Feb. 14, 1956 C. GLENN 2,734,550

FLATTENING HAMMER FOR STOVE TOP

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Fig. 1.

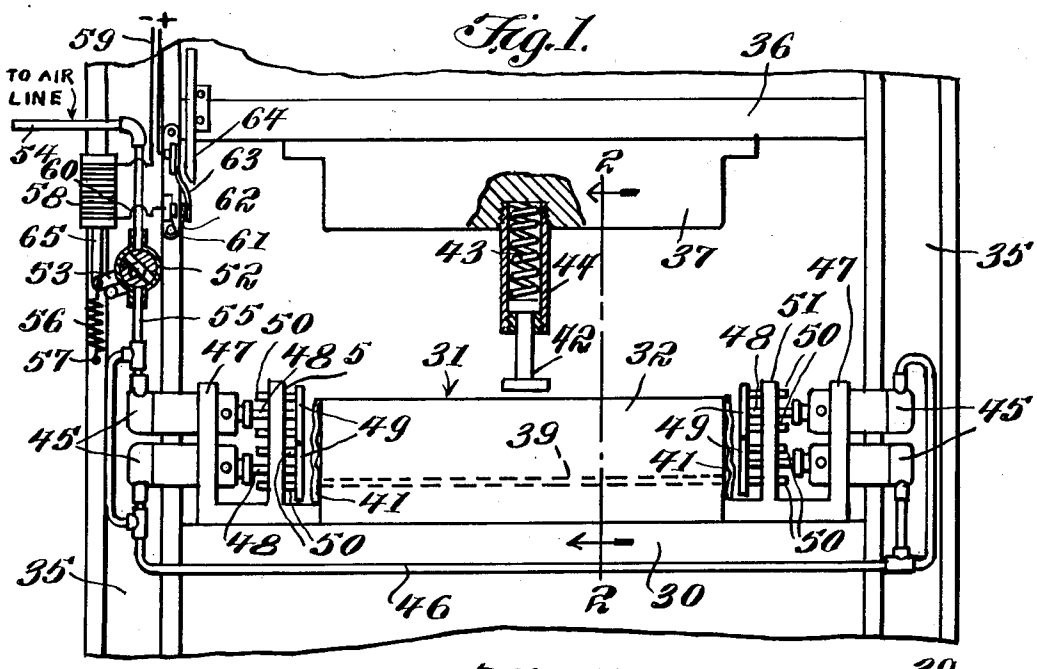


Fig. 2.

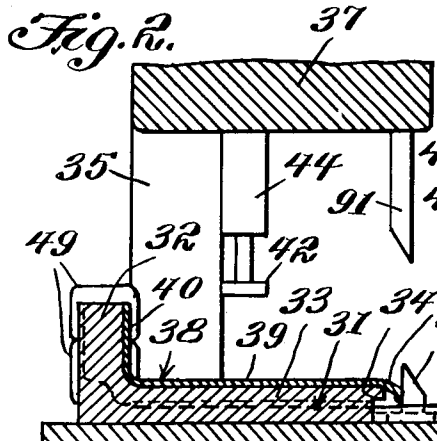


Fig. 4.

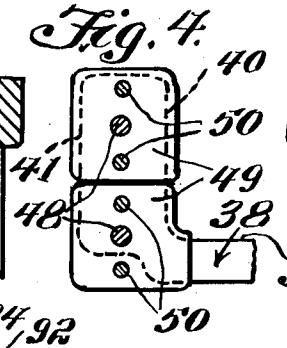


Fig. 5.

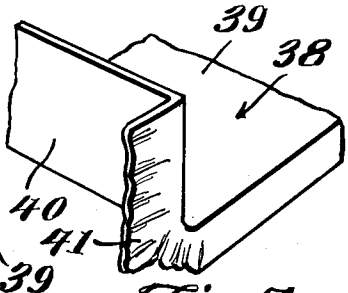


Fig. 3.

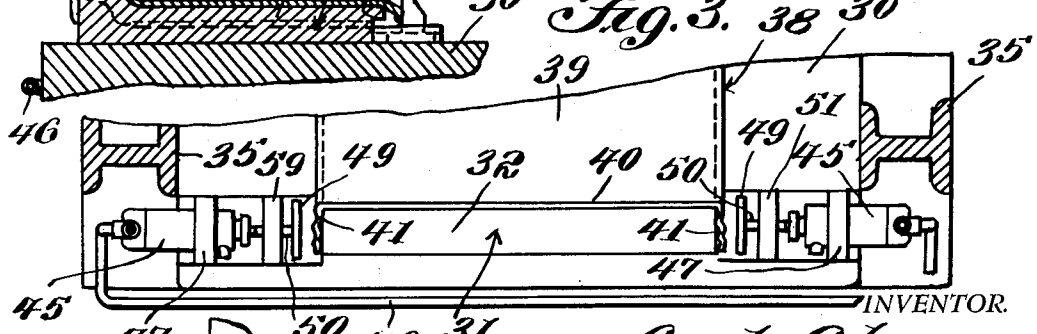
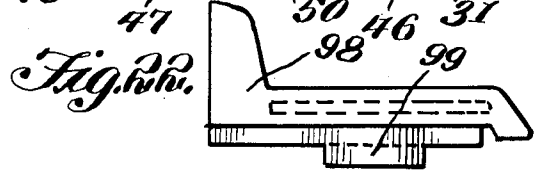


Fig. 3a.



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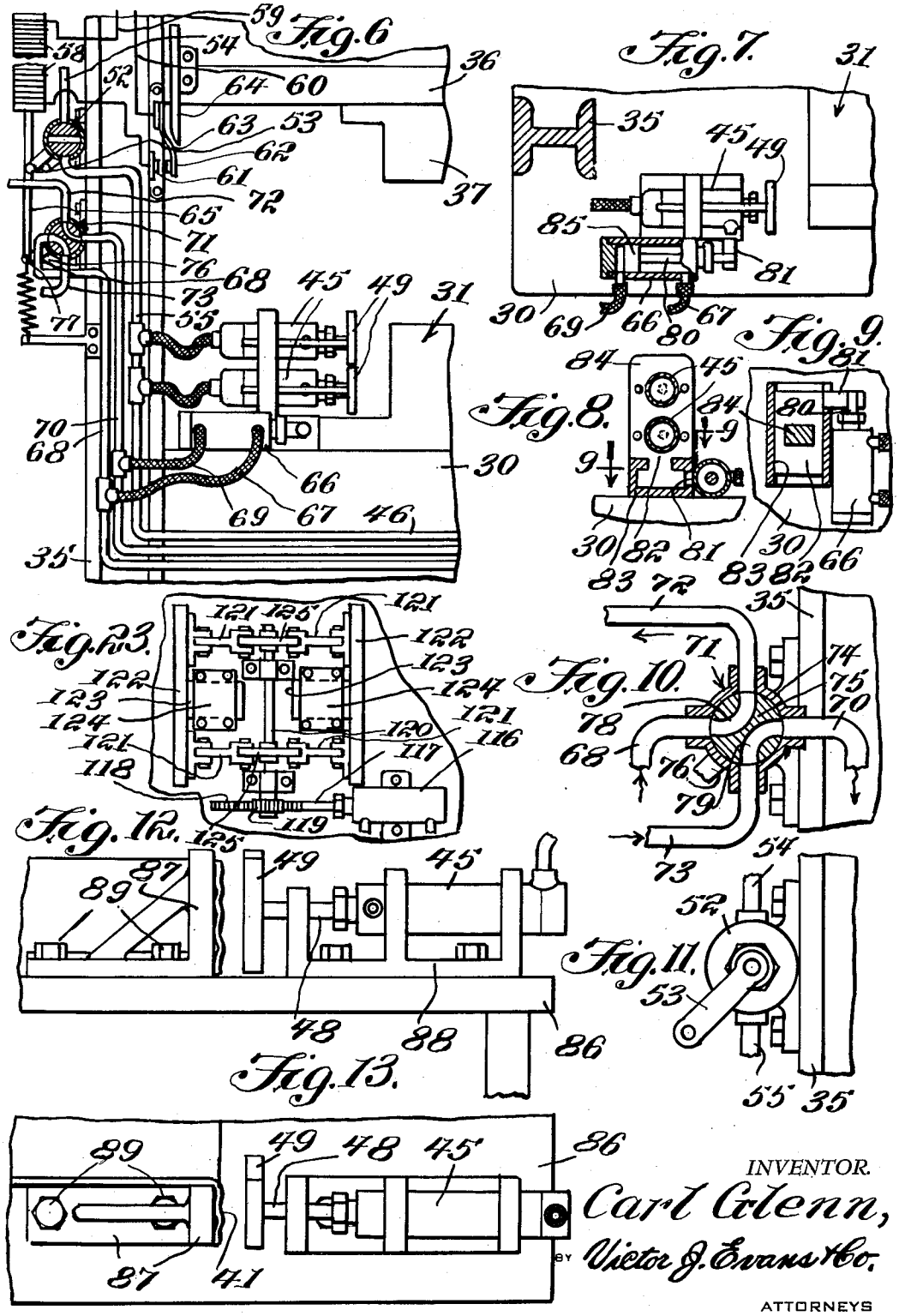
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FLATTENING HAMMER FOR STOVE TOP

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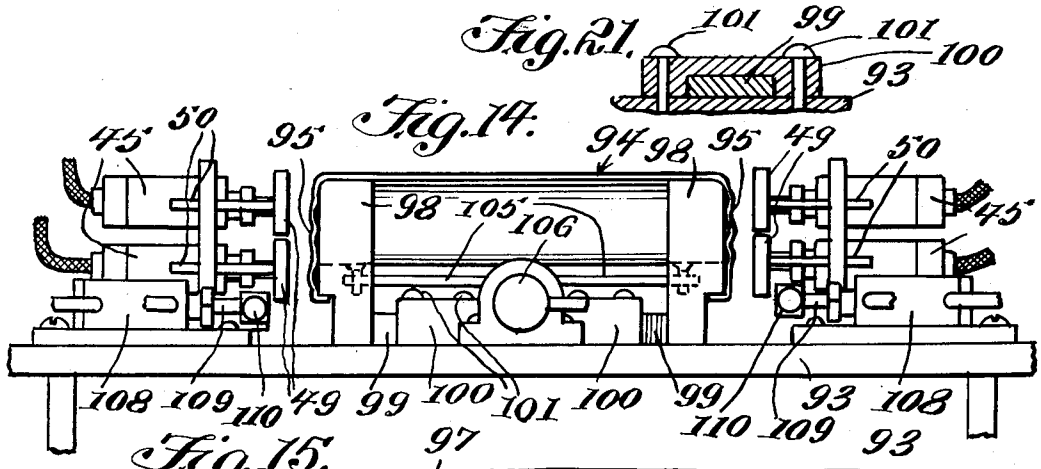


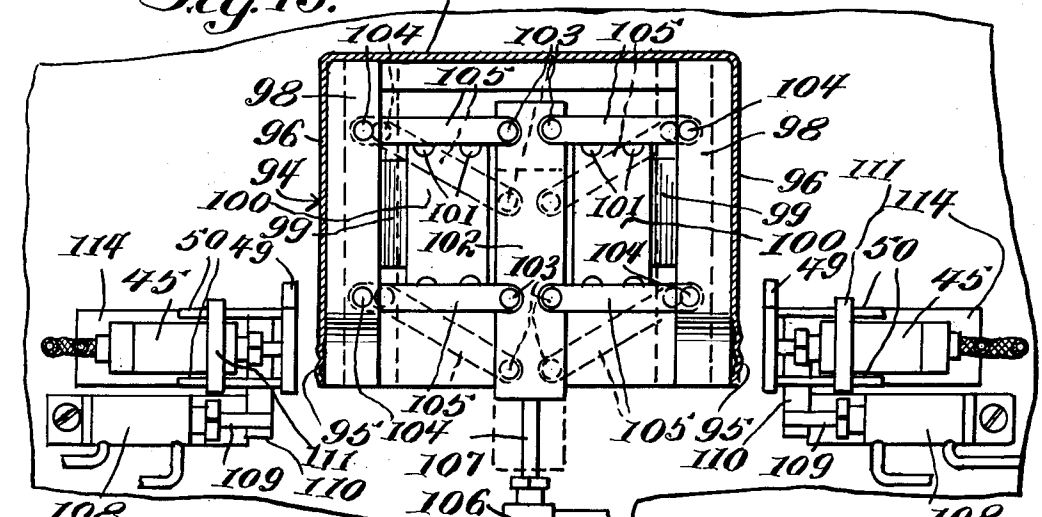
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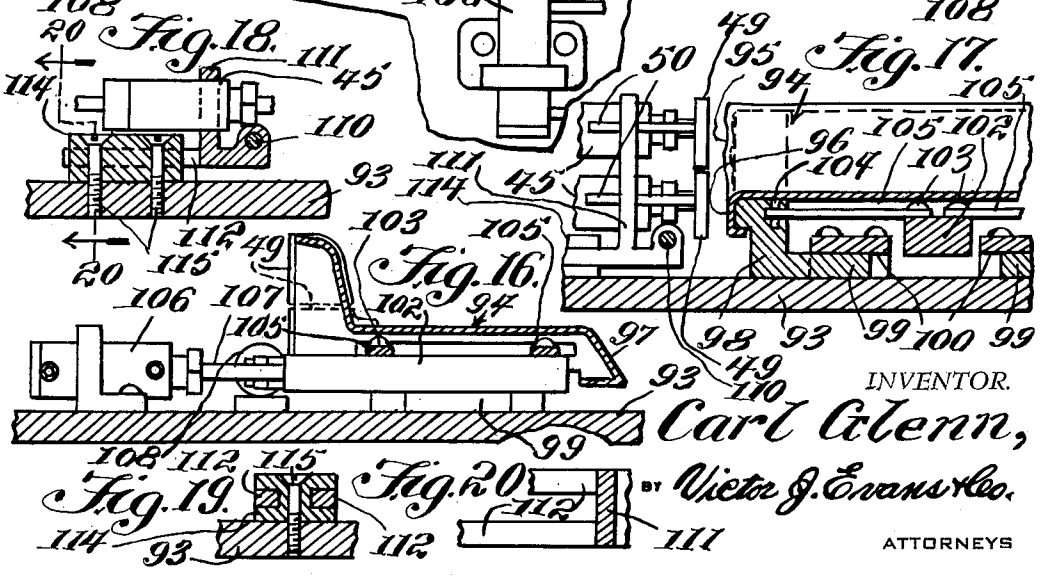
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FLATTENING HAMMER FOR STOVE TOP

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2,734,550

FLATTENING HAMMER FOR STOVE TOP

Carl Glenn, Dayton, Ohio

Application January 6, 1953, Serial No. 329,873

2 Claims. (Cl. 153—48)

This invention relates to a metal working apparatus, and more particularly to an apparatus or machine for hammering out wrinkles or irregularities in metal objects such as stove tops.

The object of the invention is to provide a metal shaping press which is adapted to be used for straightening out irregularities in work, such as wrinkles or creases in stoves, whereby the necessity of removing the wrinkles by hand is eliminated.

Another object of the invention is to provide a metal shaping press which includes a plurality of air hammers for hammering out the wrinkles or irregularities in the work piece, there being a mechanism including hydraulic cylinders for adjusting the position of the air hammers, there being a means provided for holding the work stationary while it is being worked on.

Another object of the invention is to provide a metal working press which may be mounted on a work bench or other supporting structure whereby bulges, creases and the like may be removed from such articles as stoves, wash basins, tubs, automobile body parts, and other metal articles, the present invention enabling the wrinkles or creases to be removed from the articles automatically whereby a great number of the articles can be worked on in a minimum amount of time and with a minimum amount of effort, the present invention including automatic peening and shaping hammers.

A further object of the invention is to provide a peen hammer for a stove top which is extremely simple and inexpensive to manufacture.

Other objects and advantages will be apparent during the course of the following description.

In the accompanying drawings, forming a part of this application, and in which like numerals are used to designate like parts throughout the same:

Figure 1 is a side elevational view showing the metal press of the present invention, with parts broken away and in section.

Figure 2 is a sectional view taken on the line 2—2 of Figure 1.

Figure 3 is a fragmentary plan view of the metal working press, with parts broken away and in section.

Figure 4 is a side elevational view showing a portion of a stove from which the wrinkles are to be hammered or removed.

Figure 5 is a perspective view of the stove showing the wrinkles to be removed.

Figure 6 is a fragmentary elevational view of a modified metal press.

Figure 7 is a fragmentary plan view showing a portion of the apparatus of Figure 6.

Figure 8 is a sectional view showing the hydraulic cylinder for adjusting the position of the air hammers.

Figure 9 is a sectional view taken on the line 9—9 of Figure 8.

Figure 10 is a sectional view taken through the hydraulic valve.

Figure 11 is a plan view of the valve for controlling the flow of air to the air cylinders.

Figure 12 is an elevational view of another modification.

Figure 13 is a plan view of the machine shown in Figure. 12.

Figure 14 is an elevational view of still another modified metal working machine.

Figure 15 is a top plan view of the machine shown in Figure 14, with parts broken away and in section.

Figure 16 is a longitudinal sectional view taken through the apparatus of Figure 15.

Figure 17 is a fragmentary transverse sectional view taken through the apparatus of Figure 15.

Figure 18 is a fragmentary sectional view showing the hydraulic cylinder for adjusting the position of the air cylinders.

Figure 19 is a transverse sectional view showing the guides for the air hammer.

Figure 20 is a sectional view taken on the line 20—20 of Figure 18.

Figure 21 is a sectional view showing one of the guide members.

Figure 22 is a side elevational view showing one of the supporting members.

Figure 23 is a fragmentary plan view showing a further modification of the invention.

Referring in detail to Figures 1–5 of the drawings, the numeral 30 designates a portion of a table or other supporting structure, and mounted on the table 30 is a base 31. The base 31 includes a vertical portion 32, and a horizontal portion 33, Figure 2, there being a recess 34 in the end of the horizontal portion 33 for a purpose to be later described.

The machine of the present invention further includes a stationary frame 35 which supports a movable body member 36 that has a block 37 connected thereto. The numeral 38 designates a portion of a stove which has been formed in a suitable press from a flat piece of metal, Figure 5. Thus, the stove section 38 may be used to form a gas stove or other type of stove and the stove 38 includes a top section 39 which is adapted to be arranged contiguous to the upper surface of the horizontal portion 33 of the base 31. The stove section 38 further includes a back section 40 which abuts the vertical portion 32 of the base and the stove section further includes side portions or sections 41 which are provided with a plurality of wrinkles or creases. These wrinkles are shown in Figure 5 in the side section 41 and these wrinkles occur during the process of forming the stove section 38 on a suitable press. It is the purpose of the present invention to provide a means for automatically flattening the side sections 41 so as to remove the wrinkles therefrom without the necessity of removing the wrinkles by hand which is a laborious and time consuming process.

A means is provided for holding the stove section 38 immobile while it is being worked on, and this means comprises a casing 44 which extends from the block 37 so that as the block 37 moves the casing 44 will be moved. Positioned in the casing 44 is a coil spring 43, and the coil spring 43 abuts one end of a plunger 42 and normally urges the plunger 42 to its outward position so that it will engage the top section 39 of the stove section 38 to maintain the stove sections immobile while the wrinkles are being hammered therefrom.

The numeral 45 in Figures 1 and 3 designates each of a plurality of air hammers, and a conduit 46 is connected to the air cylinders 45 for conveying air under pressure thereto. It will be seen that a pair of the air cylinders 45 are arranged on each side of the base 31, and the cylinders 45 may be supported in a suitable bracket 47. A rod 48 is slidably or reciprocably arranged

in each of the cylinders 45, and the inner end of each of the rods 48 may be connected to a suitable piston arranged within the cylinders 45. A hammer 49 is mounted on the outer end of each of the rods 48, and the hammers 49 are adapted to hammer the wrinkled side portions 41 against the sides of the base 31 in order to smooth out the side sections 41. Thus, the stove section 38 will be free of wrinkles and can be used in completing the finished product. Suitable guide pins 50 extend rearwardly from each of the hammers 49, and the guide pins 50 may extend through an upstanding apertured bar 51.

The numeral 52 designates a control valve which is adapted to be used for controlling the flow of compressed air to the cylinders 45. An inlet line 54 leads to the valve 52 and the line 54 leads from a suitable source of supply. A lever 53 is provided for rotating the rotor within the valve 52, and a line 55 serves to convey compressed air from the valve 52 to the cylinders 45. A coil spring 56 has one end connected to the lever 53, and the other end of the coil spring 56 is connected to the frame by means of a securing element such as a pin 57.

There is further provided a solenoid 58 which has an electric line 59 connected thereto. An electric lne 60 also leads from the solenoid 58, and the line 60 leads to a stationary contact 61. A movable contact 62 is mounted for movement into and out of engagement with the stationary contact 61, and the contact 62 is mounted on a flexible arm 63. A bar 64 is carried by the body member 36, so that as the body member 36 moves forwardly, the bar 64 will force the contact 62 into engagement with the contact 61 in order to complete the electric circuit leading to the solenoid 58. This will withdraw the arm 65 of the solenoid inside the solenoid coil, and it will be noted that the outer end of the arm 65 is pivotally connected to the lever 53, Figure 1. Thus, as the solenoid 58 is energized by the forward movement of the body member 36, the valve 52 will be moved to its open position so that air will be admitted to the cylinders 45 whereby the hammers 49 will be slammed against the wrinkled side portions 41 of the stove section 38 to thereby flatten or smooth out the wrinkled side sections 41. After the body member 36 has returned to its rearward position, as shown in Figure 1, the bar 64 will permit the flexible arm 63 to spring away so that the contact 62 will move away from the contact 61 whereby the solenoid 58 will no longer be energized. Thus, the spring 56 will cause the valve 52 to move to its closed position so that no additional air will be supplied to the cylinders 45 for moving the hammers 49 against the stove section 38. A suitable bleed port can be arranged in the valve 52 to permit the air to be bled from the cylinders 45.

The body member 36 may be reciprocated by any suitable mechanism.

Referring to Figures 6–11 of the drawings, there is shown a modified form of the invention wherein a hydraulic cylinder is provided for shifting or adjusting the position of the air cylinders 45 so that the position of the cylinders 45 can be controlled as desired. Thus, in Figure 6, the numerals 36 and 37 designate the body member and block respectively which have the same function as previously described. Also, although there is only shown one pair of the air cylinders 45 on one side of the base 31, it is to be understood that there is another pair of the air cylinders 45 on the other side of the base 31 for hammering out the wrinkles in the stove section 38. The solenoid 58 is adapted to be energized when the body member 36 moves downwardly since the bar 64 will move the contact 62 into engagement with the contact 61 and when the solenoid 58 is energized the arm 65 will be pulled upwardly inside the solenoid coil 58. There is provided the valve 52 for controlling the flow of compressed air to and from the air cylinders 45. The hydraulic cylinder is indicated by the numeral 66, and a pair of hoses 67 and 69 lead from opposite ends of the cylinder 66. The hose 67 leads to a conduit 68, while the hose 69 leads to a conduit 70. The conduits 68 and 70 are connected to a valve 71. The valve 71 for controlling the flow of hydraulic fluid to the cylinder 66 is shown in detail in Figure 10. Thus, the valve 71 has a return line 72 leading therefrom whereby the hydraulic fluid may be returned to a suitable reservoir, and a conduit 73 is adapted to convey hydraulic fluid under pressure from a suitable source of supply to the valve 71. The valve 71 is conventional and includes a stationary casing 74 having a rotor 75 therein. A lever 76 may have one end connected to the rotor 75, and the other end of the lever 76 may be connected to the solenoid bar 65 by means of a pivot pin 77. The rotor 75 is provided with a pair of curved passageways 78 and 79 so that the various conduits leading to the valve can be opened and closed upon rotation of the rotor 75.

The hydraulic cylinder 66 has a plunger or piston 85 slidably mounted therein, and a stem 80 is connected to the piston 85. A link 81 extends transversely from the rod 80, and the link 81 is secured to a sliding block 82, the block 82 being slidably positioned in a housing 83, Figures 7, 8 and 9. The block 82 has formed integral therewith a bracket 84 and mounted in the bracket 84 is the pair of air cylinders 45. Thus, as hydraulic fluid is introduced into the cylinder 66, the piston 85 will reciprocate therein whereby the bracket 84 will move back and forth so that the position of the air cylinders 45 can be adjusted relative to the base 31.

The modification shown in Figure 6 is used in substantially the same manner as the previously described form of the invention. Thus, the body member 36 may be reciprocated in any suitable manner, and as the body member 36 moves downwardly, the bar 64 will cause the contacts 61 and 62 to become engaged with each other so that the solenoid 58 will be energized. This will cause the bar 65 to be pulled into the solenoid 58 so that the valves 52 and 71 will be simultaneously actuated. Thus, hydraulic fluid will be permitted to flow into the cylinder 66 to move the air cylinders 45 toward the base 31 which has the wrinkled work piece 38 thereon. At the same time, the air hammers 49 will be actuated to thereby bang out or straighten out the wrinkled portions 41 of the stove section 38. When the body member 36 returns to its normal position as shown in Figures 1 or 6, the circuit leading to the solenoid 58 is opened so that the spring 56 pulls the bar 65 out of the solenoid 58 whereby the valves 52 and 71 are moved to the position shown in Figure 6.

Referring to Figures 12 and 13 of the drawings, there is shown another modification wherein the numeral 86 designates a work bench. Mounted on the bench 86 is a base 87, and the base 87 may be secured to the bench 86 in any suitable manner, as for example by bolt and nut assemblies 89. The base 87 is adapted to support a work piece such as the wrinkled stove section 41 which is to be straightened. A bracket 88 is connected to the bench 86 by suitable bolt and nut assemblies 89, and an air cylinder 45 is supported in the bracket 88. A stem 48 extends from the air cylinder 45, and the usual air hammer 49 is mounted on the outer end of the stem 48, the hammer 49 being mounted for movement into and out of engagement with the work piece 41.

As previously stated, the horizontal portion 33 of the base 31 is provided with a recess 34, Figure 2. A cam member 90 is movably mounted adjacent the recess 34, and the cam member 90 abuts the end portion 92 of the top 39 of the stove section 38. Depending from the block 37 is a cooperating cam member 91 so that when the body member 36 and block 37 move toward the base 31, the cam 91 will engage the cam 90 to move the cam 90 towards the base 31 whereby the end portion 92 of the stove section 38 will be bent into the recess 34 to properly form this portion of the stove section. Referring to Figures 14–22 there is shown another modified form of the invention. In this form of the invention the

numeral 93 designates a portion of a supporting bench or table, while the numeral 94 designates a portion of a stove section which is to have its wrinkles 95 removed, the stove section 94 including side sections 96 and an end section 97, Figure 15. A pair of movable bars 98 are adapted to engage the inner surfaces of the side sections 96 so as to clamp the stove section 94 in an immobile position while the wrinkles 95 are being removed. For guiding the bars 98 during their movement, a guide strip 99 extends from each of the bars 98, and the guide strips 99 are mounted for sliding engagement into casings 100, the casings 100 being secured to the bench 93 in any suitable manner, as for example by bolt and nut assemblies 101. A moving block 102 is positioned between the pair of blocks 98.

The moving block 102 has a plurality of links 105 pivotally connected thereto by securing elements 103, and the links 105 are connected to the laterally movable bars 98 by means of securing elements 104, Figure 15. A cylinder 106 may be connected to a suitable source of hydraulic fluid or air under pressure and the cylinder 106 serves to actuate a stem or rod 107 which is connected to the block 102. The air cylinders are again indicated by the numeral 45, and the cylinders 45 serve to actuate the hammers 49 which act upon the side sections 96 to remove the wrinkles 95 therefrom. Guide pins 50 extend rearwardly from each of the hammers 49 for guiding the hammers during their reciprocating movement. For adjusting the position of the air cylinders 45, the hydraulic cylinder 108 is provided. The hydraulic cylinder 108 actuates a rod 109 which is connected to a bracket 111 by means of a pin 110, Figure 18. The bracket 111 supports the pair of air cylinders 45 so that as the hydraulic cylinder 108 is actuated, the position of the air cylinders 45 can be shifted on the bench 93. For guiding the air cylinders 45 during their shifting or adjustment, a pair of arms 112 extend from the lower end of the bracket 111, and the arms 112 are slidably positioned in slots or guideways arranged in a block 114 which is secured to the bench 93 by suitable securing elements such as screws 115, Figures 19 and 20.

Referring to Figure 23 there is shown another modified form of clamping the stove section so that it can be worked on by the hammers 49 without the work accidentally shifting. Thus, in this form of the invention there is shown a cylinder 116 which may be connected to air or hydraulic fluid, and the cylinder 116 operates a rod 117 which has teeth 118 formed thereon. The teeth 118 are arranged in meshing engagement with a gear wheel 119 which is mounted on an end of a shaft 120. A pair of arms 125 serve to connect the shaft 120 to links 121, and the links 121 are connected to laterally movable bars 122. Thus, when the bars 122 are in their expanded position, that is when they are in their position furthest away from each other, the stove section such as the stove section 94 will be clamped in place. For guiding the bars 122 during their lateral movement toward and away from each other, guide members 123 are secured to the bars 122, the guide members 123 being slidably mounted in casings 124.

When using the form of the invention shown in Figures 14–22, the air cylinders 45 and hydraulic cylinder 106 can be actuated in any suitable manner. The stove section 94 will be securely clamped between the pair of bars 98 when the bars 98 are in their expanded position, this expansion being caused by the hydraulic cylinder 106 being actuated. Then, when the hammers 49 are actuated, the hammers 49 will hammer against the wrinkled portion 95 to thereby automatically remove the wrinkles from the stove section. After the wrinkles have been removed, the hydraulic cylinder 106 can be reversed so that the rod 107 will move the block 102 from the solid line position shown in Figure 15 to the dotted line position therein whereby the bars 98 will be moved slightly toward each other so that the stove section 94 can be readily removed and replaced by the next stove section to be worked upon.

The mechanism shown in Figure 23 illustrates another modified means of clamping the work piece such as the stove section 94. Thus, by actuating the cylinder 116, the intermeshing gears 118 and 119 will cause rotation of the shaft 120 whereby the bars 122 will expand to clamp or lock the work piece so that suitable air hammers can be used to remove wrinkles from such a work piece.

From the foregoing, it is apparent that a fully automatic peening hammer and forming tool has been provided. The present invention is especially suitable for removing wrinkles from stove tops which are being manufactured. As shown in Figure 1 the apparatus is assembled on a press which is already in existence, while the device shown in Figures 12, 13 and 14 may be mounted on a suitable table or bench. The members 45 are conventional air hammers which go back and forth continuously to remove the wrinkles from the work piece.

I claim:

1. A machine for handling stove sections comprising a table, a base supported on said table and including a horizontally disposed portion and a vertically disposed portion, said base adapted to support a stove section thereon, said stove section including side sections having wrinkles therein, a movable body member mounted for movement towards and away from said base, a block connected to said body member, a casing extending from said block, a plunger reciprocably arranged in said casing and adapted to hold the stove section immobile while the stove section is being worked on, a coil spring positioned in said casing and abutting said plunger, a pair of cylinders arranged on each side of said base, a hammer extending outwardly from each of said cylinders and actuated thereby, conduits for connecting said cylinders to a source of air under pressure, a valve arranged in said conduits for controlling the flow of air to said cylinders, a solenoid adapted to be connected to a source of electrical energy for controlling said valve, and an arm connected to said body member for selectively energizing said solenoid.

2. In a machine for removing wrinkles and creases from stove sections, a bench, means on said bench for supporting a stove section, said means comprising a pair of spaced parallel bars mounted for movement towards and away from each other, a block interposed between said pair of bars, links connecting said block to said bars, a casing arranged contiguous to each of said bars, a guide strip connected to each of said bars and movably positioned in said casings, said bars in their expanded position serving to secure the stove section while the stove section is being worked on, a pair of air cylinders movably mounted adjacent each side of the stove section, and a hammer extending outwardly from each of said cylinders and actuated thereby and hydraulic cylinders for adjusting the position of said air cylinders relative to said bench.

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