

May 14, 1963

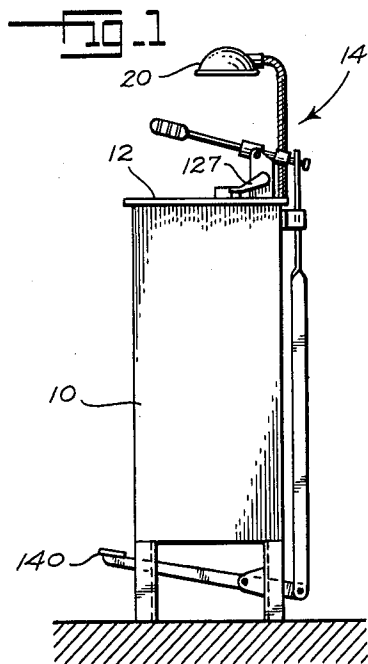
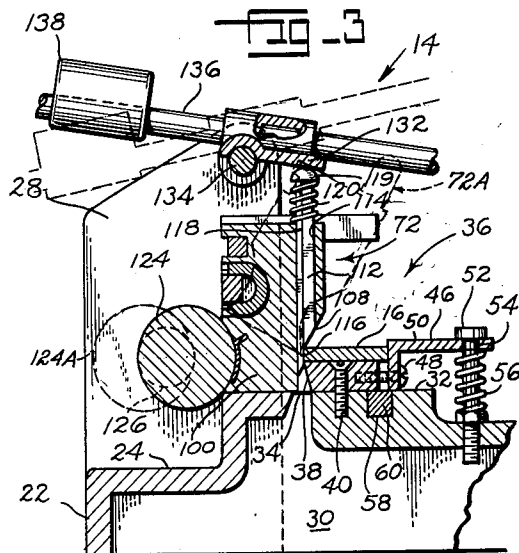
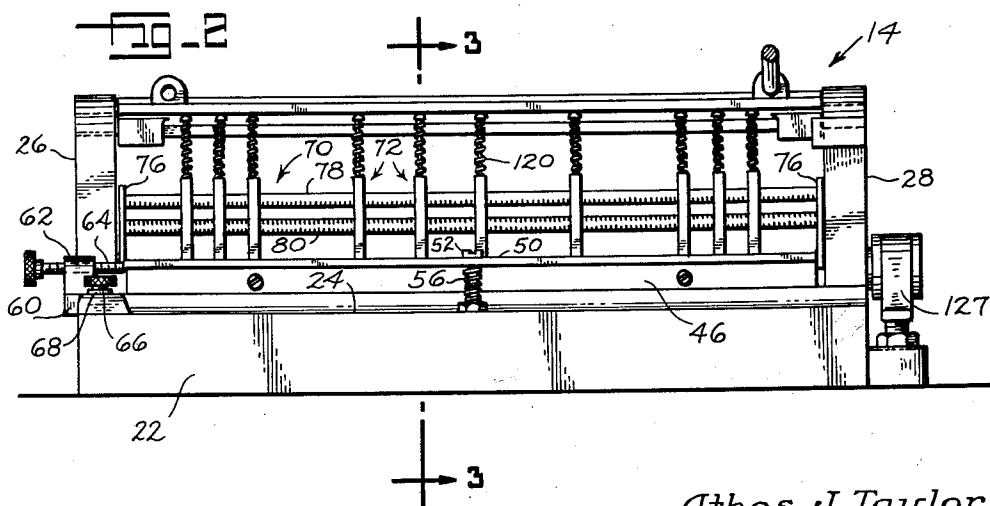
A. J. TAYLOR

3,089,374

BROACHING MACHINE HAVING MEANS FOR LATERALLY
POSITIONING A PLURALITY OF PUNCH MECHANISMS

Filed Sept. 8, 1959

2 Sheets-Sheet 1



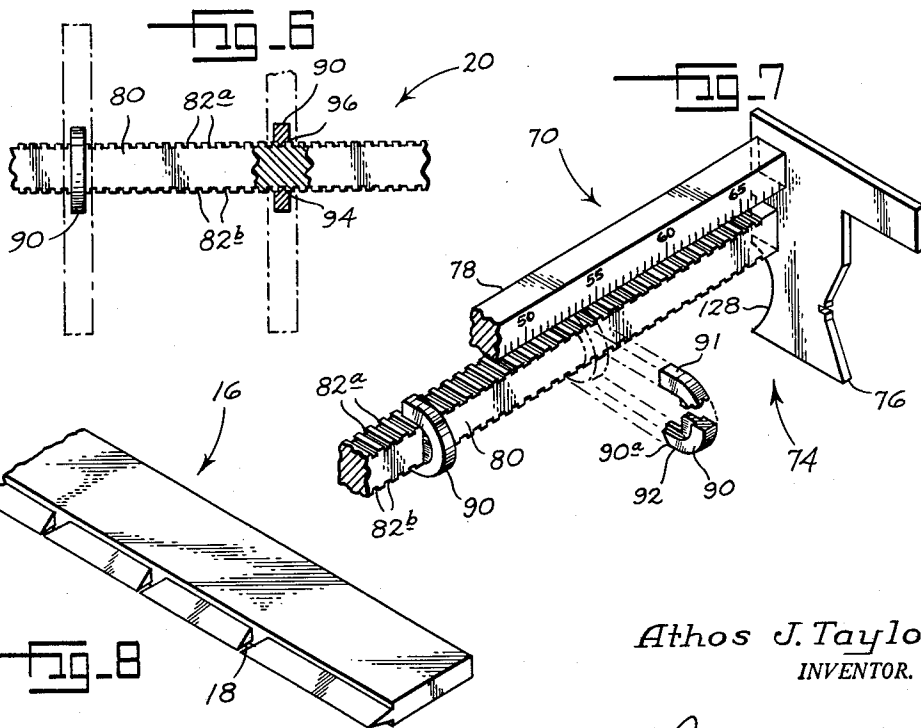
Athos J. Taylor
INVENTOR.

BY *Ramsey and Kolisch*
Attys.

May 14, 1963 **A. J. TAYLOR** **3,089,374**
BROACHING MACHINE HAVING MEANS FOR Laterally
POSITIONING A PLURALITY OF PUNCH MECHANISMS
Filed Sept. 8, 1959 **2 Sheets-Sheet 2**

BROACHING MACHINE HAVING MEANS FOR LATERALLY
POSITIONING A PLURALITY OF PUNCH MECHANISMS

2 Sheets-Sheet 2



BY *Ramsey and Kolisch*
Attys.

1

BROACHING MACHINE HAVING MEANS FOR LATERALLY POSITIONING A PLURALITY OF PUNCH MECHANISMS

Athos J. Taylor, 325 N. Bartlett, Medford, Oreg.

Filed Sept. 8, 1959, Ser. No. 838,661

4 Claims. (Cl. 83-560)

This invention relates to improvements in broaching machines, and more particularly to an improvement in the mounting for punches that may be used in producing notches or cut-outs in type rules or slugs, in order that these aforementioned rules or slugs may receive inserted column rules set at angles relative thereto.

In punching type rules so that they may receive column rules, a punch assembly may be provided that includes plural punch mechanism spaced therealong, with the spacing of the punch mechanisms determining the spacing of the cut-outs that are to be formed in a type rule, slug, or bar. When the several punch mechanisms are actuated, cut-outs or notches are made by the broaching dies included in the punch mechanisms. In such type of apparatus, obviously exact spacing of the various punch mechanism is critical. Using a conventional form of mechanism in setting punch mechanisms to register copy, the punch assembly is placed on top of the copy parallel with the horizontal lines thereon. Feed screws are then manually actuated until it is determined visually that the location of the various punch mechanisms corresponds to the placement of the vertical lines on the copy. The adjustment requires sighting with the eye, and must be meticulously done if the copy is accurately to be reproduced. A general object of the invention is to provide a mounting for punch mechanisms that eliminates such need for visually estimating registry, and eliminates positioning punch mechanisms with the lines of the copy using screw adjustment.

The point system, based upon the pica body, is commonly used by printers as a standard of measurement for width of lines, line spacing, etc. Thus in the production of a ruled page, column rules ordinarily are spaced from each other distances measured in picas. This invention relies on this uniformity by providing, as part of the mounting for the various punch mechanisms, an elongated mounting bar having grooves or notches that constitute plural seating portions spaced along the bar at spacings related to the pica system of measurement. Thus the notches define graduations. A row of such notches is provided along either of opposite sides of the bar. Employed with the bar are plural clips that have flanges complementing the grooves. These clips may be slipped into fixed position on the bar by sliding them laterally over a complementing set of grooves. The bodies of these removable clips provide part of the mounting for the punch mechanisms. The particular pair of complementing grooves that are employed to seat a clip determine the particular position of the punch mechanism mounted on the clip relative to the bar. Parallel to the bar is a gauge bar or rod, provided with marked graduations that correspond to the graduations defined by a set of grooves on the mounting bar. By reading the gauge bar, an operator can tell exactly the spacing between adjacent clips. It is necessary only to know the pica spacing of the vertical lines of a copy in order to be able to place the clips in proper position on the mounting bar. The construction greatly facilitates setting up the punch assembly to reproduce a given copy, removes a source of inaccuracy, and enables an exact setup for punch mechanisms to be duplicated at any time after the original setup is made. The grooves and clips are made to close tolerances, and this enables column rules to be threaded with little diffi-

2

culty through aligned broached type rules produced by this invention.

In the preferred embodiment of the invention, the mounting bar is provided on either of opposite sides with complementing grooves, as this enables a horseshoe or open-ended clip to be used with the legs of the clip straddling the bar and with each leg firmly held in place. The construction prevents skewing and twisting of the clip on the mounting bar.

It is also a feature of the invention that the punch assembly be detachably mounted on the frame of the broaching machine to enable easy removal of the assembly prior to setting up a series of clips on the bar with predetermined spacing. With the punch assembly removed and laid on its side on a table, the grooves of the mounting bar extend vertically up from the plane of the table, thus to accommodate easy insertion of the clips thereon. The graduations of the gauge rod or bar appear on the side of the bar that is disposed upwardly with the punch assembly in this position. This makes it a relatively easy matter to read the spacing of the clips while placing them on the mounting bar.

It is an object of the invention, therefore, to provide in a broaching machine a mounting for the punch mechanisms of the machine that incorporates removable clips that can be slipped onto a mounting bar into one of a series of seating portions provided the bar, such seating portions being spaced from each other at distances conforming to a predetermined system of measurement.

It is another object of the invention to provide in conjunction with such a mounting for the punch mechanisms a gauge rod disposed parallel to the mounting bar provided with graduations corresponding to the graduations defined by the seating portions of the mounting bar.

It is still another object of the invention to provide such a construction wherein the seating portions on the mounting bar take the form of two series of grooves or notches disposed along opposite sides of the mounting bar with the grooves on one side complementing the grooves on the other, and wherein the clips are open-ended clips and have two legs that are insertable over a set of complementing grooves, such a clip when seated on the mounting bar being firmly held in predetermined position on the bar.

Other objects, features, and advantages are obtained by the invention, which is described hereinbelow in conjunction with accompanying drawings, wherein:

FIG. 1 is a side view of a broaching machine as contemplated by this invention, showing the machine mounted on a conventional upright supporting cabinet;

FIG. 2 is a view, slightly enlarged, of the front of the broaching machine illustrated in FIG. 1;

FIG. 3 is an enlarged section view along the line 3-3 in FIG. 2, illustrating details of construction of the broaching machine, and showing in dashed outline the position of parts in the machine during the removal of a punch mechanism therefrom;

FIG. 4 is an enlarged side view of the broaching machine illustrated in FIG. 1;

FIG. 5 is a perspective view of a punch mechanism such as may be used in the machine;

FIG. 6 illustrates portions of the mounting bar employed in the invention and the manner in which the removable clips seat thereon;

FIG. 7 is a perspective view of portions of the mounting bar and illustrating the graduated gauge bar that is disposed parallel to the mounting bar; and

FIG. 8 illustrates in perspective a typical type rule or slug notched by the broaching machine of the invention.

Referring now to the drawings, and more particularly to FIG. 1, 10 indicates an upright cabinet that supports on a horizontal top surface 12 thereof a broaching ma-

chine, indicated generally at 14. The broaching machine is of the type used to cut notches or cut-outs in the tapered reduced edge of a metallic type rule, such as that indicated at 16 in FIG. 8. Such cut-outs, indicated at 18 in FIG. 8, are to receive column rules that have a cross section generally corresponding to the outline of cut-outs 18. Referring again to FIG. 1, the broaching apparatus may be provided above cabinet 19 with a lamp 20 to illumine surface 12 and the broaching machine 14 while working therewith.

Considering now more specifically the construction of broaching machine 14, and referring now more particularly to FIGS. 2, 3, and 4, the machine includes a main frame 22 having a base 24 and at opposite ends of the frame standing portions 26, 28. Base 24 has a hollow interior 30 and a raised and elongated platform portion 32 along the middle thereof. This platform portion 32 is employed to mount the punch assembly and the rule that is to be broached, as hereinafter described. Extending longitudinally of platform 32 is a slot 34. This slot opens to the interior 30 of base 24 and accommodates the ends of the broaching dies of the punch assembly to be described.

Along the forward end of platform 32, or at the right of the platform viewing it in FIG. 3, there is provided adjustable support means 36 on the frame for supporting a rule while it is being punched. Specifically, support means 36 comprises an elongated support bar 38 secured to the platform as by screws 40. In cutting a rule, the bottom face of the rule is rested on the top surface of bar 38. A retaining member 46 abuts the edge of a rule opposite the edge being notched. Member 46 is secured to bar 38 by screws 48 that pass through loosely fitting, accommodating bores formed in the retaining member. Member 46 has a top flange 50 projecting forwardly of platform 36. Approximately centrally of flange 50 is an elongated screw 52 fastened to base 24. The shank of screw 52 passes through a loosely fitting bore 54 provided flange 50. Interposed between flange 50 and base 24 is a coil spring 56, and this urges retainer 46 in a counter-clockwise direction in FIG. 3 with the inner side of the retainer engaging the outer edge of a rule. Pivotal movement of the retaining member 46 in a clockwise direction in FIG. 3 produces loosening of a rule when it is desired to remove a rule from the broaching machine.

Slidably mounted in a groove 58 extending along the length of platform 32 is a calibrated positioning bar 60. It has formed integral with one end thereof an upstanding lug 62. Extending through an accommodating internally threaded bore in lug 62 is an externally threaded adjusting shaft 64. The inner end of this adjusting shaft is used to position the end edge of a rule relative to bar 60. Bar 60 may be adjusted longitudinally in groove 58, and is fixed in adjusted positions by tightening a screw clamp 66 that has portions of a flange 68 superimposed over edge portions of the bar.

Considering now the construction of the specific mechanism used to punch the cut-outs, fitted snugly between standing portions 26 and 28 of frame 22 is an elongated punch assembly indicated generally at 70. Punch assembly 70 includes one or more punch mechanisms, indicated at 72, that are operable when actuated to produce notches in the diminished edge of a rule. In the embodiment illustrated, punch assembly 70 comprises an elongated subframe 74 having matched standards 76 at either end thereof and extending between the standards a pair of parallel bars 78, 80. The lower of the bars 80 constitutes a mounting bar in the device. Thus the bar has formed along top and bottom sides as viewed in FIGS. 6 and 7 a top series of grooves or notches indicated at 82a and a bottom series of grooves 82b. Grooves 82a complement grooves 82b, which is to say that for every groove in the top series there is a mating groove in the bottom series that is directly therebelow. The grooves are spaced at regular modules along the length of bar 80, at distances conforming to the pica system of measurement, and thus

the grooves define graduations along the length of the bar. Thus the center of each is spaced one-half pica (or six points using the point system) away from the center of adjacent grooves. Bar 78, the upper of the bars, is provided with graduations along the length of the bar corresponding to the graduations defined by the grooves 82a and 82b.

For mounting a punch mechanism 72 on the subframe 74, horseshoe-shaped, insertable clips 90 are provided. These have an open end 90a and upper and lower legs 91, 92 adapted to straddle the lower of the bars 80. Legs 91, 92 of the clips are provided with internal shoulder or ridge portions 94, 96 (see FIG. 6) that seat within a mating pair of grooves 82a, 82b. The clips, by reason of their open ends, are removable from bar 80 by moving them laterally off the bar.

A punch mechanism 72 is illustrated in detail in FIGS. 3 and 5. Each comprises a relatively flat body or housing portion 100. Along one side of housing portion 100 there is provided a rectangular notch 102 adapted to fit over the upper of the bars 78 when the punch mechanism is slid into position on subframe 74. Below notch 102 is a curved recess 104. Recess 104 has a circular groove 106 provided therein which is adapted to fit over the curved body of clip 90. In this manner housing 100 may be mounted on a clip with the clip securely holding the body or housing of the punch mechanism from shifting along the length of the bar 80.

Indented into the forward side of housing 100 is a V-shaped notch 108. Notch 108 receives the rear edge of support bar 38 when a punch mechanism is positioned in the broaching machine as shown in FIG. 3. Notch 108 also has a small channel 109 provided at the base thereof which receives the tapered reduced edge of type rule 16.

Mounted for reciprocation up and down in each body or housing portion 100 is a cutting element or broaching die 112. This is received within an elongated cavity 114 provided in body portion 100. The broaching die has a reduced lower portion 116 of triangular cross section that is forced downwardly through the reduced edge of a type rule when making a cut, with the lower portion advancing into slot 34. Die 112 has an enlarged upper end 118 protruding out of the housing for the punch mechanism, and a top 119. Encircling end 118 intermediate top 119 and the housing is a coil spring 120. The function of the spring is to urge the die upwardly in the housing so that the lower portion 116 of the die is disposed above channel 109.

For clamping various punch mechanisms on subframe 74 in fixed position on the main frame, there is provided to the rear of platform 32 an elongated roller 124 mounted eccentrically in standing portions 26, 28 by means of stub shafts 126. The roller may be rotated from the position shown in dashed outline in FIG. 3 at 124A (where the roller is spaced to the rear of the punch mechanisms) to a position wherein the roller moves up against the punch mechanisms and forces them against support bar 38, as shown by the solid outlines for the roller and punch mechanism 72 in FIG. 3. To enable removal of the punch mechanisms, roller 124 is rotated from the position shown in solid outline in FIG. 3 to the position indicated in dashed outline in FIG. 3 at 124A, which frees the punch mechanisms so that they may be removed by lifting and turning them generally as indicated by the dashed outline for a punch mechanism indicated in FIG. 3 at 72A. A lever 127 is employed to swing roller 124 between its various positions. Each punch mechanism housing and the standards 76 at the ends of the subframe are provided with curved recessed portions 128 that conform substantially to the curvature of roller 124. Mounted within each recessed portion 128 of each punch mechanism housing is a leaf spring 129 having an inner end 130 anchored in the housing. These

5

leaf springs promote clamping engagement of the surface of roller 124 with the punch mechanism housings when the eccentrically mounted roller is swung into the position illustrated in FIGS. 3 and 4.

For actuating the broaching dies downwardly in their respective housings there is provided at the top of standing portions 26, 28 an elongated bar 132. This is secured to a shaft 134 journaled in standing portions 26, 28. Secured to shaft 134 at one side of the apparatus is an actuating lever 136. The lever is rotated in a clockwise direction, viewing the apparatus in FIG. 3, to bring bar 132 downwardly against the tops 119 of the broaching dies located directly therebelow. Continued movement of bar 132 forces the lower ends of the dies through the edge of a rule. The bar may then be released with a counterweight 138 automatically swinging the bar to a raised position. With raising of the bar, springs 120 return broaching dies 112 to raised positions in the punch mechanism housings. In embodiment illustrated, pedal-actuated mechanism 140 (see FIG. 1) is also included to enable actuation of bar 132 using one's foot.

In using the apparatus described to register copy, the spacing between successive vertical lines in the copy is first determined using the pica system of measurement. Knowing the pica spacing of the vertical lines, it is an easy matter to place clips 90 in position on the lower of the bars 80 (after first removing subframe 74 from the broaching apparatus), with the spacing between successive clips exactly corresponding to the spacing between successive vertical lines on the copy. Punch mechanisms may then be mounted over the various clips, and these punch mechanisms are then accurately positioned on the subframe 74. In determining the proper position for the clips along bar 80, the graduations on bar 78 that complement the graduations defined by grooves 82a, 82b on the bar 80 are employed. Upper bar 78 also has the function of stabilizing the mounting of the punch mechanisms on the subframe. Once the punch mechanisms are properly assembled on the subframe, the subframe and punch mechanisms are inserted in front of roller 124 with V-shaped notches 108 receiving support bar 38 as illustrated in FIG. 3. A type rule or slug may then be rested on support bar 38, and its ends properly positioned relative to subframe by adjustments in the position of adjusting shaft 64 and bar 60. After this is done the bar 132 may be swung downwardly on the broaching dies to produce cut-outs or notches in the type rule as desired.

It will be noted that there is no need to place copy beneath the punch mechanisms and to make estimates of proper alignment of the punch mechanisms. The construction accommodates accurate placement of column rules exactly according to the pica spacing of the vertical lines in the copy.

I claim:

1. In a machine for broaching an elongated workpiece comprising a frame, a workpiece support mounted on the frame for supporting the workpiece, and at least one punch mechanism mounted in the machine adjacent said workpiece support, said punch mechanism including a housing and a shiftable cutter which is shifted relative to the housing upon actuation of the punch mechanism to produce a punch in the workpiece;

means supporting the housing of the punch mechanism for properly positioning the punch mechanism in the machine, said means comprising

an elongated mounting bar detachably mounted in a stationary position in the machine and disposed substantially parallel to a workpiece mounted in said workpiece support,

said bar having plural and separate seating portions formed along the length thereof and spaced at regular modules therealong,

6

said spaced seating portions defining graduations along the length of the bar,

a clip detachably mounted in one of said seating portions and supported in a stationary position on said mounting bar,

said clip being removable from the mounting bar by shifting it laterally of the bar and including a body portion upon which the housing of said punch mechanism is detachably mounted, and

elongated gauge means substantially paralleling said mounting bar and fixed to the bar and detachable from the machine together with said bar,

said gauge means having graduations along the length thereof aligned with and complementing the graduations defined along said mounting bar,

said gauge means being laterally spaced from said mounting bar a sufficient distance to enable the graduations on the portion thereof directly laterally adjacent said clip to be visible with said punch mechanism removed from said clip.

2. In a machine for broaching an elongated workpiece comprising a frame, a workpiece support mounted on the frame for supporting the workpiece, and at least one punch mechanism mounted in the machine adjacent said workpiece support, said punch mechanism including a housing and a shiftable cutter which is shifted relative to the housing upon actuation of the punch mechanism to produce a punch in the workpiece;

means supporting the housing of the punch mechanism for properly positioning the punch mechanism in the machine, said means comprising

an elongated mounting bar detachably mounted in a stationary position in the machine and disposed substantially parallel to a workpiece mounted in said workpiece support,

said bar having plural laterally spaced grooves formed therein which extend substantially perpendicular to the longitudinal axis of the bar and which are spaced at regular modules along the length of the bar,

said grooves defining graduations along the depth of the bar,

a clip which an internal shoulder supported in a stationary position on said mounting bar with said shoulder in one of said grooves,

said clip having an open end accommodating its removal from the bar by shifting it laterally of the bar and a body portion upon which the punch mechanism is detachably mounted, and

elongated gauge means substantially paralleling said mounting bar and fixed to the bar and detachable from the machine together with said bar,

said gauge means having graduations along the length thereof aligned with and complementing the graduations defined along said mounting bar,

said gauge means being laterally spaced from said mounting bar a sufficient distance to enable the graduations on the portion thereof directly laterally adjacent said clip to be visible with said punch mechanism removed from said clip.

3. In a machine for broaching an elongated workpiece comprising a frame, a workpiece support mounted on the frame for supporting the workpiece, and plural punch mechanisms mounted in the machine adjacent said workpiece support, each of said punch mechanisms including a housing and a shiftable cutter which is shifted relative to the housing upon actuation of the punch mechanism to produce a punch in the workpiece;

means supporting the housings of the punch mechanisms for properly positioning the punch mechanisms in the machine, said means comprising

an elongated subframe mounted in a stationary position on said main frame and detachable from the main frame,

said subframe including standards at the ends thereof and elongated mounting and gauge bars fastened at

7

opposite ends to said standards with said bars substantially parallel to each other and to a workpiece mounted in said workpiece support,
 said mounting bar having plural and separate seating portions formed along the length thereof and spaced at regular modules therealong,
 said spaced seating portions defining graduations along the length of the bar,
 said gauge bar having graduations along the length thereof aligned with and complementing the graduations defined along said mounting bar, and
 an open-ended clip for each punch mechanism detachably mounted in one of said seating portions and supported in a stationary position on said mounting bar, each of said clips being removable from the mounting bar, by relative lateral shifting of the clip with the bar moving through the open end of the clip,
 each of said clips including a body portion upon which the housing of a punch mechanism is detachably mounted.

4. In a machine for broaching an elongated workpiece comprising a frame, a workpiece support mounted on the frame for supporting the workpiece, and plural punch mechanisms positioned in the machine adjacent said workpiece support, each of said punch mechanisms including a housing and a shiftable cutter which is shifted relative to the housing upon actuation of the punch mechanism to produce a punch in the workpiece;
 means supporting the housings of the punch mechanisms for properly positioning the punch mechanisms in the machine, said means comprising
 an elongated mounting bar detachably mounted in a stationary position in the machine and disposed sub-

8

stantially parallel to a workpiece mounted in said workpiece support,
 said bar having plural and separate elongated seating portions that parallel each other and that extend transversely of the bar,
 said seating portions being laterally spaced from each other and spaced at regular modules along the length of the bar, and
 a clip for each punch mechanism detachably mounted in one of said seating portions and supported in a stationary position on said mounting bar,
 each of said clips having a hollow center that receives the bar, and
 an opening at one end of the clip that connects with the hollow center thereof and that accommodates removal of the clip from the bar by shifting the clip laterally relative to the bar with the bar moving through said opening,
 each of said clips further including a body portion upon which the housing of a punch mechanism is detachably mounted.

References Cited in the file of this patent

UNITED STATES PATENTS

705,945	Monck	July 29, 1902
1,124,976	Tourtel et al.	Jan. 12, 1915
1,203,262	Powers	Oct. 31, 1916
1,682,515	Hollister et al.	Aug. 28, 1928
1,732,032	Simmons	Oct. 15, 1929
1,755,468	Cheshire	Apr. 22, 1930
2,338,940	Honig	Jan. 11, 1944
2,482,218	Segal	Sept. 20, 1949
2,620,874	Chase	Dec. 9, 1952