W. M. BROWN.

SPACING DEVICE FOR PERFORATING MACHINES.

APPLICATION FILED SEPT. 5, 1918.

1,289,636.

Patented Dec. 31, 1918.

3 SHEETS—SHEET 1.

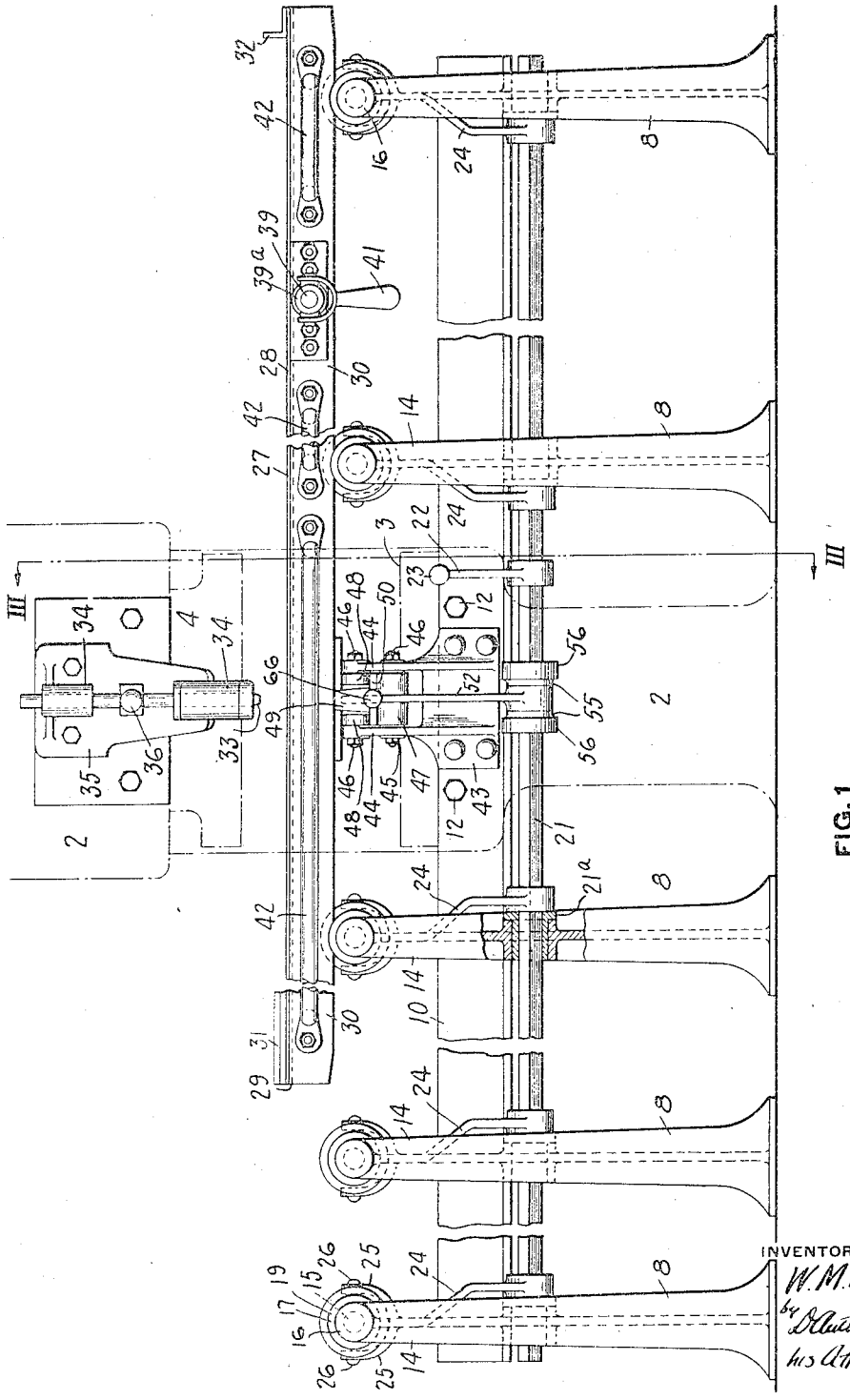


FIG. 1

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3 SHEETS—SHEET 2.

FIG. 2

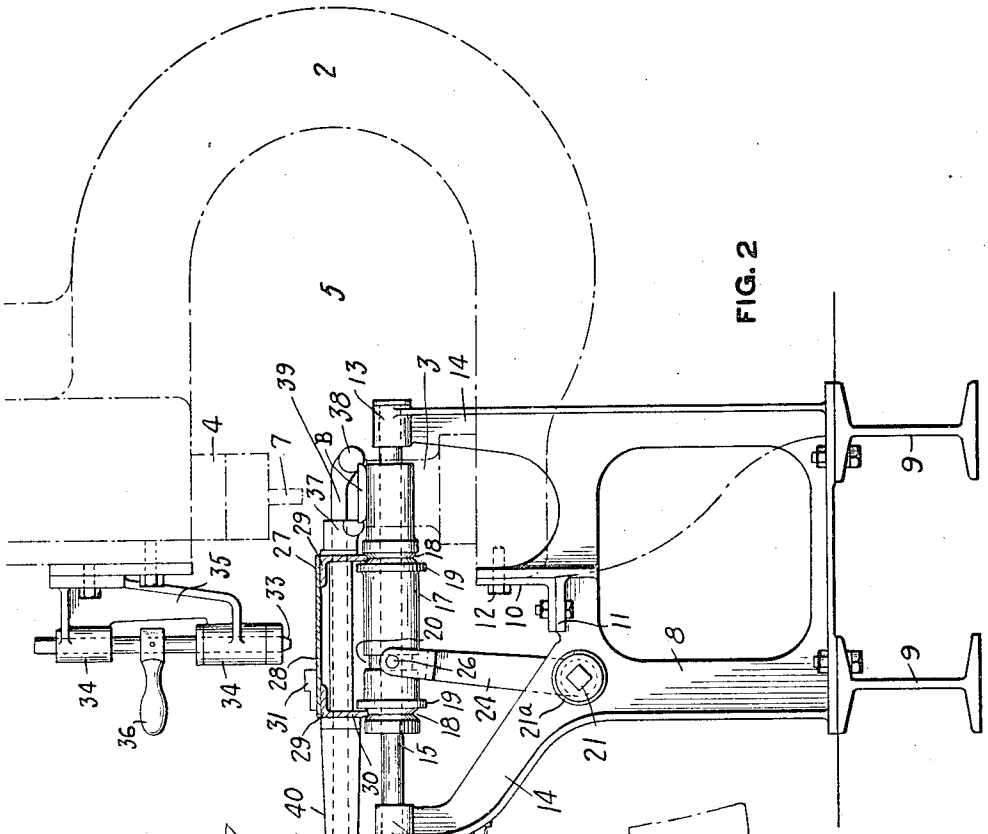
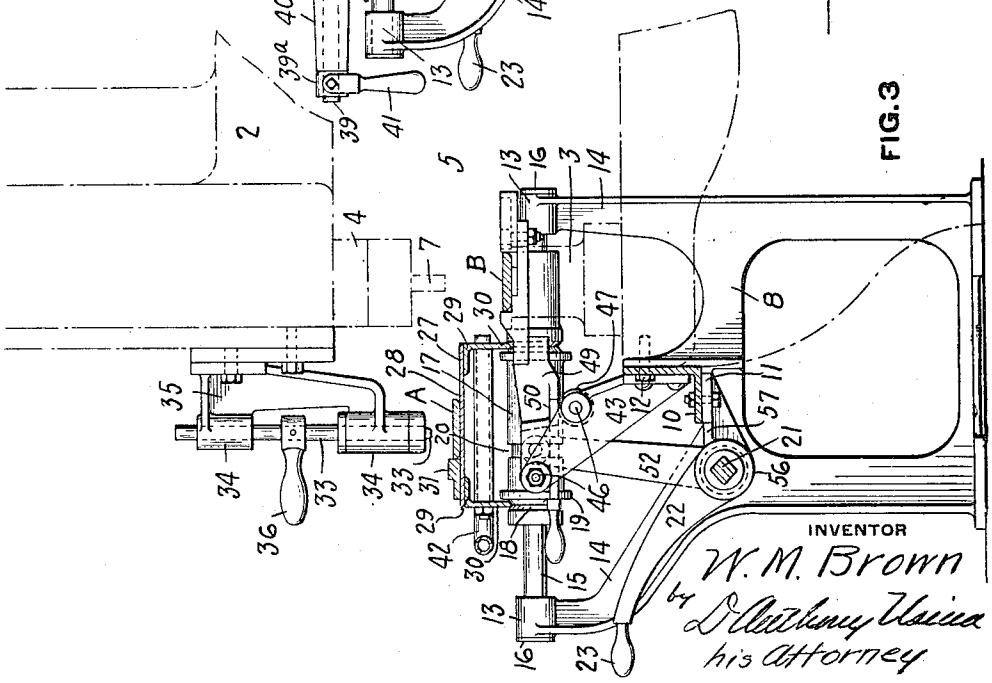


FIG. 3



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3 SHEETS—SHEET 3.

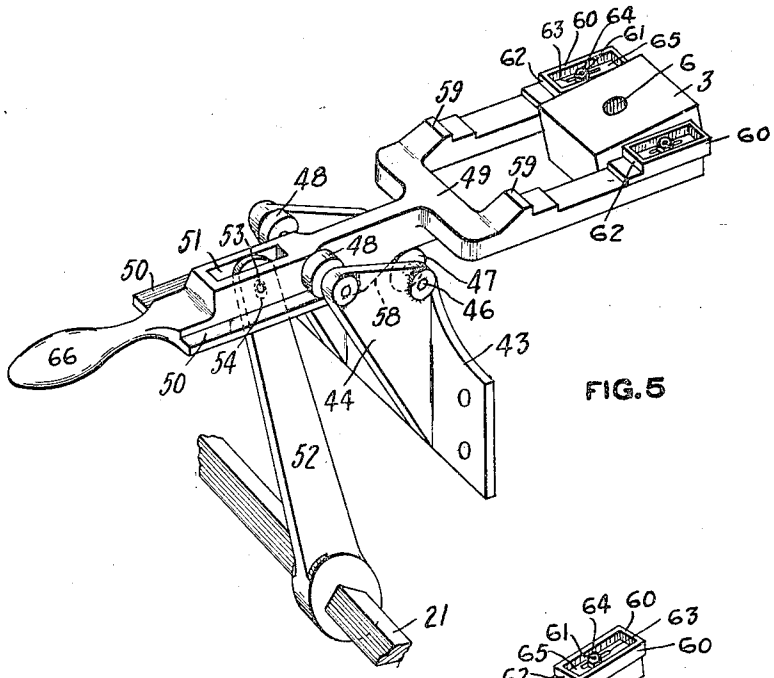


FIG. 5

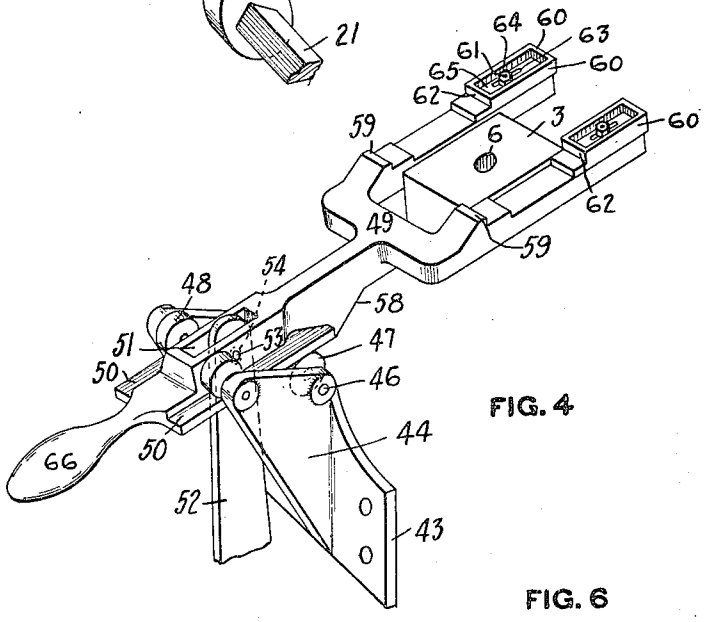
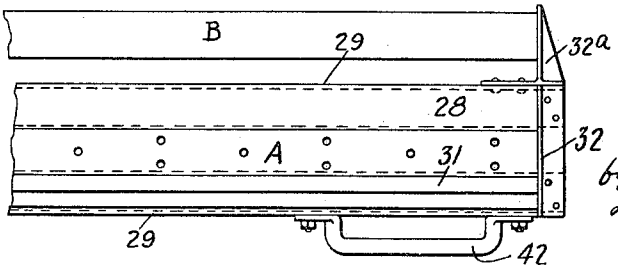


FIG. 4

FIG. 6



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UNITED STATES PATENT OFFICE.

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SPACING DEVICE FOR PERFORATING-MACHINES.

1,289,636. Specification of Letters Patent. Patented Dec. 31, 1918.

Application filed September 5, 1918. Serial No. 252,692.

To all whom it may concern:

Be it known that I, WILLIAM MILTON BROWN, a citizen of the United States, and resident of Johnstown, in the county of Cambria and State of Pennsylvania, have invented certain new and useful Improvements in Spacing Devices for Perforating-Machines, of which the following is a specification.

My invention relates to spacing devices used in conjunction with machine tools, such as punches, drill presses, and the like, for spacing or locating the individual holes of a series of holes formed in the materials operated upon by the perforating machine.

One object of my invention is to provide a spacing device of improved construction having novel means whereby the materials operated upon are moved into and are held in position while being perforated.

Another object of the invention is the provision of a spacing attachment having novel means whereby a series of successively formed duplicate parts are perforated in a rapid and accurate manner.

Another object of this invention is to provide a spacing device for perforating machines having improved means whereby long, narrow strips of the materials operated upon are handled in producing a series of successively formed duplicate parts.

A further object of this invention is the provision of a spacing device having the novel constructions, arrangements, and combination of parts shown in the drawings, and to be described in detail hereinafter, and specifically covered by the appended claims.

Referring now to the drawings, forming part of this specification, Figure 1 is a side elevation showing a spacing device constructed and arranged and applied for use with a punching machine, in accordance with my invention.

Fig. 2 is an end elevation partly in section of the apparatus shown in Fig. 1.

Fig. 3 is a sectional end elevation of the apparatus shown in Figs. 1 and 2, the section being taken on the line III—III of Fig. 1.

Fig. 4 is a plan, in perspective, showing details in the construction of the adjustable guide forming part of my improved apparatus and the application thereof to the bottom die block of a punching machine, in accordance with my invention.

Fig. 5 is a perspective view similar to Fig. 4, showing the guide in another of the positions relative to the bottom die block of the punching machine into which it is moved in the operation of my improved apparatus.

Fig. 6 is a plan of a portion of the table forming part of this apparatus, showing the relative arrangement of the end stops for the templets and the bars to be punched.

In the accompanying drawings, the numeral 2 designates the frame of a punching machine of old and well known construction, (which is shown by broken lines), having a fixed anvil or bottom die block 3 and an opposite, vertically movable ram or upper die block 4. The lower die block 3 has a vertical hole 6 therein, and the upper die block 4, which reciprocates vertically, has a punch 7 detachably secured thereon, the punch 7 being in axial alinement with the hole 6 and the die blocks being located in the throat 5 of the punching machine adjacent to the open side of the throat.

Positioned on opposite sides of the punching machine frame 2 is a series of brackets or roller stands 8, the stands being rigidly mounted on lengthwise parallel beams 9, 9, forming a base for the stands. These beams and the punching machine will be secured on a suitable foundation (not shown) constructed in any preferred manner. A horizontally extending angle 10, which is bolted to the flanges 11, on the stands, connects the upper ends of the stands, this angle also being fastened to the punching machine frame 2 by tap bolts 12. (See Figs. 1, 2, and 3).

Mounted in the openings in the bosses 13 on the upper ends of the arms 14, 14, of each stand 8 is a horizontal shaft 15, the axes of the series of shafts being in parallel planes, both vertically and horizontally. (See Fig. 1). Caps 16 bolted on one end of the bosses 13 hold the shafts 15 against lengthwise movement.

A cylindrical roller 17 is loosely mounted to rotate and to slide lengthwise on each of the shafts 15. While the rollers, as shown, rotate and slide on the shafts, it will be obvious that they may be splined on the shafts to slide thereon and rotate therewith, the shafts then rotating in the bosses 13. A

V-shaped peripheral notch or groove 18 and an integral collar or flange 19 are provided on each roller 17 near its ends, and the body of the rollers also has a peripheral groove 20 located between the flanges 19.

The pedestals or roller stands 8 have alined holes therein through which a horizontal rock shaft 21 extends. This shaft, which is rectangular in cross section as shown, has bearings 21ª which are mounted to turn in the alined holes in the pedestals or stands 8 when the shaft 21 is rocked, the shaft extending through the square openings in the bearings. A lever 22, near the middle of the length of the shaft 21, is used to rock the shaft manually in operating my improved apparatus, this lever having a handle 23 on its outer or swinging end. (See Figs. 1 and 3).

Fastened on the shaft 21 adjacent to each of the roller stands 8 is a bent lever arm 24, having bifurcated upper ends, with the tines 25, 25, of the forked upper ends of each arm embracing a roller 8. Pins 26 secured in suitable holes in the tines 25 and projecting into the peripheral grooves 20 in the rollers 17, serve to operatively connect the bent arms 24 to the rollers 17 and move the rollers lengthwise on the roller shafts 15 when the shaft 21 is rocked. Set screws (not shown) will be provided on the shaft end of the bent arms 24 to fasten the arms in position on the shaft 21.

Positioned in front of the punching machine, on the open side of the throat 5, is a horizontal frame or table 27 which is arranged to move universally in a horizontal plane. The table has a flat top plate 28 and parallel side members formed of angles 29, 29. The horizontal legs of the angles 29 are riveted or otherwise fastened on the lower side of the top plate 28, the other legs 30 of the angles extending downward vertically into engagement with the V-shaped notches 18 on the periphery of the table supporting rollers 17. (See Figs. 2 and 3.) The toes of the legs 30 are beveled at the angle of the sides of the V-shaped notches 18, as will be readily understood.

From the foregoing it will be clear that the table 27 will move lengthwise on and sidewise with the rollers 17, and that a universal movement of the table, in a horizontal plane, is secured by simultaneously moving the table on the rollers and the table and rollers on the roller shafts.

A straight edge 31 is secured along one longitudinal edge of the table 27 and a similar straight edge 32 forming an end stop is fastened at one end of the table to extend at right angles to the straight edge 31, these straight edges forming the stops against which the templet is positioned in locating the templets on the table 27. An angle 32ª is secured on one side of the table 27 with one leg thereof extending outwardly in the vertical plane of the templet engaging face of the end stop 32, but in a lower horizontal plane, which engages with the ends of the bars B and positions the bars lengthwise relative to the templet A on the table 27.

An index pin 33, which coacts with the templets used in locating the holes in the work piece being punched, is secured on the frame 2 of the punching machine so as to be movable vertically. (See Figs. 1, 2, and 3.) The pin 33 is mounted in the bosses 34 of the brackets 35, which is bolted on the front of the punching machine, and a handle 36 is used to reciprocate the pin vertically in moving it successively into and out of operative engagement with the series of holes in the templet on the table 27.

A clamping mechanism is provided on one side of the table 27, by which the materials punched are detachably fastened to the table 27, during the punching operations. This clamping mechanism comprises a clamping jaw 37 which extends outward horizontally from the vertical legs 30 of one of the angles 29 on the table 27, and a transversely movable clamping jaw 38. The jaw 38 has a shank 39 which extends through registering holes in the jaw 31 and vertical legs 30 of the angles 29, and through the sleeve bracket 40 on the opposite side of the table 27. The outer end of the shank 39 is screw threaded and has a nut 39ª thereon which is employed to move the jaw 38 toward and away from the stationary jaw 37 in clamping the work piece to be punched to the table 27. A handle 41 preferably will be pivotally secured on the nut 39ª, as shown, for turning it on the shank 39 of the clamping jaw 38.

The table 27 is provided along one edge with a series of handles 42 which are used in moving its lengthwise on the rollers 17. In some cases, the table and rollers 17 may be moved transversely of the length of the table when adjusting the table to bring the materials being punched into position for the successive punching operations by means of the handles 42.

Secured to the angle 10 connecting the series of roller stands 8, and located directly in front of the bottom die block 3 of the punching machine is a bracket 43 having upwardly and outwardly extending arms 44, 44, and rotatably secured between the arms 44, 44, by a bolt 45 and the pins 46, 46, is a roller 47 and pair of rollers 48, 48. (See Figs. 1, 2, and 3.)

Supported by the roller 47, between the arms 44 of the bracket 43 and arranged to move horizontally in unison with the sidewise movement of the table 27 and to tilt on the roller 47, is a guide 49, this guide having flanges 50, 50 on opposite sides there-

of, which engage with the rollers 47 and rollers 48, 48, when the guide is moved horizontally. (See Figs. 4 and 5.) The guide 49 is forked on one end, the forked end extending horizontally at opposite sides of and embracing the stationary bottom die block 3 of the punching machine. The rear end of the guide 49 has a vertically extending slot 51 therein, into which the upper end of the lever 52 extends, a pin 53 extending transversely through the slot 54 in the upper end of the lever 52 and registering holes in the guide to operatively fasten the lever 52 to the guide, as is best shown in Figs. 4 and 5. The lever 52 is secured by one end on the rock shaft 21 so as to be rocked thereby in unison with the bent arms 24 by which the rollers 17 are moved lengthwise upon the roller shafts 15.

Bearings 55, 55 on the shaft 21 are rotatably secured in holes in the arms 56, 56 of the bracket 57 to form a support for the shaft 21 and provide means for preventing movement of the lever 52 along the length of the shaft 21, the bracket 57 being bolted to the angle 10. (See Figs. 1 and 3.)

The lower surface of the guide 49 has an inclined face 58 which rides on the bottom roller 47 on the bracket 43, this inclined face permitting the guide to tilt and its forked end to drop when the guide is moved backwardly from the position shown in Fig. 5 into that shown in Fig. 4, and lower the upper surfaces of the guide to a position below the plane of the upper face of the stationary bottom die 3.

The upper face of the forked end of the guide 49 is provided with shoulders 59, 59, against which one edge of the work piece being punched contacts when the work piece B is clamped in place and is being moved from one position to another in the successive punching operations. The tines of the forked guide are provided with guide clips 60, 60 which are adjustably secured thereon by bolts 61 and which have shoulders 62, the guide clips 60 being made adjustable in order to move the shoulders 62 toward and away from the shoulders 59. The distance between the shoulders 59 and 62 is adjusted to suit the width of the particular size of materials being punched, and the adjustment being changed from time to time to accommodate materials of different widths. The adjustable guide clips 60, 60, are provided with slots 63 through which the fastening bolts 61 extend and the nuts 64 are located in the recesses 65 in the upper faces of the clips 60. (See Figs. 4 and 5).

A handle 66 on one end of the guide 49 affords means for tilting the guide manually in lifting the material being punched above the upper surface of the bottom die 3, as is done at intervals to release the material being punched and lift a fin projecting downwardly into the hole in the bottom die 3 above the level of the upper face of the die block 3.

The operation of my improved apparatus, which will be readily understood, will now be described.

A templet A (Fig. 3) having a series of holes therein arranged in the relative location in which they are to be punched in the metal plate or other article operated upon, will be secured on top of the table 27 with one side and one end of the templet in engagement with the straight edges 31, 32 located on the top of the table 27 by means of suitable clamps or bolts. The metal strip or work piece B to be punched is then placed alongside the table 27, with the edges thereof between the jaws 37, 38 of the clamping mechanism, and with the edges of the strip extending between the shoulders 59, 62 on the guide 49 of the apparatus. The guide clips 60 will then be adjusted on the guide until the shoulders 59, 62 are located at a distance apart just equal to the width of the material B to be operated upon. The shoulders 59, 59 on the stationary members of the guide are always in vertical alinement with the edge of the stationary clamping jaw 37 on the table 27 so that one edge of the material punched will always extend parallel to the line of lengthwise movement of the table 27 on the rollers 17. The end of the bar B will be moved into engagement with the vertical face of the end stop 32^a on the side of the table 27 to locate the bar lengthwise relative to the templet A. The clamping jaw 38 will then be tightened by turning the nut 39^a to attach the material B to the table 27.

The table 27 is then adjusted by means of the handles 42 on the table 27 and handle 23 on the lever 22 to bring one of the holes in the templet A immediately beneath the centering pin 33 on the punching machine. The pin 33 is then moved downwardly until positioned within this hole of the templet, and, when in this position, it will be known that the material to be punched is located below the punch 7 in position to have a hole punched therein. The reciprocating ram 4 of the punch is then caused to descend through its working stroke and cause the punch 7 to form a hole in the material being punched.

When the ram 4 and punch 7 are retracted, the table 27 is again shifted to bring another of the holes in the templet A into alinement with the index pin, and when the index pin has been moved downwardly into the hole in the templet and thereby indicate that the material is rightly positioned to be again punched, the ram 4 and punch 7 are again reciprocated and another hole is formed in the material A.

With some classes of material, the punch

7 will form a fin on the lower side of the material in the punching operation, and the fin will enter the hole 6 in the bottom die block 3 and interfere with movement of the material in shifting it into position for the next punching operation. In such case, the workman operating the punching machine will tilt the guide 49 by means of the handle 66 so as to lift the material slightly above the face of the bottom die block, this operation disengaging the fin. The table 27 is then again shifted as has been described, to position the material for the next punching operation.

After the required number of holes is provided in the material being punched, the table 27 will be moved transversely until in the extreme forward position, by moving the hand lever 22 downwardly. When in this position the guide 49 which rides on the roller 47 on the bracket 43 tilts downwardly to bring the shoulders 59, 59, and 62, 62, on the upper face of the guide 49 below the plane of the upper surface of the lower die block 3 or into the position shown in Fig. 5. When in this position the guide is clear of the punched material so that when the clamping jaws 37, 38 are released by backing off the nut 40 on the shank of the movable jaw 38 of the clamping mechanism, the completed material can be freely moved lengthwise or sidewise in removing it from the punching machine.

The above described operations are then repeated with the successive pieces of material punched, the position of the adjustable clips on the guides being shifted from time to time when occasioned by a change in the width of the materials to be operated upon, and a new templet being provided when the relative arrangement of the holes in the materials to be punched is changed.

The advantages of my invention will be apparent to those skilled in the art. The apparatus is simple, is applicable to existing punching machines having either a shallow or deep throat, and is easily and cheaply maintained in operative position. By means of my improved apparatus any number of duplicate, successively formed parts can be produced.

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

I claim:—

1. A spacing device for perforating machines comprising a series of rotary and lengthwise movable rollers, means forming supports on which the rollers are rotatably mounted, said rollers being movable lengthwise relative to said supports, a templet supporting table, said table being movable lengthwise on and sidewise with said rollers, a work holding clamp on the table, a work engaging guide, said clamp and guide being alongside said table, and means for moving the table sidewise, said means being arranged to actuate the guide and cause work clamped to the table to move in unison with the table.

2. A spacing device for perforating machines comprising a series of rotary and lengthwise movable rollers, means forming supports on which the rollers are rotatably mounted, said rollers being movable lengthwise relative to said supports, a templet supporting table, said table being movable lengthwise on and sidewise with said rollers, a work holding clamp on the table, a work engaging guide, said clamp and guide being alongside said table, and means connecting the table and guide adapted to actuate said guide when the frame is moved sidewise, and thereby maintain work clamped to the table in parallelism with said table.

3. A spacing device for perforating machines comprising a templet supporting table, a work holding clamp at one end of said table, a work moving guide, said clamp and guide being alongside said table, a series of rotary, lengthwise movable rollers for supporting the table, means forming supports on which the rollers are rotatably mounted, said rollers being movable lengthwise relative to said supports, said table moving lengthwise on and sidewise with the rollers, and means for moving said rollers lengthwise, said means being arranged to move the guide in unison with the rollers, in the lengthwise movement of said rollers, and thereby maintain work clamped to the frame in parallel relation to said table.

4. A spacing device for perforating machines comprising a series of rotary and lengthwise movable rollers, means forming supports on which the rollers are rotatably mounted, said rollers being movable lengthwise relative to said supports, a templet supporting table, said table being movable lengthwise on and sidewise with said rollers, a work holding clamp, a work engaging guide, said clamp and guide being alongside said table, means for moving the table sidewise, said means being arranged to actuate the guide and cause work clamped to the table to move sidewise in unison with the table, and means on the table engaging with the templet and the work for fixing the position of the work endwise relative to the templets on said table.

5. In a spacing device for perforating machines, the combination with a series of rotary, lengthwise movable rollers and a templet supporting table mounted on the rollers, said table moving with and relative to said rollers, of a work holding clamp on the table, a guide connected with said table

to move with sidewise movement of the table, said clamp and guide being alongside the table and having alined stops thereon to position the work sidewise relative to the table, and means for moving said table and guide.

6. In a spacing device for perforating machines, the combination with a series of rotary, lengthwise movable rollers, said rollers having peripheral grooves therein, and a table having side members engaging said grooves, of a work holding clamp at one end of said table, an adjustable work engaging guide, said clamp and guide being alongside the table and having work engaging shoulders arranged to aline the work lengthwise relative to said table, and means connecting said rollers and said guide for moving the table and work sidewise in unison.

7. A spacing device for perforating machines comprising a series of rotary and lengthwise movable rollers, stands forming stationary supports for said rollers, said rollers being lengthwise movable relative to said stands, a templet supporting table, said table being movable lengthwise on and sidewise with said rollers and means connected to said rollers arranged to move the rollers lengthwise in unison and thereby move the table sidewise.

In testimony whereof I have hereunto set my hand.

WILLIAM MILTON BROWN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."