

J. SCHMIDT.
SPACING AND PUNCHING MACHINE.
APPLICATION FILED FEB. 16, 1914.

1,145,167.

Patented July 6, 1915.

2 SHEETS—SHEET 1.

FIG. 1

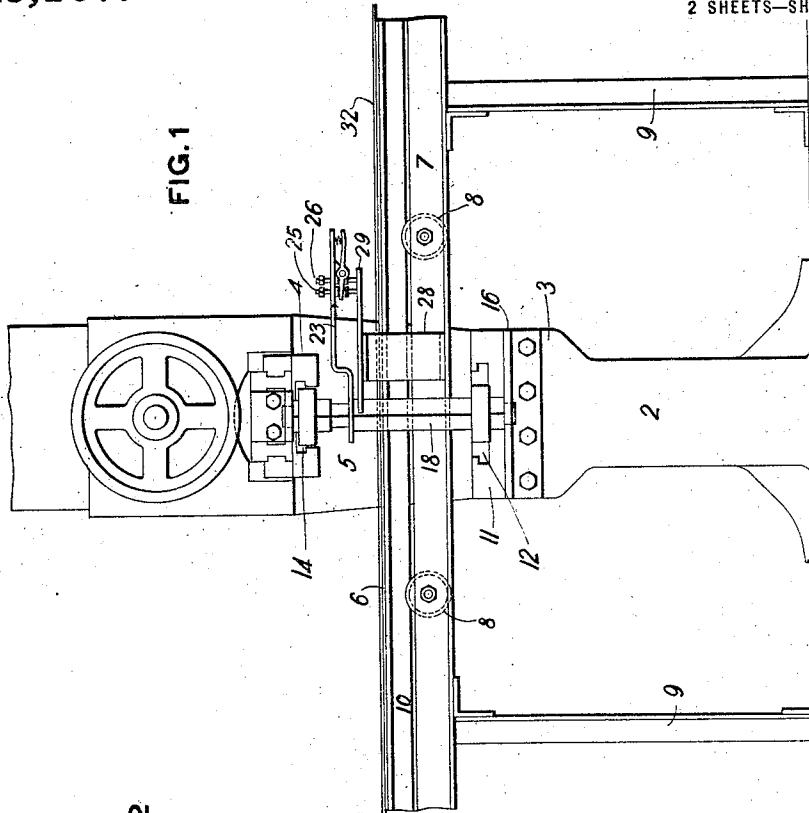
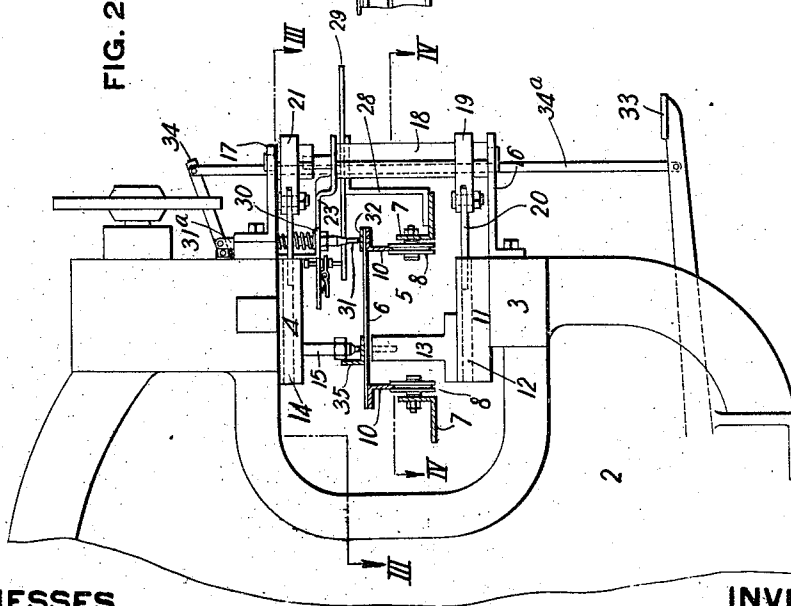


FIG. 2



WITNESSES

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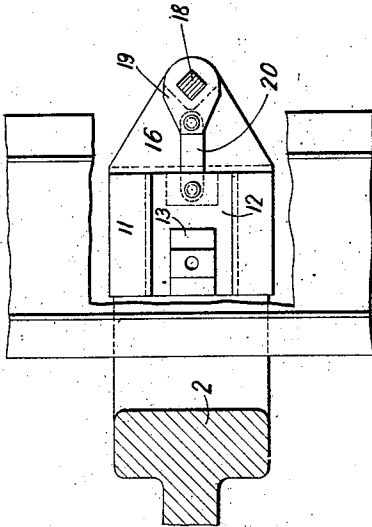


FIG. 4

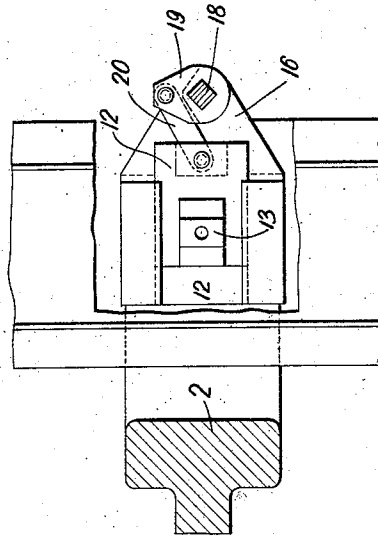


FIG. 6

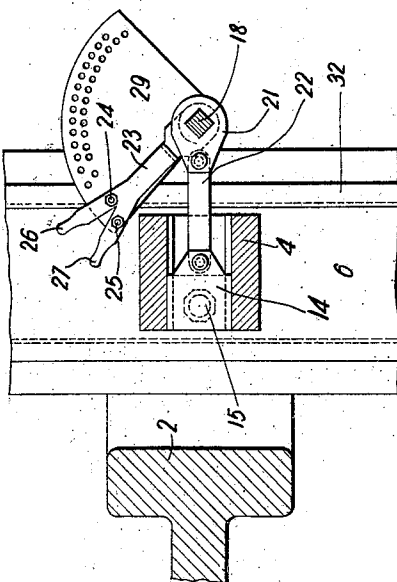


FIG. 3

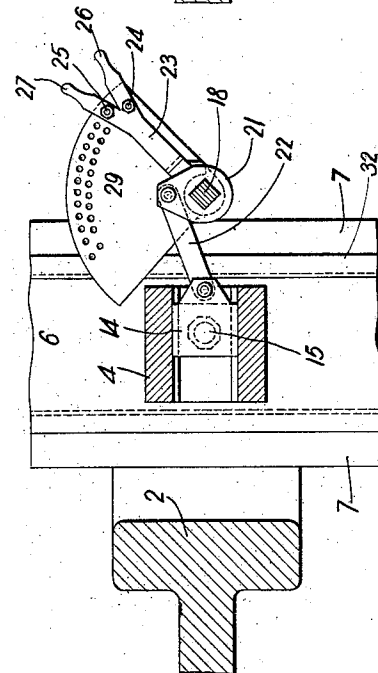


FIG. 5

WITNESSES

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JOHN SCHMIDT, OF PITTSBURGH, PENNSYLVANIA.

SPACING AND PUNCHING MACHINE.

1,145,167.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JOHN SCHMIDT, a citizen of the United States, residing in Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented a certain new and useful Spacing and Punching Machine, of which the following is a specification.

My invention relates to apparatus used in conjunction with punching machines and similar apparatus, in locating the position of the holes which are punched or otherwise formed in plates, angles, beams and similar metal materials, preparatory to the later fabrication of the punched materials.

One object of my invention is to provide a universal gage or spacing machine for power punches and similar hole forming apparatus having novel means enabling a plurality of rows of openings or holes being formed in the material being punched while the material is being moved but once from end to end across the path of the punch or perforating apparatus.

Another object of the invention is to provide a gage or spacing machine for punches having novel means whereby the formation of a series of staggered holes in the materials being punched is effected without the use of gage lines and with but one end to end movement of the material across the path of the hole-forming device.

Another object of the invention is to provide a punching machine having improved means for accurately punching the holes of a plurality of rows in a successive manner and without the use of gage lines or punch marks on the material.

A further object of my invention is to provide a punching machine having movable top and bottom punching dies, and having improved means whereby the dies are moved in unison relative to the material in bringing the material into position, and having novel means for determining the position of holes formed in the material by the movable dies.

A still further object of my invention is to provide a gage and spacing machine adapted for use with existing punching machines.

Still further objects of the invention consist in the novel combination and arrangement of parts more fully described herein after and specifically pointed out in the appended claims.

Referring now to the drawings, forming part of this specification, Figure 1 is a front elevation showing a vertical punching machine having a universal gage and spacing machine applied for use thereon and constructed and arranged in accordance with my invention. Fig. 2 is a side elevation of the apparatus shown in Fig. 1 showing the spacing table as located within the throat of the punching machine and the arrangement of the gage or spacing mechanism. Fig. 3 is a sectional plan of a portion of the apparatus, taken on the line III—III of Fig. 2 showing the movable punch on the upper vertically reciprocating head of the punching machine in one extreme position into which it is moved, and the connecting mechanism between the punch and the gage forming part of this invention. Fig. 4 is a similar sectional elevation taken on the line IV—IV of Fig. 2 showing the cooperating bottom die in the same extreme position and the mechanism connecting the die with the gage. Fig. 5 is a plan partly in section showing the punch in the other extreme position into which it is movable. Fig. 6 is a plan partly in section showing the bottom die in its other extreme position on the bottom anvil of the punching machine.

In the accompanying drawings, the numeral 2 designates the frame or housing of a vertical punching machine having a bottom head or anvil 3 and, above the anvil 3, is a vertically reciprocating opposing ram or head 4, the throat 5 of the punching machine being formed in the usual manner, between the bottom head 3 and the reciprocating ram 4.

Positioned so as to extend lengthwise horizontally within the throat 5 and on opposite sides of the punching machine, is a spacing table 6 which is movably mounted on a track formed by angles 7, 7, and rollers or track wheels 8. The wheels 8 are located at separated intervals in the length of each of the angles 7 and vertically extending supports 9 conveniently formed of rolled steel angles, are provided at suitable intervals in the length of the angles 7 forming the spacing table track. The track wheels 8 have peripheral grooves therein engaging with the edge of the vertically extending legs of angles 10 which form the slides for the grid forming the spacing table or work support 6. The table 6 which is lengthwise movable upon the idler wheels 8 of the track, is preferably

made in the form of a grid so as to support the materials being punched without interference with the punching operations.

Positioned on the upper face of the bottom head 3 is a block 11 having a recessed groove in its upper face, and slidably mounted in the recessed groove is an anvil support 12. Removably mounted on the anvil support 12 is a bottom die 13 having an opening or hole in the upper end thereof, as is shown in Figs. 4 and 6.

Mounted in the recessed groove in the lower end of the reciprocating head 4 is a sliding block 14 and removably secured on this block is a punch 15 by which the holes are formed in the materials punched.

Secured upon angle brackets 16 and 17, which are rigidly mounted on the front face of the punching machine, is a square vertically extending shaft 18, having reduced end portions by which the shaft is rotatably secured in the brackets 16 and 17, and secured on the shaft 18 adjacent to the lower end thereof is a lever or arm 19 which is connected by a link 20 with the sliding block 13 on the lower anvil of the punching machine. Fastened to the upper end of the shaft 18 is a similarly constructed lever 21 which is connected by a link 22 to the sliding block 14 movably mounted in the lower face of the reciprocating top head 4. Also secured on the shaft 18, so as to rock this shaft, is a manually actuated operating lever 23 and mounted on the forked rear end of the rocking lever 23 is a pair of index pins 24 and 25 which are lengthwise movable upon the lever and are moved into operative position by means of their respective grip levers 26, 27. The shaft 18 as shown is divided transversely into sections, the reduced upper end of the lower section telescoping within the recessed lower end of the upper section so as to permit the upper section of the shaft 18 and attachments reciprocating with the top ram 4 of the punching machine.

Secured by a knee or support 28 to the outside one of the track angles 7 is a quadrant forming a dial or gage plate 29, which is provided with a series of staggered holes arranged in concentric circular arcs on the quadrant or dial 29. The holes in the quadrant cooperate with the index pins 24, 25 on the lever 23, as will be described, two rows of the holes being provided to reduce the size and enable the quadrant being made as small as possible. Secured by an angle support 30 to the vertically movable top platen or head 4 is a third index pin 31 which is arranged to project downwardly into proximity with the upper face of the spacing table 6. This pin is connected by the link 31^a to the pivoted lever 34 and the lever 34 is connected to the treadle 33 by a link 34^a.

A templet 32 having the lengthwise spacing of the holes to be punched is secured positioned on top of the table 6 or a tape, marked in a similar manner, may be laid lengthwise on the table 6 in place of the templet to determine the position, center to center, of the holes in the length of the material being punched.

In the operation of my improved apparatus the angles, plates or other material 35 to be punched are placed in position on the spacing table 6 and are clamped to the upper surface of the table 6. The templet or when used the tape is likewise secured in position along the outer marginal edge of the work table 6.

The staggered holes in the gage plate 29 are generally spaced at distances equal to $\frac{1}{8}$ inch center to center, and, as for example, when the gage lines of the two or more rows of holes to be punched in the materials equal two inches, the appropriate holes in the gage plate 29 are marked with chalk or in other suitable manner so as to be readily identified. The operator then moves the arm 23 until the right one of the index pins, 24 or 25, registers with the marked hole in the gage plate 29. The work table 6 is then moved lengthwise on its track until the index pin 31 is in line with the required mark on the templet or tape. The operator moves the index pin 31 which is connected by the link 31^a to the lever 34, downwardly by pressing the treadle 33 until the index pin engages the proper hole in the templet when a templet is used where it remains so as to form a stop which holds the work in position during the punching operation. The movement of the treadle 33 also causes the punch 15 to be set in motion, and as it descends a hole is punched in the material on the table 6, beneath the punch. When the punch 15 is retracted, it automatically stops at the end of its upward stroke, in the manner common to all punching machines, in which position it remains until released by the operator. After the punch has been retracted, the work support 6 is moved lengthwise on its track until the index pin 31 again registers with the desired mark on the templet 32 or tape, and the lever 23 is again moved to shift the position of the punch 15 and the bottom die 13 beneath the punch, one of the index pins 24, 25 on the lever 23 registering with a hole in the dial 29 in indicating when this position is reached. The foot lever 33 is then again pressed by the operator to again start the punch in operation and form the next hole in the material being punched, in this case forming the hole in the second of the two rows of holes to be formed in the material. The above described operations are then repeated as often as is required to form the necessary number of holes in the material.

rial being punched. The punched material is then removed and is replaced by unpunched material, when the above operations are repeated.

- 5 In fabricating structural material and punching plates for boilers, tanks and similar apparatus, there usually is a considerable number of duplicate pieces, so that all of the number of like pieces will be punched
10 with one setting of the templet or tape on the work support.

The advantages of my invention will be apparent to those skilled in the art. By its use a plurality of rows of holes can be
15 formed in plates, angles and similar materials without the use of gage lines and with but one series of entire adjustments of the material being punched.

Modifications in the construction and arrangement of the parts may be made without departing from my invention as defined in the claims.

I claim:—

1. In a punching machine, the combination with a punching machine having a bottom anvil and a vertically reciprocating ram, of a die block movably mounted on the bottom anvil, a punch point movably mounted on the ram, and means for moving the die block and punching point on the punching machine in unison, to thereby vary the punching position of said punch and die block.

2. In a punching machine the combination with a punching machine having a bottom anvil and a vertically reciprocating ram, of a die block movably mounted on the bottom anvil, a punch point movably mounted on the ram, and means for moving the die block and punch point on the punching machine and maintaining the die block and punch point in alinement in a plurality of punching positions to thereby form a plurality of rows of holes in materials positioned therebetween.

3. In a punching machine the combination with a punching machine having a bottom anvil and a vertically reciprocating ram, of a die block movably mounted on the bottom anvil, a punch point movably mounted on the ram, means for moving the die block and punching point on the punching machine in a plurality of punching positions, to thereby vary the location of holes punched in materials, positioned therebetween and means connected to the die block and punch point moving mechanism, for determining the relative position of successive holes punched in the materials.

4. In a punching machine the combination with a punching machine having a bot-

tom anvil and a vertically reciprocating ram, of a die block movably mounted on the bottom anvil, a punch point movably mounted on the ram, means for simultaneously moving the die block and punch point on the punching machine in forming a plurality of rows of holes in materials positioned therebetween and means connected to the die block and punch point operating mechanism for determining the relative position of the successive holes punched in the materials.

5. In a punching machine the combination with a punching machine having a bottom anvil and a vertically reciprocating ram, of a die block movably mounted on the bottom anvil, a punch point movably mounted on the ram and means for simultaneously moving the die block and punch point on the punching machine in forming a plurality of rows of holes in materials positioned therebetween and a gage for determining the position of the successive holes punched in any of the plurality of rows of holes.

6. In a punching machine the combination with a punching machine having a bottom anvil and a vertically reciprocating ram, of a die block movably mounted on the bottom anvil, a punch point movably mounted on the ram, and means for simultaneously moving the die block and punch point on the punching machine in forming a plurality of rows of holes in materials positioned therebetween, a gage for determining the position of the successive holes punched in any of a plurality of rows of holes and means on the punch for determining the distance between centers of successively formed holes lengthwise in the materials.

7. In a punching machine the combination with a punching machine having a bottom anvil and a vertically reciprocating ram, of a die block adjustably mounted on the bottom anvil, a punch point adjustably mounted on the ram, means for adjusting the die block and punch point, a spacing table movable in the throat of the punching machine for supporting the material being punched, and means on the punch for moving the punch point and die block, co-operating with the spacing table to determine the position of the holes in the length of the punched materials.

In testimony whereof, I hereunto set my hand.

JOHN SCHMIDT.

Witnesses:

J. M. MARTIN,
W. E. JONES.