May 29, 1928. 1,671,619

J. W. VANCE

PUNCHING APPARATUS FOR RADIATORS

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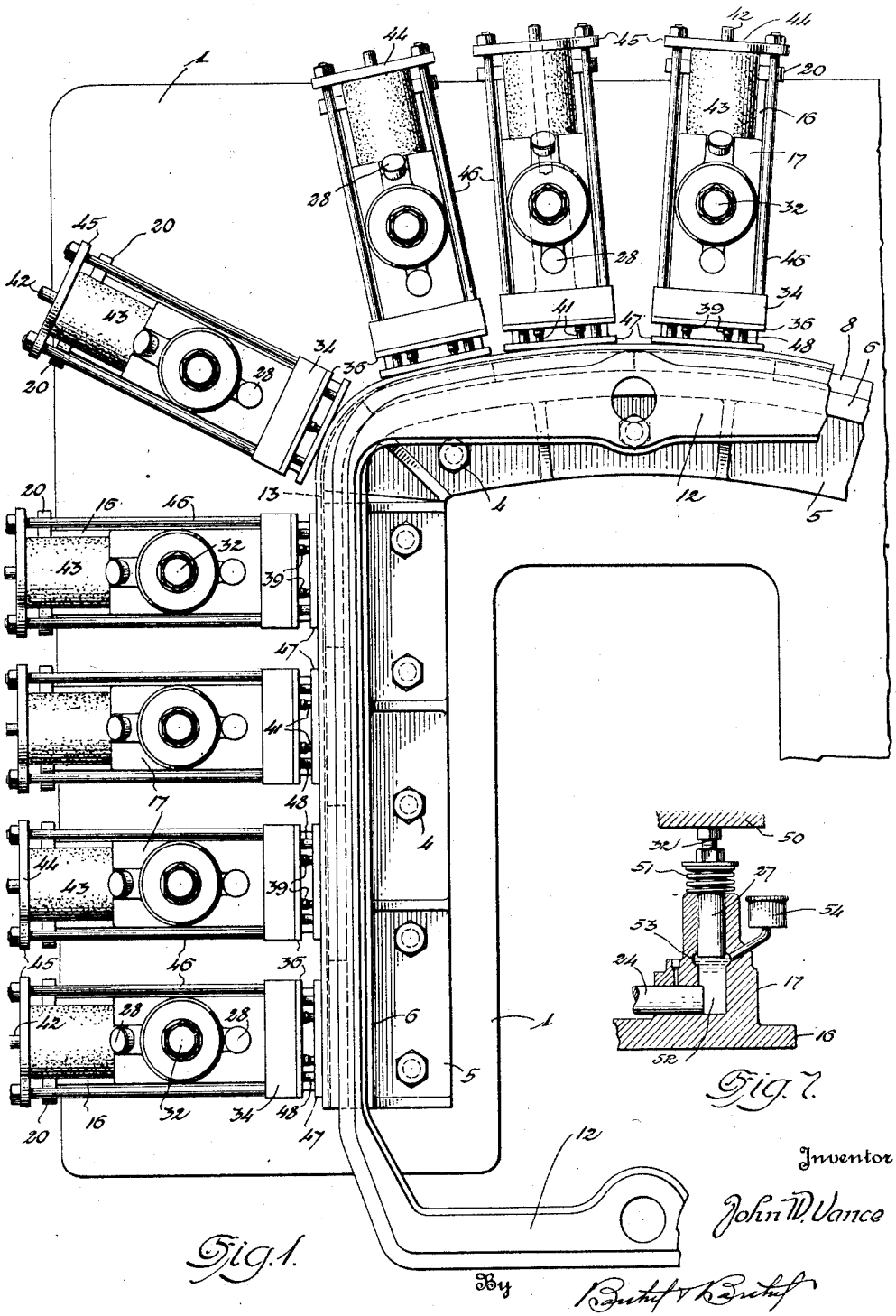


Fig. 1.

Fig. 7.

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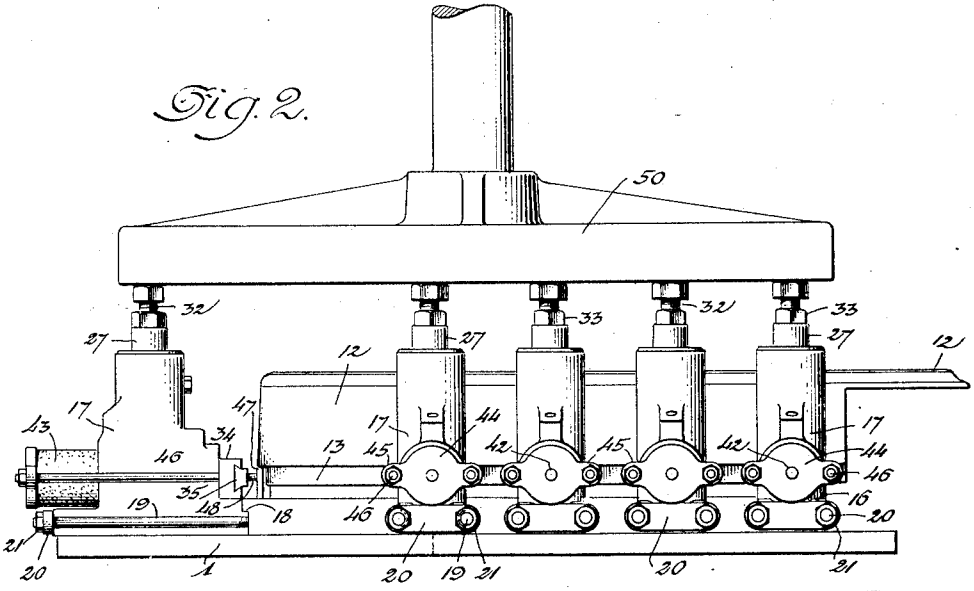
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PUNCHING APPARATUS FOR RADIATORS

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Fig. 2.



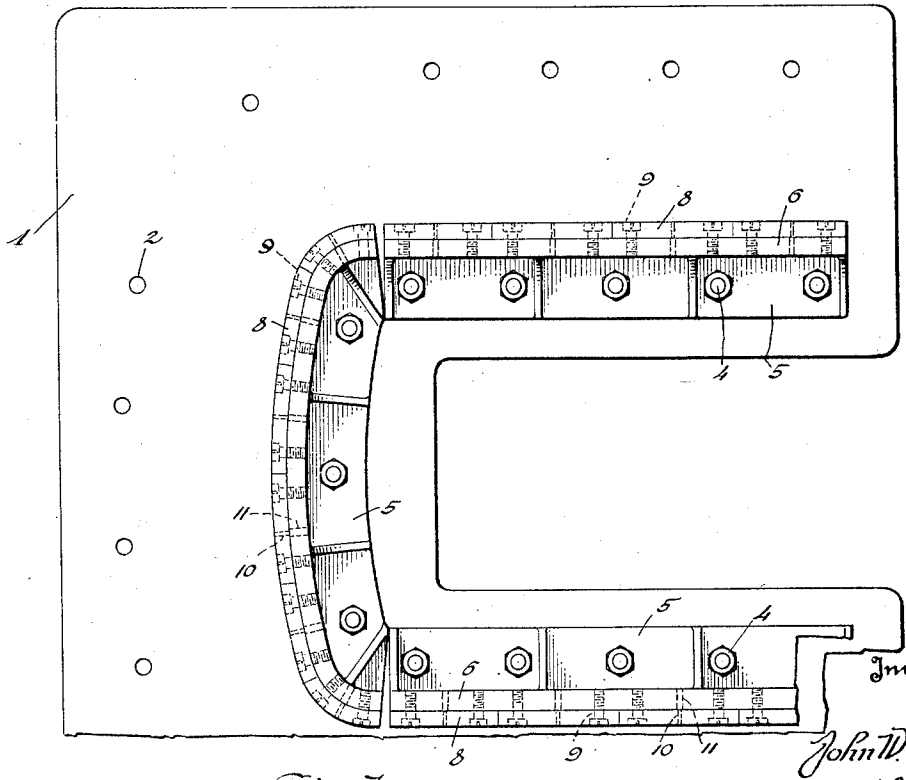


Fig. 3.

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Fig. 5.

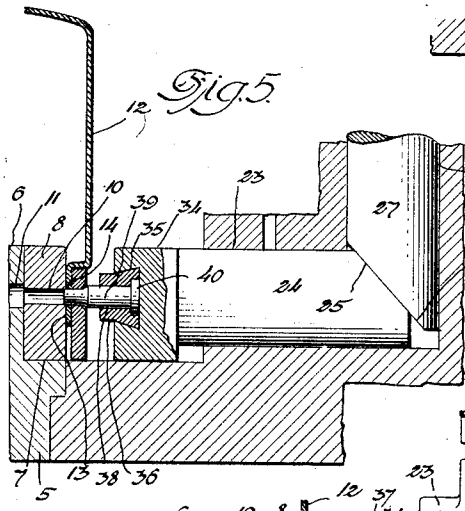
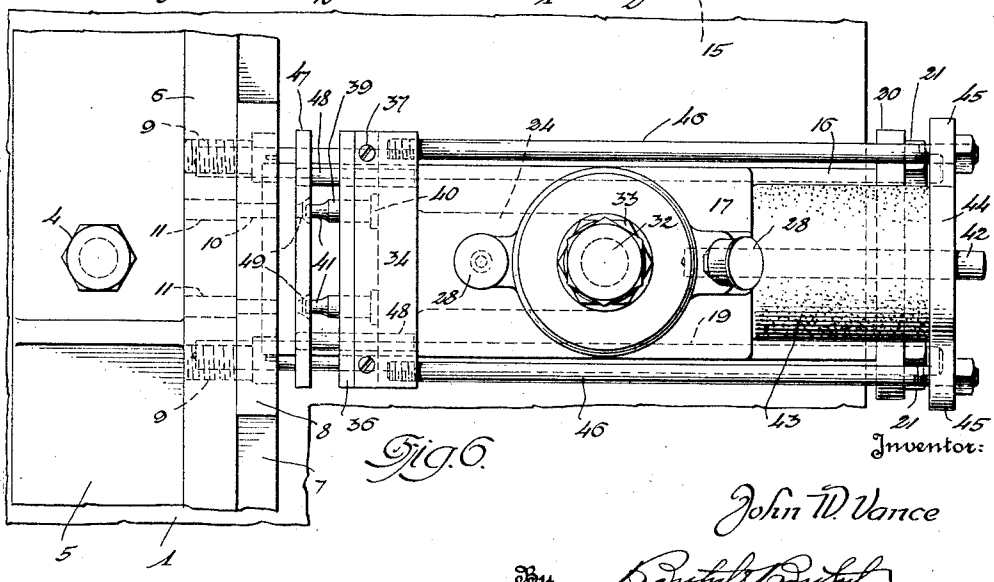


Fig. 4.

Fig. 6.



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UNITED STATES PATENT OFFICE.

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PUNCHING APPARATUS FOR RADIATORS.

Application filed July 9, 1925. Serial No. 42,359.

This invention relates to a punching apparatus for radiators, and has special reference to the punching of radiator shells to provide a multiplicity of openings about the shell with the openings arranged so that a hood or any suitable structure or device may be attached thereto. In the production of a large quantity of radiator shells for any particular automobile all of the openings punched in the shell must be properly spaced and uniform in size. It is the present practice to punch these shell openings one at a time or in small groups with a result that considerable time and labor are required and very often an opening misplaced which results in waste and delay.

My invention aims to provide an apparatus that may be used in various types of presses or other machines having a presser head or plunger for striking a blow. Such a head or plunger is utilized in connection with my apparatus for simultaneously operating a plurality of punching instrumentalities which are arranged about a shell die so that a radiator shell may have all of its openings punched at a single operation.

My invention further aims to provide novel punching instrumentalities that may be arranged for simultaneous operation on a piece of work, and each instrumentality includes a punch; wedge means for actuating the punch; means for lubricating the punch, and a stripper device. The construction of the punching instrumentalities is such that they may be easily grouped about the piece of work and positively fixed to insure accuracy. Many advantages are gained from the economical and expeditious manner in which the radiator shells are punched. Some of these advantages will hereinafter appear when describing my invention in detail by aid of the accompanying drawings, wherein

Figure 1 is a plan of a portion of the apparatus with a portion of a radiator shell in position to be punched;

Fig. 2 is a side elevation of the same;

Fig. 3 is a plan of a portion of the bed plate showing a stationary shell die thereon;

Fig. 4 is a side elevation of a punching instrumentality with a portion of the bed plate in section;

Fig. 5 is a longitudinal sectional view of a portion of the punching instrumentality showing the punch as having been actuated;

Fig. 6 is a plan of the punching instrumentality shown in Fig. 4; and

Fig. 7 is a vertical sectional view of another form of punching apparatus.

To put my invention into practice, I provide a light and durable bed plate 1 and in this bed plate are a series of outer openings 2 and a series of inner openings 3. The outer openings 2 are adapted for anchoring individual punching instrumentalities and the inner openings 3 are used for anchoring a stationary die, consequently these openings are accurately positioned in the bed plate so that no mistake may occur in locating the parts adapted to position a radiator shell while other parts operate upon the shell.

The inner series of openings 3 are adapted to receive screw bolts 4 and these screw bolts anchor the lateral flanges 5 of die holders 6 on the bed plate 1. The die holders 6 have shoulders 7 and seated on said shoulders are dies 8 retained thereon by screws 9 or other fastening means. The dies 8 have punch openings 10 alining with slug openings 11 in the shoulders 6.

As shown in Fig. 3 some of the holders 6 may be straight and others curved and the configuration of the entire die depends on the piece of work to be punched. In this instance it is a radiator shell 12 having an inset flange 13 which must be provided with a plurality of spaced openings 14. The top and bottom flanges 13 are to be punched and the die of the bed plate is arranged so that the radiator shell 12 may be placed down on the die with the inset flange 13 about the dies 8 so that these dies will back up the flange 13 during punching operations.

The outer series of openings 2 of the bed plate 1 are adapted to receive screw bolts 15 which enter the base pieces 16 of punch housings 17, said base pieces fitting under under-cut portions 18 of the die holders 6, so that said die holders may cooperate with the screw bolts 15 in preventing vertical displacement of the punch housings. To prevent lateral displacement there are side tie rods 19 screwed into the die holders 6 and supporting clamping bars 20 against the outer ends of the housing base pieces 16. Nuts 21 on the ends of the tie rods 19 permit of the bars 20 being clamped against the punch housings to firmly anchor said housings on the bed plate 1.

The punching instrumentalities are identical in construction, therefore I deem it only necessary to specifically describe one of these devices.

Each punch housing 17 has a vertically disposed bore 22 and communicating with the lower end of said bore is a lateral bore 23. Slidable in the lateral bore is a horizontal wedge 24 having its inner end beveled, as at 25 for engagement with the lower beveled end 26 of a vertical wedge 27. The wedges 24 and 27 are preferably cylindrical and the walls of said wedges and bores are adapted to receive lubricant from suitable cups 28 carried by the housing 17 and communicating with the bores 22 and 23 by ports 29 in said housing.

The vertical wedge 27 is provided with a longitudinal groove 30 into which extends the inner end of a stop screw 31, said screw cooperating with ends of the groove in limiting the sliding movement of the vertical wedge 27 in the bore 22. The vertical wedge has its upper end projecting above the housing 17 and provided with a screw 32 adapted to be adjusted and set relative to the upper end of the vertical wedge by a lock nut 33.

On the outer end of the horizontal wedge 24 is a head 34 provided with a transverse dove-tailed groove 35 for a dove-tail punch holder 36 which must be placed endwise in the head 34. Screws 37 or other fastening means may be employed for anchoring the punch holder.

In the punch holder are openings 38 for punches 39, said punches having heads 40 seated in the punch holder 36 and outer reduced ends 41 that actually do the punching.

What may be considered the outer end of the punch housing 17 has a stationary support 42 for a retractile device 43, preferably in the form of a heavy rubber sleeve about the support 42. The outer end of the rubber sleeve 43 is engaged by a plate 44 having side ears 45 for connecting rods 46, said rods extending inwardly at the sides of the housing 17 with the inner ends thereof mounted in the head 34 so that this head will be held normally against the inner end of the housing 17.

When the vertical wedge 27 is struck a blow to actuate the horizontal wedge 24 the rubber sleeve 43 is placed under compression or stressed to the extent of providing a force which will retract the head 34 and the wedges 24 and 27 after each punching operation. The retractile device 43 also serves as a cushioning element and in this connection may be considered the mechanical equivalent of a retractile spring.

Between the punch holder 36 and the die 8 is a stripper bar 47 having its ends provided with dowel pins 48 slidable through the punch holder 36 and in the head 34. The stripper bar 47 has openings 49 corresponding in number to the punches 39. This stripper bar is reciprocable relative to the reduced punching end 41 of the punchers 39 and said stripper bar is adapted to press the shell flange 14 against the die 8 during the punching operation, so that the flange cannot be distorted by the punches 39 said punches drive the slugs into the openings 10 of the dies and the openings 11 of the holders 6.

With the punching instrumentalities grouped about the large shell die, as shown in Fig. 1, all of the wedges 27 are vertically disposed with the screws 32 thereof in substantially the same horizontal plane, consequently a large presser head or plunger 50, forming part of an ordinary press or punching machine may be employed for simultaneously operating all of the punching instrumentalities to simultaneously provide the flange openings 14. It is only necessary for a workman to place the radiator shells 12 in position, cause the presser head or punch 50 to strike a blow, and then remove the punch shell and place another in position.

In Fig. 7 I show another form of apparatus wherein the expansive force of a spring 51 holds the vertical wedge 27 against the plunger 50. The inner ends of the edges 27 and 24 are squared off and a body of oil or other liquid 52 is placed in the bore 22, between the wedges. The bore 22 has an annular chamber 53 supplied with oil or liquid from a reservoir 54 and when the vertical wedge 27 is depressed a quantity of oil is trapped in the bore and constitutes a medium of compression against the horizontal wedge 24. Of course, the oil serves as a lubricant and the reservoir supply takes care of any oil leakage.

It is thought that the operation and utility of my punching apparatus will be apparent without further description, and while in the drawings, there is illustrated a preferred embodiment of my invention, it is to be understood that the structural elements are susceptible to such variations and modifications as fall within the scope of the appended claims.

What I claim is:—

1. A punching instrumentality comprising a housing, punches, wedges adapted to actuate said punches, retractile means at one end of said housing for said punches, and a stripper bar at the opposite end of said housing.

2. A punching instrumentality as called for in claim 1, wherein said wedges are disposed in housing bores one at a right angle to the other.

3. A punching instrumentality as called for in claim 1, and a blow receiving screw carried by one of said wedges.

4. A punching instrumentality as called

for in claim 1, wherein said retractile means includes a support, a rubber sleeve on said support, and a plate bearing against and connected to one of said wedges.

5. A punching instrumentality comprising a housing, a vertical wedge in said housing adapted to be struck a blow, a horizontal wedge in said housing actuated by said vertical wedge, a punch holder supported from said horizontal wedge, punches in said holder and retractile means for said punches.

6. A punching instrumentality as called for in claim 5, wherein said retractile means includes a rubber sleeve, and a plate bearing against said rubber sleeve and connected to said horizontal wedge.

7. A punching instrumentality as called for in claim 5, and a stripper bar slidably supported relative to said punches.

In testimony whereof I affix my signature.

JOHN W. VANCE.