. It will be seen that rocking or reciprocating rotational movement is transmitted to shaft 52 by movement of cam follower 62 on cam plate 63 and the consequent movement of arm 61. This reciprocating movement is in turn transmitted through connecting member 53 to rocker arm 41 and slide plate 23 upon which the welding member 22 is mounted.

This welding member (Figs. 1, 2 and 7) is adapted to receive individual nails and transfer them from a position above the welding member to a position therebeneath where a strip of metal molding is being moved along in synchronism with the intermittent rotation of the welding member. The latter comprises a circular metal disk 68 fixed, as explained, upon the outer end of the short shaft 26. The edge of disk 68 is provided with a plurality of regularly-spaced, radially-projecting fingers 69 having each a longitudinally-extending bore 70 opening upon the outer end of the finger. The bores 70 are adapted to receive successively the nails to be spot-welded to the molding strips, the heads of the nails being adapted to rest against the outer tapered ends of fingers 69 (Fig. 7).

The mechanism (Figs. 1, 2, 4 and 5) effecting the supply of nails to the fingers 69 will now be described. This comprises a tumbler 71 positioned adjacent the top of the machine body upon a bracket 72 attached to said body. The tumbler is rotatably mounted upon a stub shaft 73 attached to bracket 72 and projecting through the opening 74 of the tumbler into a suitable bearing (not shown) in the interior of the tumbler. Rotation of the tumbler is effected by

means of a belt 75 passing around the tumbler through a guideway 76 formed in the outer face thereof. The belt passes over and is driven by a pulley 77 fixed upon shaft 15 (Fig. 2). Nails are supplied to the tumbler by means of a guide plate 78 projecting into the tumbler. The nails are received interiorly of the tumbler and fed in a line therefrom by an inclined feed chute 79 comprising a pair of spaced longitudinally aligned strips between which are suspended the bodies of the nails, the heads thereof being in downwardly-sliding contact upon the upper faces of said strips. Another strip 80 immediately overhangs the nail heads in the chute and precludes removal of the nails therefrom during movement down the chute. The bottom of the chute terminates in front of and adjacent the upper portion of the slidable plate 23. Beneath this lower portion of the chute is positioned a claw member 81 comprising a pair of spaced elongated fingers 82 (Fig. 4) pivotally joined as at 83 and urged together at the forward end by spring means 84 at the opposite end thereof. The space between fingers 82 is in vertical alignment with the nail slot of the feed chute 79 so that the nails as they reach the lower portion of the chute project downwardly between said fingers 82 and at the end of the chute are prevented from passing out of the chute by the resiliently-contacting forward ends of fingers 82. A vibrator strip 85 is secured to the outer edge of claw member 81, extends upwardly in contact against feed chute 79 and at the upper end bears resiliently against a ratchet wheel 86 mounted upon a short shaft rotatably mounted in a bearing 87 the opposite end of said shaft having a pulley 88 secured thereto and turned by a belt 89 passing rearwardly over a pair of guide pulleys 90 and 91 and around a drive pulley 92 secured to driving shaft 15. By this means the nails traveling downwardly through the chute are prevented from crowding or "jamming".

The bottom-most nail in the chute is adapted to be placed in one of the welding member fingers 69 upon each upward movement of the intermittently-rotating welding member 22. For accomplishing this, there is positioned above the nail chute a downwardly-pressing strip 93 having a block 94 upon the under face of its bottom end. This block projects through an aperture 95 in the nail-retaining strip 80, and bears against the heads of the last few nails in the chute (Fig. 1). An enlargement 96 is formed at the outer end of block 94 preventing normal movement of the nail heads past the intermediate portion of said block. A hook member 97 is pivotally mounted at one end as at 98 upon the front of body 1 adjacent the lower end of the nail chute. The rearwardly directed hooked end 99 thereof is adapted to enter intermittently between the last and second-last of the nails in the chute separating the last nail from the chute and moving it past the enlargement 96 of the block 94 into the bore 70 of one of the radial fingers 69 of welding member 22. The hooked end 99 moves inwardly and outwardly relative to said nails by virtue of a cam 100 fixed upon the face of slide plate 23 (Fig. 4) and operative upon a cam follower or arm 101 secured to hook member 97 and extending rearwardly thereof. A coil spring 102 urges the hook member rearwardly. When slide plate 23 moves upwardly to bring one of the fingers 69 into nail-receiving position, the cam follower 101 and hook member 97 are actuated outwardly, and then, as the finger 69 reaches its highest

point, are moved inwardly, the larger inner part of the hock portion 99 causing separation of the last nail from the chute and movement thereof into the awaiting finger 69. The nail is then carried downwardly into association with a molding strip 7 which pauses in its movement when the nail head is initially placed thereon and until the instantaneous welding operation has taken place. A curved slide strip 103, (Fig. 1) is attached at 104 to the molding guideway and at its upper end is provided with a lever arm 105 having a pivotal mounting on body 1. A spring 106 urges strip 103 into contact with the nail heads projecting at the ends of the downwardly-directed fingers 69, preventing outward movement of the nails from the fingers until the welding position has been reached.

The means for welding the nails to the molding strips will now be described. The forward end of the lower rocker arm 51 extends through an opening 107 (Fig. 1) in the front of the machine body 1. A pair of spaced rods 108 is pivotally connected at their lower ends to this end of said arm. The upper ends of the rods are reduced in diameter to provide shoulders 109 and said reduced ends extend slidably through brackets 110 secured laterally of a resilient welding member. Coil springs 112 embrace said reduced ends, bearing upon brackets 110 at one end and adjustable abutment means 113 at the upper ends. The welding member comprises a central piece 114 which at the rear has a backward extension 111 which may be integral with the piece 114 and which is preferably of slightly resilient copper. The rear end of extension 111 is secured as at 115 (Figs. 2 and 8) to a copper body block 161 mounted upon insulation 162. The central piece 114 has thereon a pair of contact arms 117 and 118, the upper ends of which overhang the molding strips and which rise and descend simultaneously with the upper welding member 22, through the action of rods 108. The rear end of rocker arm 51 in rising effects descent of welding member 22 at the same time that the forward end of arm 51 pulls the resilient lower welding member downwardly. Above extension 111 an adjustable support horn 116 of electrical conducting material is secured to block 161 in a vertical T slot 163. Horn 116 has mounted upon its front end a vertically adjustable abutment member 164 having studs 165 contacting the under faces of the molding strips. A centrally depressed copper pad 166 on member 164 is adapted to contact the sagging ends of the molding strips when said ends are adjacent this point. This pad does not contact the strips when the latter are supported upon both studs 165.

The movement of the molding strips 7 through the machine is effected by means of a rocker arm 119 (Figs. 1 and 6) mounted as at 120 upon the side of body 1. One end of said arm is provided with a cam-follower 121 adapted to ride upon the periphery of a cam 122 fixed upon the driving shaft 18. The opposite end of arm 119 is pivotally connected as at 123 with one end of a link 124 extending toward the front of the machine and having at its opposite end a ball and socket connection 125 with one arm of a bell crank lever 126 (Fig. 3). The latter is mounted at 127 upon a support 128 and has its other arm pivotally attached as at 129 to a molding strip advancing member 130 slidably positioned in a guideway 131. Member 130 comprises a hooked portion 132 adapted to engage each nail immediately after the latter has been welded to a

molding strip. Each molding is introduced into the machine at the right side thereof as seen in Figs. 1 and 3. The initial end of the strip is pushed inwardly by the operator until said end is in position to be engaged by the copper pad, whereupon the machine is put into operation and the first nail is spot-welded to the molding strip a short distance from the end thereof. The member 130 then engages the nail and advances the strip a given distance and then, by action of the lever 126, is withdrawn to its former position in readiness to engage the next-welded nail. A coil spring 142 (Fig. 6) retains the lower end of rocker arm 119 against its cam 122. The molding strips 7 are precluded from movement from their guideways 6 by overhanging plates 133 and also by a spring strip 134 bearing upon each strip at the entry side of the machine.

Another nail spacing means is provided in addition to the regular limited movement of the molding strips by the advancing member 130. Said means (Figs. 1, 3 and 6) comprise a link 135 pivotally attached to the cam-following arm 61 fixed upon shaft 60. At its opposite end link 135 is similarly connected with one arm of a bell crank lever 136 mounted upon the side of body 1 on an outwardly-projecting bearing 137. The other arm of lever 136 is pivotally joined at 138 with the rear end of a forwardly-extending link 139. The opposite end of this link connects pivotally with the inner end of a nail-engaging spacing member 140 positioned above and slidable transversely of the molding guideway 6 in the guideway 9 referred to above. The forward end of spacer 140 is formed with a nail-engaging slot 141, divergent at the front. The movement of arm 61 is transmitted and modified by the means described and effects reciprocating motion of spacer 140. The spacer is not effective until a number of nails, for example five, have been spot-welded. As the advancing member 130 moves the fifth nail to a point approximately opposite the opening of slot 141, the spacer 140 slides forward, and the slot 141 engages the nail, and each nail thereafter, thus overcoming the slight variation that might occur in the movement of the molding strip by the member 130, and effecting an exact and invariable spacing of the nail held in the slot 141 and the nail about to be spot-welded.

The electrical circuits and means employed in the machine and illustrated diagrammatically in Fig. 2 will now be indicated. A switch 143 and circuit A B actuates the motor 11. A push-button switch 144, normally held open by internal spring means, completes and breaks the circuit C D which energizes a solenoid 145 positioned at the side of the machine. This solenoid actuates an extension rod 146 the outer end of which engages and operates clutch means, indicated at 147, said means being operative upon the pulley 16 for effecting and breaking driving relationship of said pulley with shaft 15, whereby operation of the whole machine is controlled. During passage of a molding strip through the machine, the operator's foot is held continuously upon a spring pedal 148 adapted to bear upon and close the switch 144.

A circuit E F embraces a contact member 149 pivotally mounted at the rear of the machine. This member has secured thereon an arm 150 with a cam follower 151 at its free end, said follower being retained, by a spring 152, in contact upon a cam 153 secured upon shaft 52. The slight rocking of this shaft upon its longitudinal axis during operation of the machine is sufficient

to effect intermittent contact of the points or plates 154 of member 149, whereby the current flow through said member is likewise rendered intermittent. Circuit E F also embraces a transformer 155, the primary 156 of which provides for low amperage and high voltage, and the secondary 157 of which is formed of a single turn of winding and which provides for high amperage and low voltage. One terminus 158 of the secondary electrifies the upper parts of the welding means, that is the slide plate 23 and the rotating nail-receiving member 22 attached thereto. A non-rigid strap 159 may be utilized for carrying current to the moving slide plate. The other terminus 160 of the secondary is connected to the rear block 161 whereby the lower resilient welding member abutment 164 and contact arms 117 and 118 are electrified.

At the moment of welding each nail, the circuit flowing through the primary 156 is made and broken. At this time, the electrified nail, the abutment member 164 and the two contact arms 117 and 118 are all in position against the molding strip. The depressed portion of pad 166 is positioned immediately opposite the welding point of the nail head so that no burn or mark is made upon the outer or free face of the molding even though one end of the molding is in contact against one end of the pad. It will be noted, in Fig. 2, that the cross section of the molding strip 7 is shown as curved. The nail heads may likewise be curved similarly to the inner curvature of the strip to which they are to be welded, whereby the welding heat is concentrated for effecting a more efficient and more instantaneous weld. It will be understood, however, that the machine set forth herein is adaptable to the manufacture of articles other than molding strips by means coming clearly within the scope of this invention.

What is claimed is:

1. A machine for attaching nails to metal molding and comprising guide means for the molding, means for effecting regular intermittent movement of the molding through the guide means, a nail supply and means for feeding nails therefrom, a nail-receiving member adapted to enclose the body portions of individual nails fed from the supply, means for moving individual nails into the nail-receiving member, means for successively shifting the nail-holding member from the receiving position to a release position in which an individual nail is held at right angles with the molding and with the head thereof resting upon the molding, the nail-receiving and molding-moving means being synchronized whereby a nail is held at rest upon the molding during each pause in the movement of the molding, and means operative during said pauses to electrify the nail-receiving member and the adjacent portion of the molding whereby the nail head resting against the molding is spot-welded thereto.

2. A machine for attaching nails to a metal strip or the like and comprising guide means, means for intermittent regular movement of the strip through said guide means, nail-feeding means, a member for receiving nails and for bringing the head of an individual nail into contact against the metal strip during each pause in the movement thereof, and means for electrifying the nail-receiving member and the adjacent portion of the metal strip at the moment of contact of each nail with the strip for spot-welding the nails thereto.

3. A machine for attaching nails to a metal strip or the like and comprising a guide means, means for intermittent regular movement of the strip through said guide means, nail-feeding means, means for separating individual nails from said nail-feeding means, a member for receiving the individual separated nail and for bringing the head of one of such nails into contact against the metal strip during each pause in the movement thereof, and means for electrifying the nail-receiving member and the adjacent portion of the metal strip at the moment of contact of each nail with the strip for spot-welding the nails thereto.

4. A machine for attaching nails to a metal strip or the like and comprising guide means, means for intermittent regular movement of the strip through said guide means, nail-feeding means, a member for receiving nails and for bringing the head of an individual nail into contact against the metal strip during each pause in the movement thereof, means for electrifying the nail-receiving member and the adjacent portion of the metal strip at the moment of contact of each nail with the strip for spot-welding the nails thereto and means engaging spot-welded nails immediately prior to the spot-welding of subsequent nails for effecting regular spacing of the nails attached to the strip.

5. A machine for attaching nails to a metal strip or the like and comprising guide means, means for intermittent regular movement of the strip through said guide means, nail-feeding means, a member for receiving nails and for bringing the head of an individual nail into contact against the metal strip during each pause in the movement thereof, means for electrifying the nail-receiving member and the adjacent portion of the metal strip at the moment of contact of each nail with the strip for spot-welding the nails thereto and means associated with the spot-welding means to prevent welding marks upon the outer or free face of the strip.

6. A machine for attaching nails to a metal strip or the like and comprising guide means, means for intermittent regular movement of the strip through said guide means, nail-feeding means, a member for receiving nails and for bringing the head of an individual nail into contact against the metal strip during each pause in the movement thereof, means for electrifying the nail-receiving member and the adjacent portion of the metal strip at the moment of contact of each nail with the strip, and means associated with the welding circuit and the welding means for making and breaking said circuit at the moment of contact of the nails and molding strips for spot-welding the former to the latter.

7. A machine for spot-welding nails to one face of a metal strip and precluding marking of the free face of the strip, said machine comprising guide means, means for regular intermittent movement of the strip through the guide means, nail-feeding means, a member for receiving individual nails from the nail-feeding means and for bringing a nail head into contact with a face of the strip during each pause in the movement thereof, a movable member synchronized with the nail-receiving member and comprising a pair of arms contacting the strip simultaneously with each nail and at opposite places relative to the nail, a member contacting the under face of the strip beneath said arms, and means for electrifying said nail-receiving and contact members at the time of contact of the nail and movable mem-

ber with the strip for spot-welding of the nails to the strip.

8. A machine for spot-welding nails to metal strips and comprising a guide for the strips, means for regular intermittent movement of the strips through the guide, a pair of movable welding members, means synchronized with the movement of the strips for simultaneously moving said welding members for bringing one of them into contact against the strip and the other into a position adjacent the strip, the latter welding member being adapted to hold a nail and to bring the head thereof into contact against a face of a strip during each pause in the movement of the strip, an electrical transformer circuit embracing said welding members, and means operative when a nail is brought to position upon a strip for making and breaking said circuit to effect spot-welding of the nail-head to the strip.

9. A machine for spot-welding nails to metal strips and comprising a guide for the strips, means for regular intermittent movement of the strips through the guide, a pair of movable welding members, means synchronized with the movement of the strips for simultaneously moving said welding members for bringing one of them into contact against the strip and the other into a position adjacent the strip, the latter welding member being adapted to hold a nail and to bring the head thereof into contact against a face of a strip during each pause in the movement of the strip, means for adjusting said nail-holding member for cooperation with various sized nails, an electrical transformer circuit embracing said welding members, and means operative when a nail is brought to position upon a strip for making and breaking said circuit to effect spot-welding of the nail-head to the strip.

10. The combination with means for attaching nails to a strip, said means being adapted alternately to approach and withdraw from the work, of means for effecting intermittent movement of the strip and regular spacing of the nails and comprising a guideway for the strips, a member positioned adjacent the guideway and adapted to releasably engage each nail immediately after attachment thereof and to advance the strip a limited distance in the guideway by means of said nail, said advancing means being operative when said attachment means are in the withdrawn position, and a reciprocating member operative transversely of the guideway and adapted to slidably engage nails upon the advancing strip for maintaining a fixed interval between the nail in the process of attachment and the nail engaged by said reciprocating member.

11. A machine for spot welding nails to one face of a metal strip and comprising a strip guide, a rotary member provided with radially-ex-

tending fingers adapted each to embrace an individual nail, means for rotating the rotary member to bring a nail head into contact upon the strip, means for electrifying the rotary member and the adjacent portion of the metal strip at the moment of contact of the nail with the strip for spot welding the nail thereto, and a reciprocating member engaging each nail immediately after spot welding thereof for moving the strips through the guide.

12. A machine for spot welding nails to one face of a metal strip and comprising a strip guide, a welding member provided with radially extending fingers adapted each to embrace an individual nail, said member being mounted for rotation and for vertical reciprocation, means for simultaneously effecting reciprocation and partial rotation of said member, nail feeding means positioned above the welding member, said member being adapted upon upward movement to receive a nail in one of its fingers and upon downward movement to bring a nail head into contact against the strip, means for electrifying the welding member and the adjacent portion of the metal strip at the moment of contact of each nail with the strip for spot welding the former to the latter, and a reciprocating member engaging each nail immediately after spot welding thereof for moving the strips through the guide.

13. A machine for spot welding nails to one face of a metal strip and comprising a strip guide, a welding member provided with radially extending fingers adapted each to embrace an individual nail, said member being mounted for rotation and for vertical reciprocation, means for simultaneously effecting reciprocation and partial rotation of said member, nail feeding means positioned above the welding member, said member being adapted upon upward movement to receive a nail in one of its fingers and upon downward movement to bring a nail head into contact against the strip, a second welding member movable in synchronism with the first welding member and comprising a pair of arms for contacting a molding strip simultaneously with each nail and at opposite places relative thereto, means for electrifying the two welding members upon contact thereof with a molding strip for spot welding a nail to the strip, a reciprocating member engaging each nail immediately after spot welding thereof for advancing the strip through the guide, and a spacing member reciprocating transversely of the guide and successively engaging welded nails for maintaining a fixed interval between the nail in the process of attachment and the nail engaged by said reciprocating member.

HOWARD D. RANDALL.