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2,583,615

APPARATUS FOR MAKING RASP WEBS

Filed Dec. 11, 1945

2 SHEETS—SHEET 1

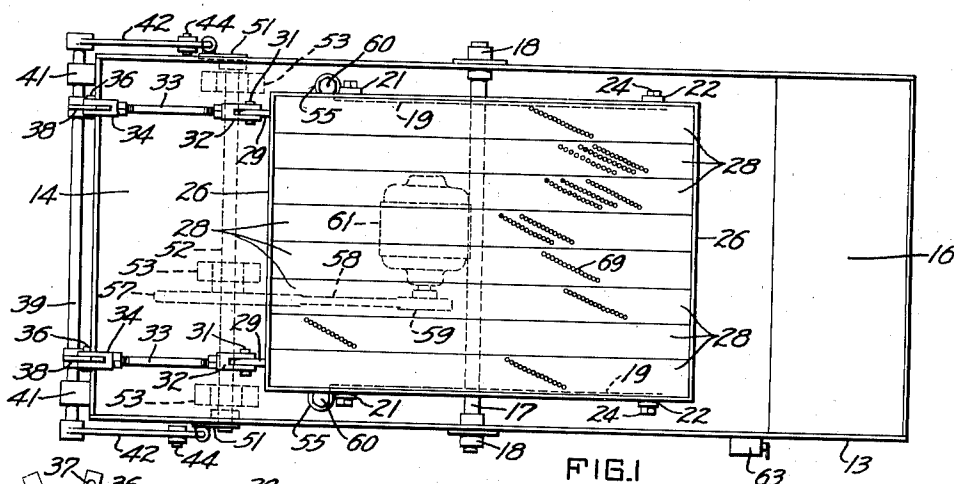


FIG. 1

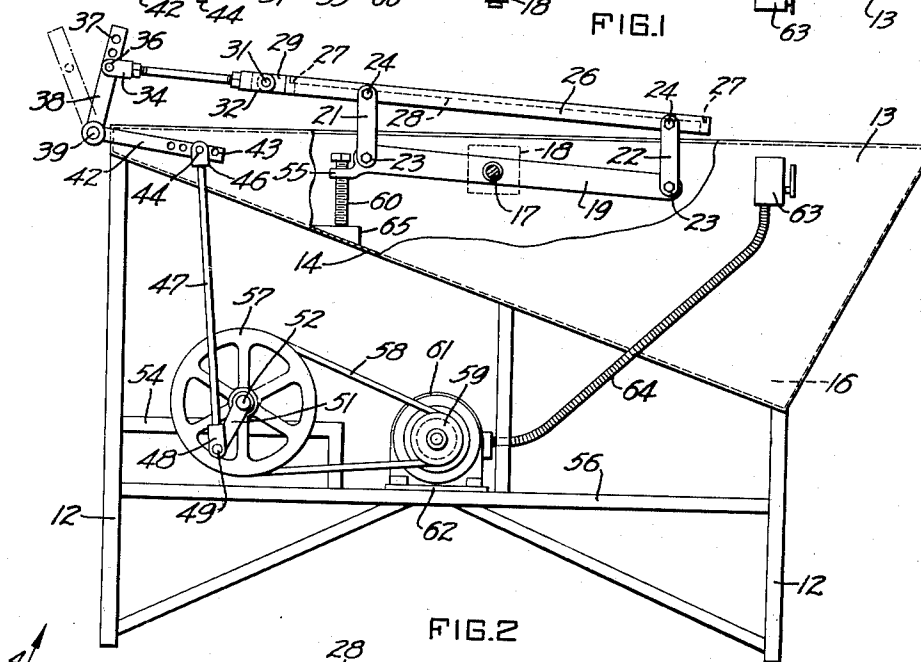


FIG. 2

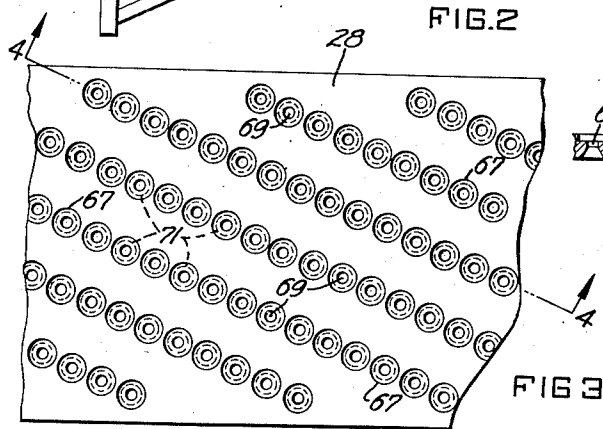


FIG. 3

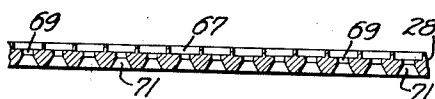


FIG. 4

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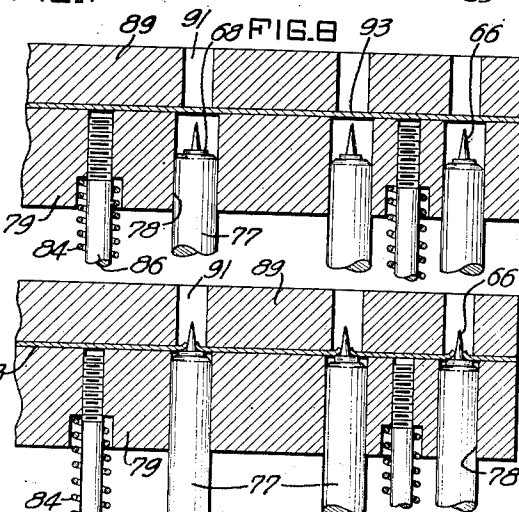
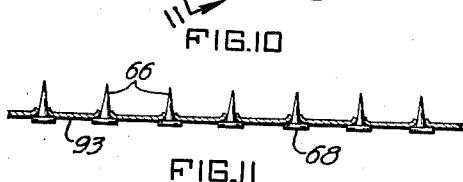
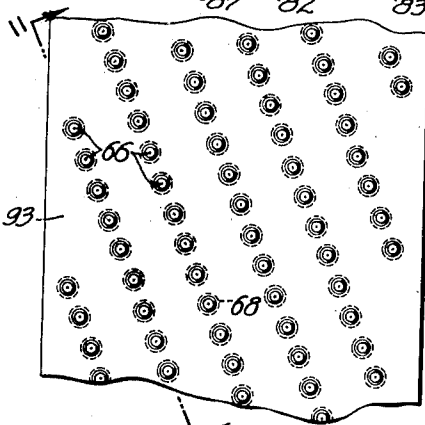
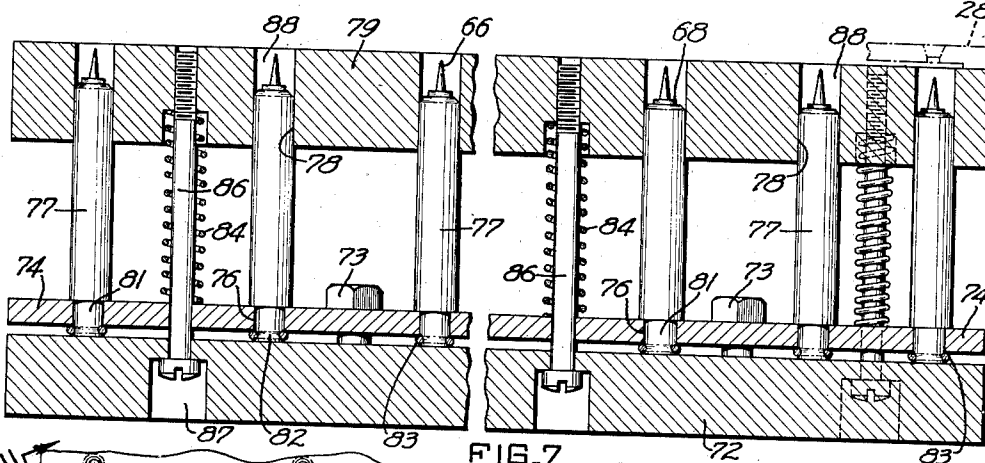
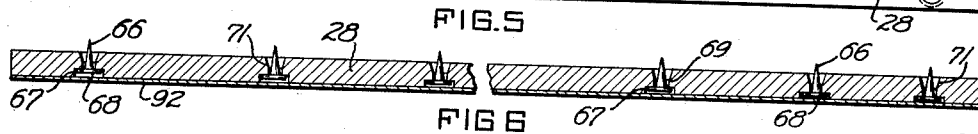
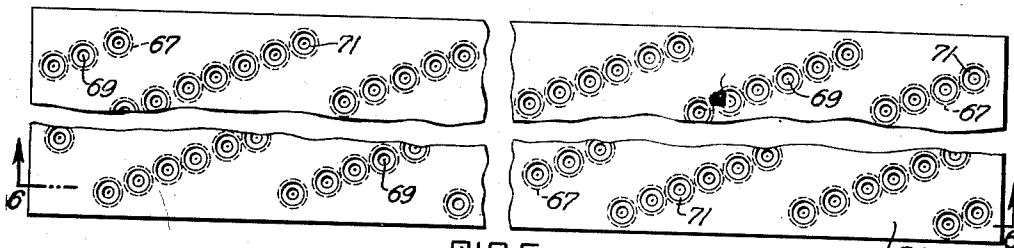
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APPARATUS FOR MAKING RASP WEBS

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2 SHEETS—SHEET 2



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UNITED STATES PATENT OFFICE

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APPARATUS FOR MAKING RASP WEBS

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2 Claims. (Cl. 1—1)

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This invention relates to the construction of point-studded webs used as rasps in roughing the surfaces of objects such as tire casings preparatory to bonding a layer of material such as retread rubber thereto.

An object of the invention is to provide apparatus for arranging a jumbled mass of pointed abrading elements into orderly relationship and for transferring the arranged elements into engagement with a web member designed as a permanent carrier therefor.

Another object of the invention is to provide apparatus of the character described which effects an orderly columnar arrangement or grouping of point elements such as tacks and permits the transferral of an arranged group between separated locations without disturbing the relationship between the elements of the group.

A further object of the invention is to provide, in apparatus of the character described, transfer means for carrying prearranged groups of pointed elements from an arranging stage of the apparatus to another stage of the apparatus and, prior to returning the carrier to the arranging stage, for depositing the pointed elements in their predetermined arrangement.

Still another object of the invention is to provide, in apparatus of the character described, means for receiving successive groups of point elements arranged in a predetermined pattern and for maintaining the pattern arrangement of said elements while the latter are being engaged with a member functioning to maintain permanency of pattern between the respective elements.

The invention possesses other objects and features of advantage, some of which, with the foregoing, will be set forth in the following description of the preferred form of the invention which is illustrated in the drawings accompanying and forming part of the specification. It is to be understood, however, that variations in the showing made by the said drawings and description may be adopted within the scope of the invention as set forth in the claims.

Referring to the drawings:

Figure 1 is a top plan view of the transfer plate loading machine.

Figure 2 is a side elevational view of the structure shown in Figure 1 with a portion of the view broken away so as to more clearly disclose the internal construction.

Figure 3 is a top plan view, to an enlarged scale, of a portion of a transfer plate.

Figure 4 is a vertical sectional view of the

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transfer plate taken in the plane indicated by the line 4—4 of Figure 3.

Figure 5 is a plan view of a transfer plate showing the latter in inverted relationship to the showing of Figure 3 and illustrating the plate in association with the pointed abrading elements. Portions of the view are broken away so as to compress it.

Figure 6 is a vertical sectional view taken in the plane indicated by the line 6—6 of Figure 5.

Figure 7 is a vertical sectional view of the setting die.

Figure 8 is a vertical sectional view, similar to a portion of Figure 7, showing the arrangement of the die prior to the insertion of the pointed rasp elements in their mounting web.

Figure 9 is a view similar to Figure 8 showing the relation of the parts when the rasp elements are fully engaged in the mounting web.

Figure 10 is an enlarged plan view of a portion of a completed rasp section.

Figure 11 is a vertical sectional view taken in the plane indicated by the line 11—11 of Figure 10.

In the process of retreading automobile tires, power driven rotary rasps are employed for abrading from the tire carcass sufficient of the original tread rubber to provide a suitable roughened base to which the new camelback may be securely bonded. Such rasps, similar to that described in my prior application, Serial No. 546,821, now matured into Patent No. 2,436,621 dated February 24, 1948, comprise a rotatable drum to which is affixed a peripheral band carrying radially outwardly protruding pointed abrasion elements in the nature of tacks which provide on the drum a multitude of rasp teeth which function, when a tire carcass is held against the revolving drum, to tear and abrade the tread rubber from the carcass. Such rasp bands under normal usage are capable of remaining satisfactorily sharp during the processing of about fifty carcasses which means that, in a busy shop, several replacements per day of the rasp bands are required. These rasps, which comprise a base band of thin sheet metal perforated at spaced intervals in its surface to receive common tacks, have been comparatively expensive to produce and add considerably to the cost of machine operation.

I have provided mechanism for cooperatively producing such rasp bands which is not only capable of increased production over former methods, which results in a material saving to the consumer, but the tack mounting is actually stronger

and will extend the useful life of the rasp. One of the major problems in the manufacture of rasps of the type above referred to is the placement of the tacks in the individual holes of the band and the handling of the tacks preceding the actual placement. In the apparatus of my invention I have reduced these former time-consuming steps to the status of ordinary rapidly accomplished components of the procedure. In Figures 1 and 2 I have illustrated mechanism, for arranging the tacks automatically in the grouping or pattern in which they are to ultimately appear in the rasp band, comprising a suitable frame having legs 12 on the upper ends of which is mounted an open top hopper 13 having a bottom 14 which slopes downwardly toward what will be referred to as the front of the machine to form a well 16 toward which objects such as tacks deposited on rearward portions of the hopper bottom 14 may flow under the influence of gravity. Thus the contents of the hopper will be concentrated at the front of the machine where they will be within easy reach of the operator whose working position is located at the said front end of the machine. Extending transversely across the hopper, at a position medially of the front and rear ends thereof is a rocker shaft 17 which is mounted for rotary motion in bearings 18, carried on the respective sides of the hopper, and which is secured to rocker bars 19 movable with the shaft 17 and extending therefrom forwardly and rearwardly of the hopper. Shackle links 21 and 22, pivotally connected by bolts 23 to the respective ends of the rocker bars 19, rise vertically from the latter and are pivotally engaged, by means of screws 24 to the side members of a rectangular transfer plate frame 26 positioned in superposed relation above the hopper. The frame 26 is composed of angle bar or other structural material having an upwardly exposed rabbet 27 which forms in the frame a positioning ledge adapted to receive and position a plurality of transfer plates 28 which are cooperative, when in place, to form a relatively extended co-planar upper surface on the frame. These transfer plates which may be made about three inches wide are about twenty-six inches in length and represent the circumferential length of the rasp bands which are made to fit standard eight inch diameter rasp drums with which the rasp machines are provided.

Means are provided for moving the frame 26 and the transfer plates 28 carried thereby so as to impart to the latter an oscillating gyratory movement. Secured to and extending rearwardly from the frame 26 is a pair of ears 29 each of which is apertured to receive the pivot bolt 31 carried by a clevis 32 attached to one end of a link 33, a similar clevis 34 being secured to the other end of the link and being pivotally engaged by means of a bolt 36 in a selected one of a series of holes 37 formed in a lever 38 secured to and rising from a shaft 39 journaled for rotary movement in bearings 41 mounted on and extending from the rear end of the hopper 13. Levers 42 secured to the opposite ends of the shaft 39 and extending forwardly of the machine each have a series of apertures 43 provided therein, a selected one of which may receive a bolt 44 carried by an end clevis 46 of a substantially vertical connecting rod 47 having an additional clevis 48 at its other end which is pivotally attached by means of a pin 49 to the distal ends of a crank 51. The cranks 51 are secured to the opposite ends of a shaft 52 extend-

ing transversely of the machine and journaled in bearings 53 which are mounted on suitable support members 54 erected on the cross-member portions 56 of the machine frame. The shaft 52 is fitted with a peripherally grooved pulley 57 connected through a belt 58 with the drive pulley 59 which is carried and driven by a motor 61 carried by a base plate 62 suitably mounted on the machine frame structure. Current for operating the motor 61 may be supplied through a suitable length of extension cord, not shown, and means for controlling the operation of the motor may be provided in the form of a lever or pushbutton switch 63 mounted on the side of the hopper adjacent the operator's work position and connected with the motor through a length of conductor cable 64. Energization of the motor 61 to rotate the shaft 52 will, through the connecting rod and bellcrank drive 47-42-38, cause oscillatory movement of the shaft 39 and will create a resulting oscillatory movement of the transfer plate frame. The degree of such movement may be varied as desired by moving the pins 36 and 44 to engage selected ones of the holes 37 and 43 in the respective levers 38 and 42. The arrangement of the parts is such that, during oscillation, the arcuate travel of the shackle links 21 and 22 will impart a slight vertical oscillatory movement to the frame 26 and the transfer plates mounted therein so that material, such as loose tacks, placed on the transfer plates will be agitated and will be forced, unless restrained as will hereinafter be explained, to move over the aggregate area of the plates, the unrestrained material then dropping over the margin of the frame 26 and falling into the hopper 13 to be returned by gravity to the well 16 from where quantities may be picked up by the operator and, if desired, may be re-deposited on the oscillating transfer plates. The arrangement of the pivoted rocker 19 permits the frame 26 and its contained transfer plates 28 to be rocked back and forth in a vertical direction, while the horizontal oscillation is in progress, by manually raising or lowering the forward side of the frame. Means are provided, however, for limiting the degree of rearward tipping so that the major discharge or clearing of surplus material from the transfer plates may be directed toward the forward end of the plates into the well 16. This is accomplished by providing the rear-most end of each rocker bar 19 with a lug 55 drilled and tapped to receive a vertical screw 60 which impinges against and which may slide horizontally over pads 65 provided on the bottom of the hopper.

Means is provided in each transfer plate for trapping and holding, in a pattern or predetermined spaced relationship, a quantity of the material, such as the tacks 66 shown in Figure 6, during the interval in which the oscillation of the frame 26 is occurring. As is best shown in Figures 3 and 4, each transfer plate 28, in its normally upper surface, is provided with a plurality of diagonally arranged and relatively parallel rows of recesses 67 each being just deep enough, as will be seen in Figure 6, to receive the heads 68 of the tacks. Provided in the recesses is a plurality of holes 69 passing completely through the plate and having their lower ends provided with countersunk portions 71. The diameter of each of the holes 69 is sufficiently in excess of that of the shank of the tack 66 that the latter may pass freely into the hole without any danger of binding therein and the counter-

sunk portion 71 of each hole is provided so as to shorten the sides of the hole at its upper or entering end in order that the possibility of a tack point becoming wedged against the side of the hole in entering the latter is minimized. When a plurality of transfer plates is mounted in the frame 26, the latter will possess a top surface bearing a multitude of perforations which, when a quantity of loose tacks is placed thereon and the frame is oscillated and rocked as explained above, will serve as traps into which individual tacks will fall, point foremost, the tacks coming to rest with their heads resting in the recesses 67 and substantially flush with the plate surface. Complete occupancy of all of the holes by tacks will take only a comparatively short time whereupon the transfer plates are ready for removal from the machine.

The next step in the procedure is to transfer bodily the groups of tacks in each transfer plate into a die illustrated in Figure 7 which effects simultaneous connection of the tanks with the band forming the base member of the rasp. The die comprises a base plate 72 on which is mounted by suitable spaced screws 73 a lower holder plate 74 which carries in apertures 76, positioned and spaced correspondingly with the holes 69 of the transfer plates 28, punches 77 which rise upwardly and slidably engage in mating holes 78 provided in an upper die plate 79 overlying and vertically registered with the base plate 72 and the punch holder plate 74. The punches 77, it will be observed, are provided with shouldered extensions 81 which pass through the apertures 76 and are provided with peripheral grooves 82 coincident with the bottom surface of the plate 74 in which wire snap rings 83 or the like are engaged for securing the punches to the plate 74. Springs 84 are interposed between the punch holder plate 74 and the upper die plate 79 to urge the latter upwardly and screws 86 concentric with the springs, threadedly engaged in the upper die plate and slidably engaged in suitable apertures and a counterbore 87 in the punch holder and base plates respectively, limit the upward movement of the upper die plate relative to the punches 77 so that the upper portion of each hole 78 in conjunction with the upper end of each punch provides an upwardly opening recess 88 the upper surface of the die plate 79. A backing plate 89, shown in Figures 8 and 9, is adapted to overlie the upper die plate and is provided with apertures 91 axially registered with the recesses 88. The die so far described is adapted for operation by a standard punch press or other such mechanism which will function to cause cycling movement of the die plate 79 toward and from the base plate 72.

Before a transfer plate is removed from the tack distributing machine a strip 92 of sheet metal, shown in Figure 6 and large enough to completely cover the surface of the transfer plate is laid over the plate and is held in contact therewith manually or by other suitable means while the transfer plate is being inverted. This strip 92 then underlies the heads of the tacks and prevents the latter from falling out of their respective locating holes 69. The inverted transfer plate, together with its underlying strip 92 is then laid upon the upper surface of the die plate 79 in the same relationship as though the structure of Figure 6 were lowered until it rested on the upper surface of the structure of Figure 7. This will position the tacks 66 with their points uppermost directly above

the recesses 88 of the die plate 79 so that by manually withdrawing the strip 92 from between the marginally registered plates 28 and 79 the tacks may be permitted to fall into the recesses 88 until their heads 68 rest on the upper ends of the punches 77 after which the emptied transfer plate is returned to the tack distributing machine for reloading. On the upper surface of the die plate 79 is now laid a blank strip 93 of sheet metal as shown in Figure 8 and this strip is overlaid by the backing plate 89 after which the punch press or other such mechanism is operated to suddenly and forcibly bring the upper die plates 79 toward the base plate 72. This, as shown in Figure 9, will cause the points of the respective tacks to pierce the sheet 93 and to mushroom therethrough as indicated until the tack head engages the sheet. This radial expansion of each perforation by the tapered shank of the tack will result, after the tack has been finally positioned, in a reactionary radial pressure of the displaced sheet metal on the body of the tack which will serve to securely bind the latter to the sheet. In addition, the protruded metal will form a comparatively elongated bearing axially of the tack shank which will further serve to lend rigidity to the mounting and will delay the loosening of the tacks which the rasping action will eventually cause. Sections of finished rasp strip are illustrated in Figures 10 and 11.

From the foregoing description it will be seen that various steps of producing spiked plates or strips, especially the heretofore difficult and time-consuming steps of arranging the barbs or tacks in their pre-arranged pattern and in finally affixing the tacks to the base plate or strip have been reduced to very simple and rapidly accomplished procedures, and that the resulting product as regards its durability is superior to the heretofore known types of machine rasps.

I claim:

1. Apparatus of the character described for driving tacks into a strip of metal of a thickness less than the tangs of the tacks, a die, said die comprising an upper plate, a base plate and a backing plate, said upper plate having a plurality of apertures therein, punch members extending from said base plate into said apertures and having upper surfaces normally below the upper surface of said upper plate and arranged to receive and support tacks in point-up position, means on said upper die plate for supporting and receiving said metal strip, said backing plate having apertures therein arranged in complementary pattern relationship with said upper plate apertures, said backing plate apertures being of a cross-sectional area less than that of said upper plate apertures, said backing plate disposed adjacent said metal strip, said upper plate, metal strip, and backing plate being movable relative to said base plate whereby said tangs will pass entirely through said strip and enter said backing plate apertures.

2. Apparatus of the character described for driving tacks into a strip of metal of a thickness less than the length of the tangs of the tacks, a die, said die comprising a base plate, an upper plate and a backing plate, said upper plate having a plurality of apertures therein, means within said apertures and fixedly mounted relative to said base plate for receiving and supporting said tacks in point end up position, means on said upper die plate for supporting and receiving said metal strip, said backing plate having apertures

therein arranged in complementary pattern relationship with said upper plate apertures, said backing plate apertures being of a cross-sectional area less than that of said upper plate apertures, said backing plate disposed adjacent said metal strip, said upper plate, metal strip, and backing plate being movable relative to said base plate whereby said tangs pass entirely through said strip into said backing plate apertures to effect formation of a receiving aperture for said tangs.

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