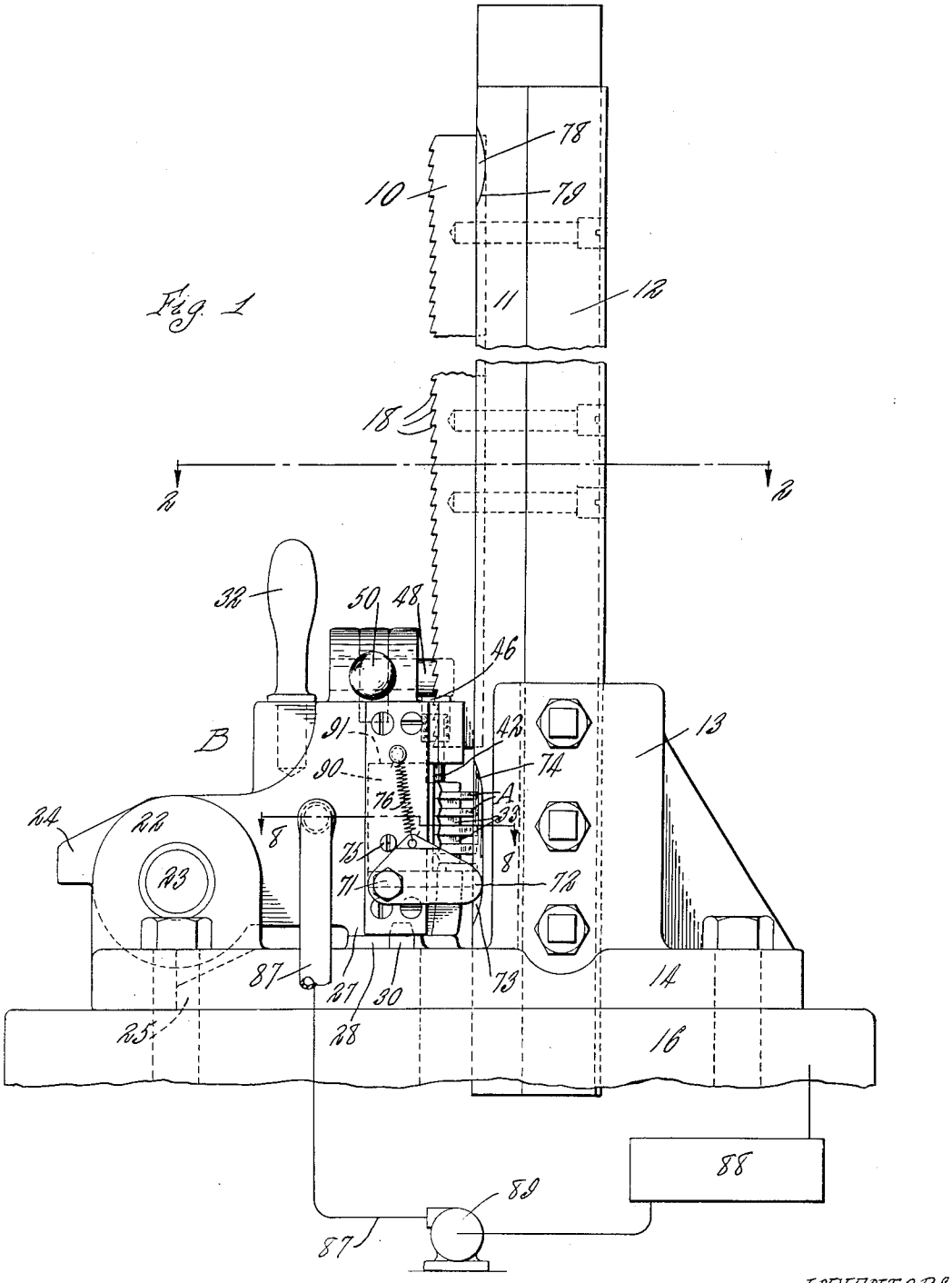
Dec. 5, 1933. C. VALLONE ET AL 1,938,233

BROACHING MACHINE

Filed May 11, 1931 4 Sheets-Sheet 1

Fig. 1



INVENTORS
Charles Vallone,
John H. Illig
by Parker & Prochnow
ATTORNEYS.

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BROACHING MACHINE

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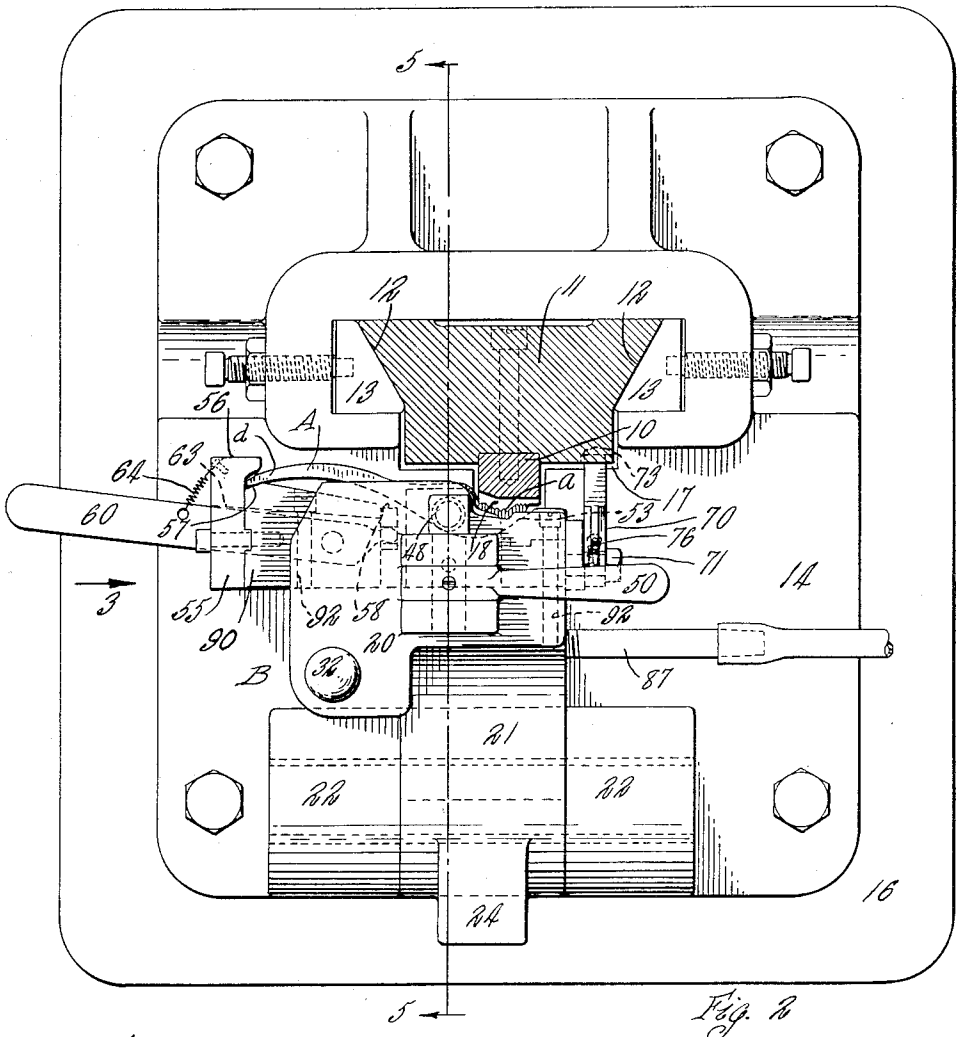


Fig. 2

Fig. 3

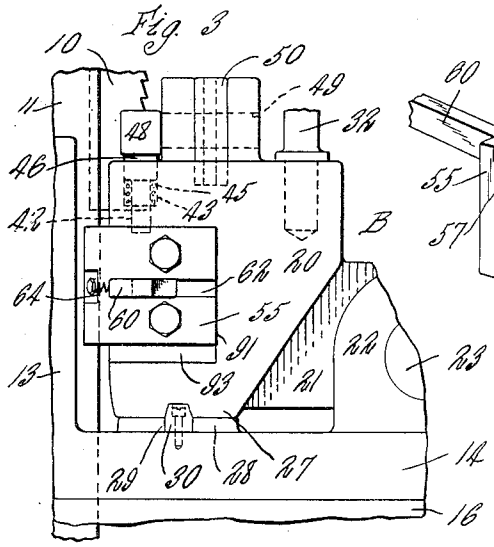
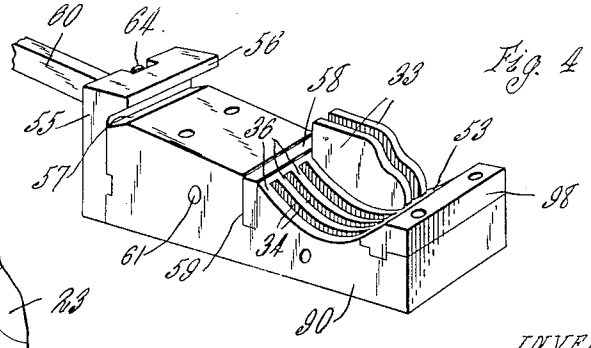


Fig. 4



INVENTORS
Charles Vallone &
John A. Illig
by Parker & Prentiss
ATTORNEYS.

Dec. 5, 1933. C. VALLONE ET AL 1,938,233

BROACHING MACHINE

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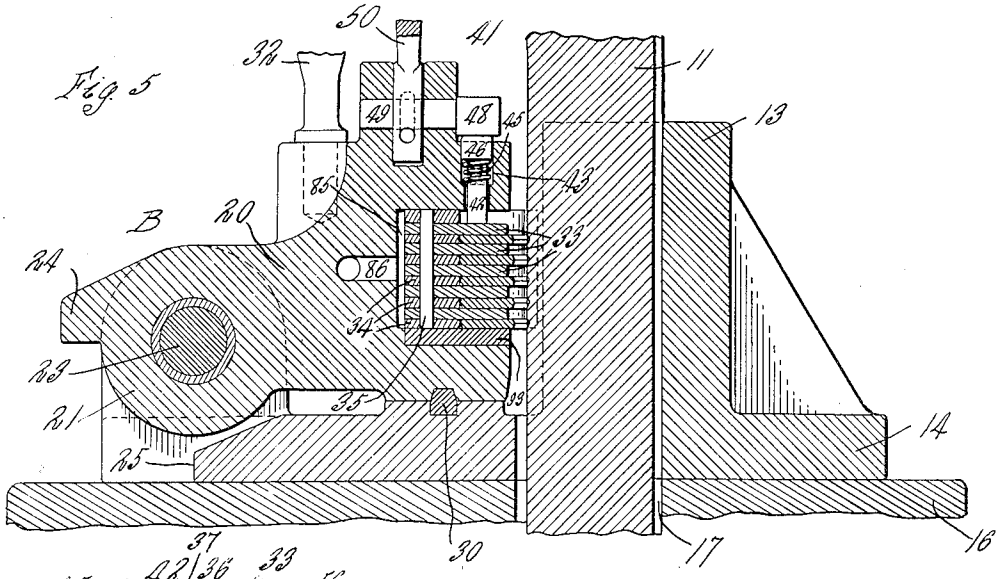
Fig. 5



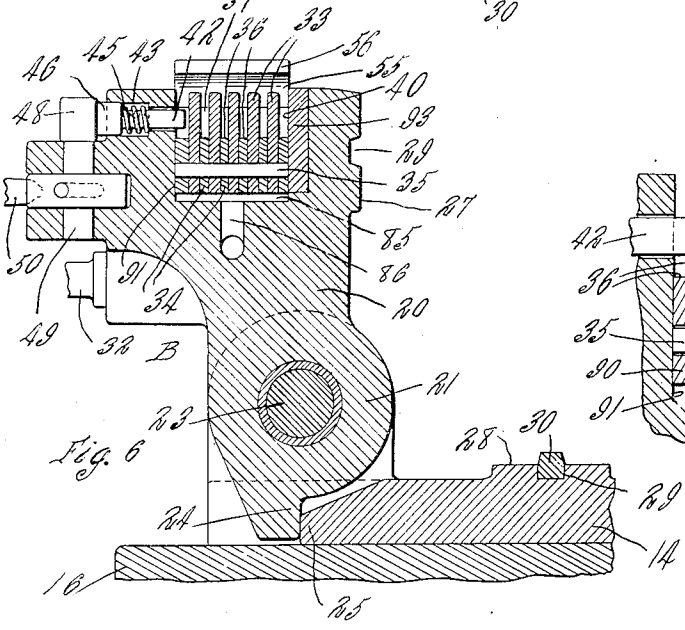


Fig. 6

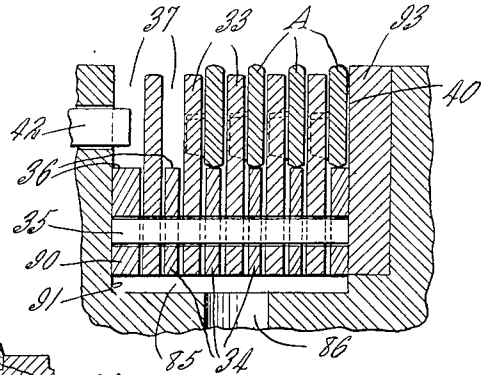


Fig. 7

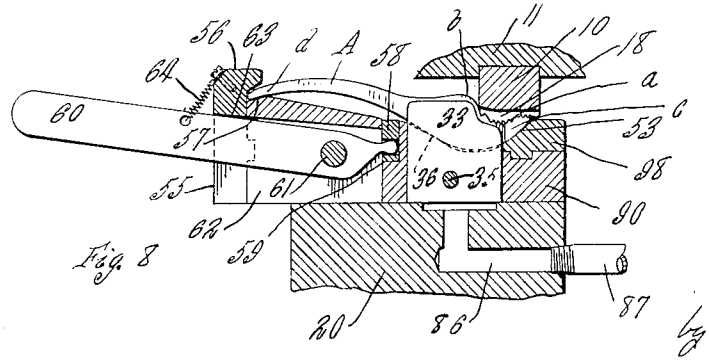


Fig. 8

INVENTORS
Charles Vallone &
John A. Illig
by Parker & Prochnow
ATTORNEYS.

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BROACHING MACHINE

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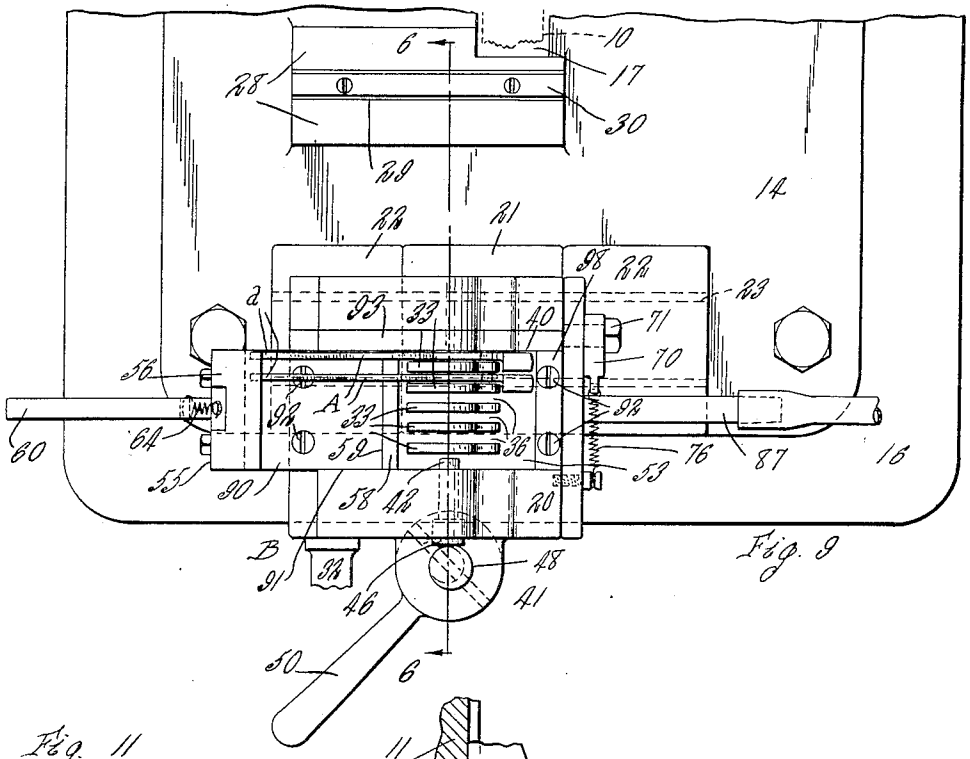

Fig. 9

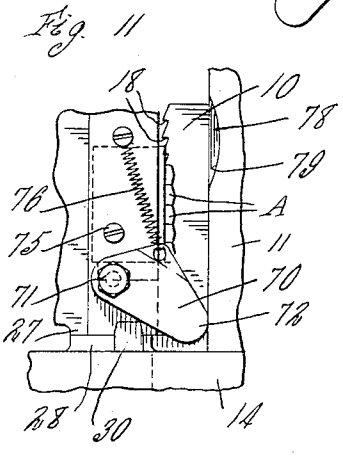

Fig. 11

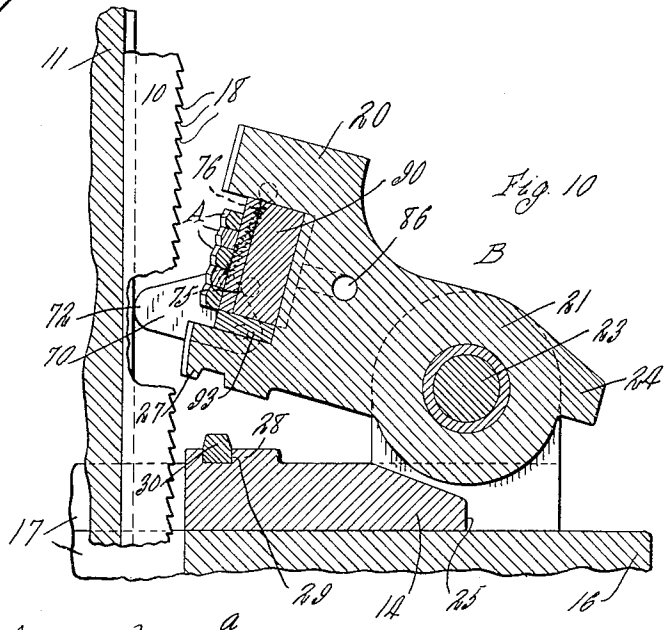

Fig. 10

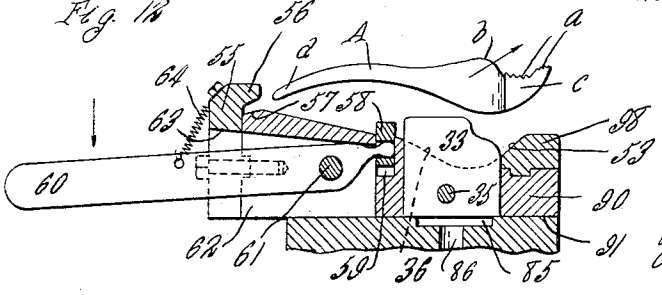

Fig. 12

INVENTORS.
Charles Vallone &
John H. Illig
by Parker & Prochnow
ATTORNEYS.

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UNITED STATES PATENT OFFICE

1,938,233

BROACHING MACHINE

Charles Vallone and John H. Illig, Buffalo, N. Y., assignors to Barcalo Manufacturing Company, Buffalo, N. Y.

Application May 11, 1931. Serial No. 536,374

14 Claims. (Cl. 90—33)

This invention relates to improvements in machines for broaching or performing analogous operations upon metal blanks or articles.

Broaching machines are ordinarily provided with a reciprocating broach or tool, usually mounted for vertical movement, and having one or more of its side faces provided with teeth for cutting away portions of the blanks or articles, hereinafter termed "blanks". The blanks are usually arranged singly on the machine, clamped in a holder or otherwise, so as to be positioned in the path of movement of, or presented to the broach or tool to be operated upon thereby.

Such procedure is relatively slow and expensive, and it is an object of the present invention to provide a machine of novel construction for operating upon blanks in which a number of such blanks can be quickly placed and secured in like position for simultaneous presentation to and operation upon by the broach or tool.

Other objects are to provide an improved holder for the blanks which is movably mounted upon the machine so that a number of blanks can be easily and quickly placed in corresponding positions thereon and secured in place under fully accessible conditions and at one side of the tool, thereby permitting the tool to reciprocate continuously without requiring the attention of the operative to intermittently actuate the same, effecting a saving in time, and allowing the operative to work in a safe manner; also to construct and mount the holder so that after said blanks have been positioned and secured thereon, said holder can be instantly moved into operative position for presenting the blanks to the tool; also to provide a safety device of exceedingly simple and inexpensive construction, which is positive in action, durable and reliable in use, and which preferably may be mounted directly on the blank holder, and cooperates with the tool in a manner to permit the holder to assume its operative relation to the tool only when the latter is at the beginning of its working stroke; which engages the tool and retains the holder in a position in which the blanks are clear of the tool in the event that the holder is moved towards its operative position after the tool has started its stroke in either direction, and which can also be actuated by the tool to shift the holder away from the tool to place the blanks in clearance position at the commencement of the return stroke of the tool, or after the toll has performed its work upon the blanks.

It is customary with machines of this sort to provide a constant supply of liquid cutting lubricant which flows over the work in the work holder and adjacent parts, thus providing positive lubrication of the tool while passing through the work. In thus flowing over the outer surfaces of the holder, some of the metallic cuttings and other foreign matter may be washed into the holder between the clamping members or other parts provided for securing the blanks thereon. These parts therefore become more or less clogged and inoperative, and require frequent cleaning and attention.

A further object of the invention is to provide a blank holder for machines of the sort mentioned, which is constructed so that the cutting lubricant or liquid can be introduced into the holder so as to flow outwardly over the blanks and their securing means, thereby washing the cuttings and other matter away from the holder so that it remains in a clean, unclogged condition.

An embodiment of the invention with which the above objects and advantages may be attained is illustrated in the accompanying drawings, in which:

Fig. 1 is a side elevation of a broaching machine having a work holder arranged in operative position for presenting a number of blanks to the action of a vertically reciprocating broach or tool.

Fig. 2 is a plan view thereof, taken partly in section on line 2—2, Fig. 1.

Fig. 3 is a fragmentary side elevation of the parts of the machine as viewed in the direction of the arrow, Fig. 1.

Fig. 4 is a perspective view of a removable block provided with certain clamping and positioning parts used on the work holder.

Fig. 5 is a fragmentary, vertical section of the machine on line 5—5, Fig. 2, the holder being in operative position for presenting the blanks thereon to the tool.

Fig. 6 is a similar figure on line 6—6, Fig. 9, with the work holder moved to an inoperative position in which the blanks or parts can be secured in place thereon.

Fig. 7 is a fragmentary view on an enlarged scale of a portion of the parts of the holder shown in Fig. 6.

Fig. 8 is a fragmentary, horizontal section of the machine on line 8—8, Fig. 1.

Fig. 9 is a fragmentary plan view thereof

with the work holder in its inoperative position, as in Fig. 6.

Fig. 10 is a fragmentary, vertical section showing a safety device for retaining the work holder in an inoperative position in which the blanks are held clear of the broach or tool.

Fig. 11 is a fragmentary side elevation showing the position of the safety device during an operative stroke or position of the tool.

Fig. 12 is a view similar to Fig. 8, and illustrating means for ejecting the blanks from the work holder.

The broaching machine shown in the drawings is illustrated as being equipped for the formation of teeth or gripping parts *a* upon the inner edge portion *b* of the jaws *c* of plier blanks A before these parts are connected to form the complete tools.

It should be understood, however, that the invention is applicable to other analogous machines or apparatus, and that various other kinds of blanks or articles can be operated upon or substituted for the plier blanks.

The broaching machine shown includes a broach or tool 10 which is mounted on a vertically reciprocating tool holder or slide 11 having a dove-tailed portion 12 engageable in a vertical guide 13. The guide 13 extends upwardly from a horizontal base plate 14 secured to the frame 16 of the machine.

The upper end of the tool holder or slide 11 is fashioned for operative connection to suitable reciprocating mechanism (not shown) for actuating the tool. The tool and its slide operate through openings 17 in the base plate 14 and frame 16. As shown in Fig. 1, the broach or tool 10 is provided with a series of suitably shaped, transverse teeth or cutting portions 18, each of which, from the bottom of the tool upwardly overhangs or projects beyond the tooth below to a slight extent, in the usual manner, so that during the down or operative stroke of the tool, each tooth will remove a small portion or shaving from the work, so that upon the termination of said stroke the cut will be completed. The machine as thus far described may be of the construction shown or of any other suitable construction.

In order to permit the broach or tool 10 to simultaneously operate upon a number of the plier blanks A or other blanks, the machine is provided with a novel holder B which is constructed to allow the required number of blanks to be easily and quickly inserted therein and clamped rigidly in position. The holder is movably mounted so as to occupy an inoperative position in which the aforementioned positioning of the blanks in the holder can be effected while the tool is in movement, and nevertheless with complete safety to the operative, after which the holder may be moved to an operative position wherein the blanks are presented to the cutting action of the tool.

Our improved work holder B comprises a body portion 20 formed with an extension 21 arranged between a pair of lugs or bearings 22 projecting upwardly from the base plate 14. The holder is pivotally connected to the lugs 22 so as to swing in a vertical plane longitudinally of the apparatus, or towards or from the tool 10 by a horizontal, transverse pivot 23.

Fig. 6 and Fig. 9 show the holders B extending upwardly in its inoperative position, in which the blanks are positioned and secured therein, the holder being preferably maintained in this position by cooperating stops or abutments 24 and 25 on the holder and base plate 14 respectively, as shown in Fig. 6.

The holder is also provided with a transverse stop or supporting face 27 engageable with a corresponding horizontal face 28 on the base plate 14, by swinging the holder about its pivot 23 to its operative position, Figs. 1 and 5. Preferably the face 27 is recessed at 29 so as to engage over a hardened block of projection 30 on the base plate 14, and which acts as a locating member, and also acts to relieve the pivotal connection 23 of excessive thrust transmitted to the holder during the engagement of the work by the tool.

The holder B is provided with a suitable handle 32 for shifting it from one position to the other.

For mounting the blanks A on the holder, the body 20 is provided with a series of transversely extending, movable clamping plates or members 33 which are disposed in operative relation to and extend or alternate with a series of separators 34. The separators are preferably fixed or stationary, thus forming a series of pockets, and as shown in Fig. 7, the clamping members 33 extend loosely therebetween, that is, in said pockets so as to have a limited play or movement towards and from said separators or pocket walls. Preferably, the clamping members are releasably connected or retained in their intended relation to the separators by a pin or part 35 extending loosely and transversely through registering holes in the clamping members and separators, thus permitting the required side play of the clamping members, while preventing edgewise movement or displacement thereof.

The clamping members 33 extend out of the holder beyond the outer edges 36 of the separators 34, thereby forming spaces or recesses 37 into which the blanks or parts A can be inserted, as shown in Figs. 7 and 8, with a portion of each blank extending slightly beyond the outer edge of the adjacent clamping members.

The thickness of the spacers or walls 34 should be less than that of the blanks A, see Fig. 7, so as to enable the clamping members 33 to be moved into engagement with and firmly grip the opposite faces of the blanks.

Any suitable means may be provided for shifting the clamping members to clamp the blanks in position, that shown comprising a fixed face or abutment 40 against which the blank A at one end of the series is adapted to abut, and a quickly operable pressure device 41 at the opposite end of the series. The pressure device includes plunger 42 mounted in a pocket 43 in the holder body 20, and having one of its ends engageable with a side face of an adjacent clamping plate 33. The plunger 42 is normally held out of engagement with said plate 33 by a coil spring 45 arranged in the recess 43 and bearing against a head 46 on the other end of the plunger and the bottom of said cavity respectively. After the blanks have been properly inserted in the spaces or recesses 37, the plunger 42 is forced towards the adjacent clamping plate 33, as by means of a cam or eccentric 48 mounted upon a stud 49 which in turn is rotatably mounted in the holder body 20. The stud 49 is provided with a suitable lever 50 for actuating the eccentric.

By appropriate manipulation of the lever 50 the inner end of the plunger 42 can be engaged with the adjacent clamping plate 33 to move it

towards the stop face 40 beforementioned, and which by the reaction through the alternate clamping plates 33 and blanks A, permits the necessary slight lateral movement of these parts required to bring them all into forcible contact and gripping relation one with another.

It is desirable, particularly in the case of irregularly shaped blanks such as the plier blanks A or the like, to provide means enabling all of the blanks to be positioned correspondingly, both lengthwise and transversely thereof, so that the teeth *a* may be formed or other work done on the blanks in the same relative position on each.

As shown in Figs. 4 and 8, for example, the the outer edges 36 of the spacers or walls 34 are formed to provide seats corresponding substantially in shape to the outer edges of the jaw portions *c* of the blanks A, and upon which said edges can engage in a manner to locate the jaw portions in substantially like positions, such that the inner edge portions *b* will all project beyond the members 33 to an extent such that the teeth *a* will be formed at the same distance from said outer edges of the blanks. If desired, the edges may be extended upon the holder body 20 as shown at 53.

In order to dispose relatively long blanks, such as the plier blanks A, in corresponding positions in a lengthwise direction, suitable means are provided against which another part, such as an end of each blank can engage when being positioned in the holder B. For this purpose the holder is provided with a stop 55, preferably fixed, which extends in a crosswise direction relatively to the parts 33 and 34, and against which the ends or tail portions *d* of the blanks A can be engaged. The stop 55 is preferably provided with an overhanging portion 56 which insures the engagement of the adjacent ends of the blanks upon the face portions 57 of the holder so that the teeth *a*, when formed, will be in the same relative planes in all of the blanks.

By the construction described, a number of blanks can be easily and quickly positioned on the holder and clamped in place for presentation to the broach or tool 10.

After the blanks have been operated upon, the quick operating pressure device 41 can be actuated by means of the lever 50 to simultaneously release all of the blanks, by relieving the pressure on the clamping members 33.

In order to further expedite the work, ejector means are provided, whereby all of the blanks when so released can be thrown out of the holder.

For this purpose there is provided a kicker bar or member 58 movably mounted in a slot or recess 59 in the holder B, preferably adjacent to and extending transversely of the parts 33 and 34, with its outer edge disposed beneath the backs of the blanks, as shown in Fig. 8. The member 58 is loosely connected to one end of an operating lever 60 mounted on a transverse pivot 61 in a recess 62 in the holder body. The lever extends out of the recess so as to be easily accessible, and is normally held against a fixed part 63 by a tension spring 64 in a manner to retain the kicker member 58 in a retracted position.

To eject the released blanks A, it is only necessary to give the handle portion of the lever 60 a sudden downward movement against the action of the spring 64, thereby projecting the kicker member 58 out of its recess and into forcible engagement with the blanks, which will cause them to move simultaneously out of engagement with the clamping members 33 and the stop 55, see Fig. 12. As soon as the lever 60 is released, the parts of the ejector will be returned to their inoperative positions by the spring 64.

After the blanks A have been arranged on the holder B and clamped in position, (the holder being in its upright position, as explained), the latter is swung downwardly about its pivot 23 to its operative position, with the faces 27 and 28 in engagement, as shown in Figs. 1 and 5, in which position the projecting inner edge portions *b* of the jaws of the blanks all project into and extend horizontally and transversely across the path of movement of the teeth 18 of the broach or tool 10. In practice the holder, with its blanks secured thereon, is intended to be moved to this operative position during the time that the broach or tool is in its upper position, or at the end of its return stroke, as shown in Fig. 1, with its lowest teeth 18 located above the blanks A, so that upon the subsequent downward or operative stroke of the tool, its teeth 18 will engage the blanks and remove the necessary amount of metal from all of said blanks A during a single operative stroke. As soon as this stroke has been completed, the holder can, if desired, be moved by hand away from the broach or tool 10 by grasping the handle 32, thus shifting the finished blanks out of the path of the returning broach.

It is important that means be provided to prevent the projecting edges of the blanks from being moved into the path of or into engagement with the teeth of the broach or tool, after the downward or operative stroke thereof has been initiated, in order to prevent breakage of parts of the machine, or to avoid the production of incomplete or defective blanks.

For this purpose, in the machine illustrated, the holder B is provided with relatively simple safety means which comprises a cam plate or dog 70 pivoted at 71 on a side face of the holder body 20, and having at its free end a nose or rounded projection 72. The lower end of the broach or broach holder 11 is provided with a recess or cut-away portion 73 terminating at its upper end in a forwardly inclined cam or shoulder 74. The plate 70 is normally held in the position shown in Fig. 1, with its nose 72 approximately horizontally opposite the center of its pivot 71, in which position it is held against a fixed stop 75 on the holder by means of a tension spring 76.

The location of the recess 73 in the broach holder is such that when the broach is in its upper position, the holder B can be moved from its inoperative position to its operative position, since the nose 72 of the plate 70 will then enter said recess, as shown in Fig. 1. However, should the holder be thus moved when the broach is descending or ascending, the nose or cam portion 72 of the dog 70 will encounter the face of the broach holder, as shown in Fig. 10, and the plate 70 reacting against the stop 75, will retain the holder in an inoperative position in which the blanks are held out of the path of movement of the broach.

However, when the holder has been properly positioned, as shown in Fig. 1, with the nose 72 of the plate 70 extending into the recess 73, the desired movement of the broach or tool can proceed and the work upon the blanks completed.

since directly after the downward stroke of the tool has commenced, the overhanging upper portion or cam 74 of the recess will engage the nose 72 and swing the plate 70 downwardly about its pivot 71 against the action of the spring 76, as shown in Fig. 11. The plate 70 will remain in its displaced position during the remainder of the operative stroke by the engagement of the nose 72 with the face of the tool guides 11.

The upper end of the broach holder 11 is provided with a second recess 78 having a forwardly extending cam shoulder 79 at the lower end. This recess 78 is so positioned that after the down stroke of the tool, and the work upon the blanks is about to be terminated, said recess 78 will move to a position opposite the cam plate 70 and permit the latter to be returned by its spring 76 against its stop 75, wherein the nose 72 will again be horizontally opposite the pivot 71. Therefore, as soon as the upward or return stroke of the tool commences, the cam portion 79 of the recess 78 will engage the nose 72 of the plate 70, and through the engagement of the latter with its stop 75, will cause the holder to swing about its pivot 23 to a position corresponding to that shown in Fig. 10, so that the finished portion of the blanks will be moved out of engagement with the broach during its return stroke, thus avoiding unnecessary contact of the tool with the work and preventing noise and rattling which would result from such contact.

As stated, it is usual to supply lubricating liquid under pressure over the work during the engagement of the work by the tool, and in order to prevent the cuttings and other foreign matter from being washed into the holder between the clamping plates 33 and separators 34, the lubricating liquid in the present instance is introduced back of said clamping plates and separators so as to flow outwardly thereover and wash away the cuttings. For this purpose the holder is provided with a shallow chamber 85 disposed inwardly beyond said members 33 and 34 so as to provide communication with the spaces between said members. (See Figs. 7 and 8). This chamber 85 is in turn connected by a passage 86 and tube or pipe 87 to a source of fluid, under pressure.

As shown diagrammatically in Fig. 1, the machine may be provided with or connected to the usual circulating system in general use, and including a reservoir or tank 88 to which the liquid is returned after passing over the work, and from which it is recirculated under pressure to the pipe 87 by suitable pump 89. Thus, the lubricating liquid is introduced under pressure in a direction to pass outwardly through the spaces between the parts 33 and 34 of the holder, and over the work in such a manner as to carry any foreign matter away from the holder.

Preferably, the stationary separators 34 are formed in a detachable block or member 90, see Fig. 4, which may be removably secured in a recess or transverse groove 91 in the holder B, as by means of screws or fastening devices 92, and the bearing face 40 is preferably formed on a separate, removable wear plate 93 which is seated in an extension of said recess 91. By this arrangement the clamping members 33 can be easily interchanged for those of different shapes by removing the securing pin 35 from the block 90, and blocks of different forms or those having separators 34 forming seats of different contour may be interchanged to permit blanks of different sizes and shapes to be properly mounted in the holder B. The extention 53 of the bearing seats may be formed upon a renewable separate piece 98 and the stop 55 is also preferably made detachable so that the expense of providing new parts is reduced to a minimum.

It will be noted, upon reference to Fig. 5, that the axis of the pivot 23 is disposed at or slightly below the horizontal plane of the lowest blank A, in that figure. In other words, a horizontal plane passing through the axis of said pivot and extending perpendicular to the vertical plane of the cutting edges 18 of the broach 10, would approximately coincide with the lower end or blank A of the group of blanks on the holder when the latter is in its operative position.

With this relation of the parts, the downward force exerted upon the work during the engagement of the broach therewith is transmitted largely to the locating block 30, and to some extent to the pivot 23. Very little, if any, of this force is, however, expended in a forward direction above the axis of said pivot, since the angle between said axis and the point at which the broach engages the upper blank of the group, is relatively acute. If a greater number of blanks are to be cut, or should the series extend to a greater vertical height, then the holder pivot would be positioned farther away from the vertical cutting plane to retain the cutting area within approximately the same, or a lesser angle. We have found that any appreciable deviation towards a more obtuse angle in the above connection, results in chattering and imprefect cutting, when the broach engages the upper blanks of the group.

This construction enables the holder to be moved away from the broach without binding between the latter and the blanks, and also enables the holder to be retained in place with the faces 27 and 28 in contact without the use of locking devices or mechanism, by the downward travel of and the pressure exerted by the broach itself.

The holder described is very durable and practical and enables broaching and the like to be done at less cost than heretofore, since a number of blanks can be mounted therein and operated upon at once, with the assurance that they will all be alike when finished. The construction and mounting of the holder enables the blanks to be quickly positioned and secured thereon in an accessible and safe position, and the work presented to the tool by a simple controlled movement.

The safety device is of the utmost simplicity and is positive in action under the different conditions explained above.

We claim as our invention:

1. In a machine for operating upon blanks, a blank holder having a plurality of relatively loose, laterally movable clamping members disposed alternately with a plurality of relatively fixed separators, each movable clamping member having a part projecting outwardly beyond the adjacent separators thereby providing spaces between said projecting parts of said clamping members into each of which a blank can be loosely disposed, and pressure means for forcing said clamping members and said blanks tightly together to rigidly secure said blanks on said holder.

2. In a machine for operating upon blanks, a blank holder having a plurality of spaced separators, clamping members loosely arranged side by side and in alteration with said sep-

arators for lateral movement towards and from the same, said clamping members having parts extending beyond said separators to provide spaces between said clamping members into each of which a blank can be loosely positioned, said separators having parts upon which said blanks rest so as to limit the extent to which said blanks enter said spaces and whereby said blanks will all occupy the same relative position and project out of said spaces to the same extent, and means for simultaneously moving all of said clamping members laterally into gripping relation to said blanks for rigidly securing the latter on said holder.

3. In a machine for operating upon blanks, a blank holder having a plurality of narrow pockets arranged side by side and separated by walls common to adjacent pockets, a clamping member loosely arranged in each of said pockets, said clamping members having parts extending beyond said pocket walls to provide spaces between said clamping members into each of which a blank can be loosely disposed, and each of said pocket walls having its edge formed into a seat upon which a blank engages and rests so that all of said blanks can be adjusted to like positions while being thus freely movable relatively to said clamping members, and means for shifting said clamping members into gripping relation to and secure said blanks in adjusted position.

4. In a machine for operating upon blanks, a blank holder having a plurality of narrow pockets arranged in spaced relation, substantially flat clamping members loosely arranged in said pockets and having a limited play in a lateral direction, said clamping members having portions extending outwardly beyond said pockets to provide spaces between said members in each of which a blank can be loosely disposed, and means for moving said clamping members in the aforementioned lateral direction to cause said members to clamp and rigidly secure said blanks on said holder.

5. In a machine for operating upon blanks, a blank holder having a plurality of substantially flat separators arranged in spaced relation, substantially flat clamping members loosely arranged in the spaces between said separators and having a limited play in a direction perpendicular to the face planes thereof, said clamping members having portions extending beyond said separators to provide spaces between said members in each of which a blank can be loosely disposed, a transverse pin extending through registering holes in said separators and in said clamping members to thereby retain said loose clamping members in operative relation to said separators, and quickly operable pressure means for simultaneously moving all of said clamping members lengthwise of said pin into and out of clamping engagement with the blanks for securing and releasing the blanks.

6. In a machine for operating upon blanks, a holder having a plurality of alternately disposed separators and movable clamping members, said clamping members being arranged to extend beyond said separators to provide spaces in each of which a blank is positioned so as to extend parallel to said separators and said members with an end of each blank projecting away therefrom, each of said separators having a locating seat upon which a part of a blank rests, a positioning stop on said holder at one side of said clamping and positioning parts against which said end of each of said blanks abuts, whereby said seats and said stop cooperate to enable all of the blanks to be correspondingly positioned in both a transverse and lengthwise direction relatively to the holder, and means for shifting said clamping members into gripping relation to said blanks to rigidly secure them on said holder.

7. In a machine for operating upon blanks, a holder having a body, a plurality of relatively loose, laterally movable clamping members each having a part projecting outwardly from said body and forming spaces therebetween in each of which a blank can be loosely disposed, seats on said holder against which said blanks engage to locate them in like positions partly extending from between said clamping members, and means for forcing said clamping members and said blanks bodily sidewise so as to clamp the same tightly together to rigidly secure said blanks on said holder.

8. In a machine for operating upon blanks, the combination with a reciprocating tool holding slide having a tool movable therewith, of a holder for a blank movable from a position in which said blank may be placed and secured on the holder to an operative position in which a portion of said blank extends into the path of said tool so as to be worked upon thereby during an operative stroke of said slide, a safety device movably mounted on said holder, a recess in said slide into which said safety device extends at the beginning of said stroke of the slide and which enables said holder to be moved into operative position, and a part movable with said slide which engages and deflects said device as the operative stroke of said tool commences to enable said slide to continue its stroke and said holder to remain in operative position during such stroke, and another part movable with said slide which engages said device when the return stroke of said tool commences to move said holder to an inoperative position in which said blank is clear of said tool.

9. In a machine for operating upon blanks, the combination with a reciprocating tool holding slide having a tool movable therewith, of a holder for a blank movable from a position in which said blank may be placed and secured on the holder to an operative position in which a portion of said blank extends into the path of said tool so as to be worked upon thereby during an operative stroke of said slide, a pivoted member and a stop on said holder, means for yieldingly holding said member normally against said stop, a recess in said ram into which said member projects at the beginning of said stroke of the slide and which enables said holder to have unobstructed movement into said operative position, and a part on said slide which overhangs and is engageable with said member as the operative stroke of said slide commences to swing said member about its pivot away from said stop to enable said slide to continue its stroke while said holder remains in operative position.

10. In a machine for operating upon blanks, the combination with a reciprocating tool holding slide having a tool movable therewith, of a holder for a blank movable from a position in which said blank may be placed and secured on the holder to an operative position in which a portion of said blank extends into the path of said tool, so as to be worked upon thereby during an operative stroke of said slide, a pivoted

member and a stop on said holder, means for yieldingly holding said member normally against said stop, a recess in said slide into which said member projects at the beginning of said stroke of the slide and which enables said holder to have unobstructed movement into said operative position, a part on said slide which overhangs and is engageable with said member as the operative stroke of said slide commences to swing said member about its pivot away from said stop to enable said slide to continue its stroke while said holder remains in operative position, and the relative positions of the pivot of said member and of said stop being such that should said holder be moved toward its operative position after said operative stroke of said slide has commenced, said member will engage said overhanging part of said slide and be held thereby against said stop and thus prevent said holder from assuming its operative position, whereby said blank is held out of the path of said tool.

11. In a machine for operating upon blanks, the combination with a reciprocating tool holding slide having a tool movable therewith, of a holder for a blank movable from a position in which said blank may be placed and secured on the holder to an operative position in which a portion of said blank extends into the path of said tool so as to be worked upon thereby during an operative stroke of said slide, a pivoted member and a stop on said holder, means for yieldingly holding said member normally against said stop, a recess in said slide into which said member projects at the beginning of said stroke of the slide and which enables said holder to have unobstructed movement into said operative position, and a part on said slide which is positioned to engage said member at the commencement of the return stroke of said tool, so as to react through said member against said stop, and shift said holder out of its operative position and hold said blank clear of said tool.

12. In a machine for operating upon blanks, a holder having a body, a plurality of spaced movable clamping members thereon forming spaces between them open at a side of said holder body, means for securing the blanks between adjacent clamping members with parts of said blanks extending for presentation to a cutting tool on said machine, a passage in said holder body located inwardly beyond said clamping members and blanks and in communication with said spaces and which is connected to a source of liquid under pressure, whereby said liquid discharges outwardly from said body through said spaces and over said blanks to wash away cuttings and the like and prevent them from being carried in between said clamping members.

13. In a machine for operating upon blanks, a holder comprising a body, a block removably seated thereon and having a plurality of loose clamping members releasably secured in said block with projecting portions forming spaces for the reception of the blanks, and which clamping members can be detached and replaced by others by removing said block from said recess, and pressure means on said holder body for forcing said clamping members and said blanks into gripping relation.

14. In a machine for making edge cuts in substantially flat blanks, a reciprocating cutting tool having alined cutting edges, which travel in a prescribed cutting plane in the operative stroke of said tool, a holder having means for securing thereon a plurality of blanks disposed in a series face to face with a part of each projecting for presentation to said cutting edges, said holder being mounted on a pivot so as to swing thereon to an operative position in which said projecting parts of said blanks are disposed in and parallel with said cutting plane, with the last of said blanks, with respect to the direction of the cutting stroke of said tool, disposed flatwise approximately in a plane perpendicular to said cutting plane and passing through the axis of said pivot, said machine and said holder having abutting faces parallel to said perpendicular plane and beyond the same with respect to the direction of said cutting stroke to resist the pressure of said tool in that direction, and interfitting parts on said holder and said machine disposed adjacent said last blank for retaining said holder rigidly in operative position and relieving said pivot of excessive strains during the cutting operations.

CHARLES VALLONE.
JOHN H. ILLIG.