

May 4, 1943.

C. F. WOLTERS

2,318,446

PUNCH

Filed Feb. 28, 1942

2 Sheets-Sheet 1

Fig. 1.

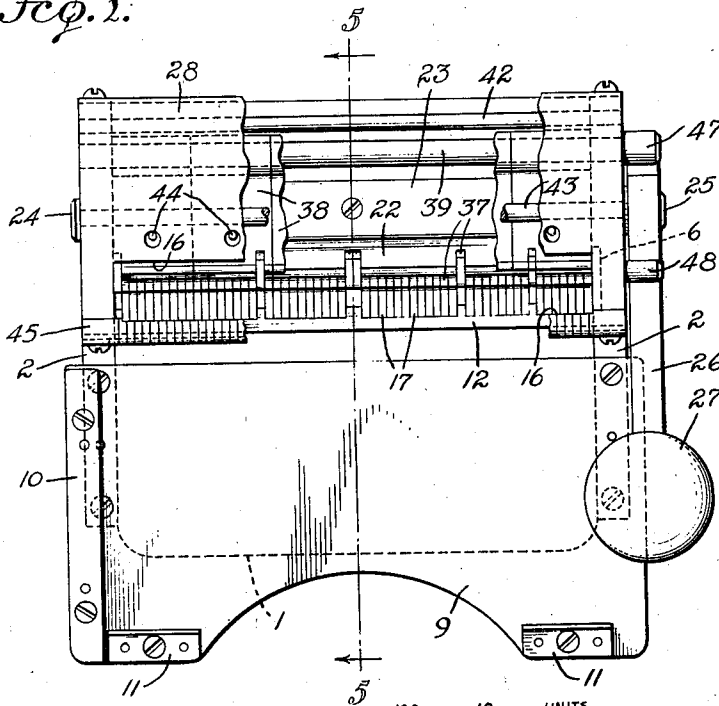


Fig. 2.

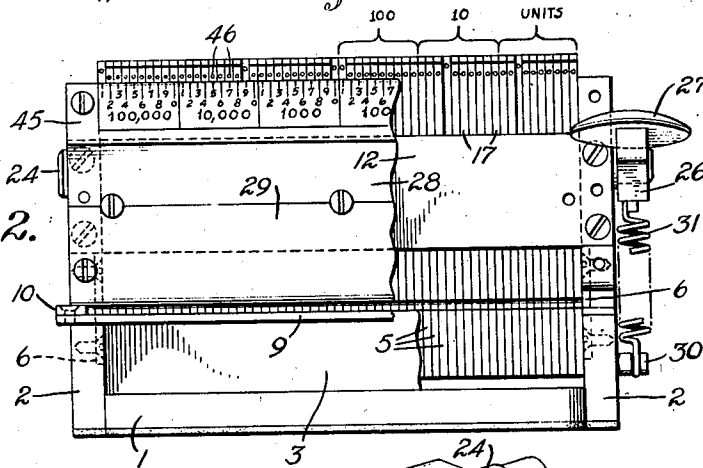
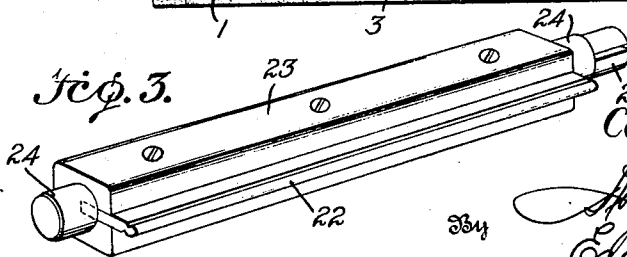


Fig. 3.



Inventor

Carl F. Wolters

By *Edwin O. Blodgett*
Attorney

May 4, 1943.

C. F. WOLTERS

2,318,446

PUNCH

Filed Feb. 28, 1942

2 Sheets-Sheet 2

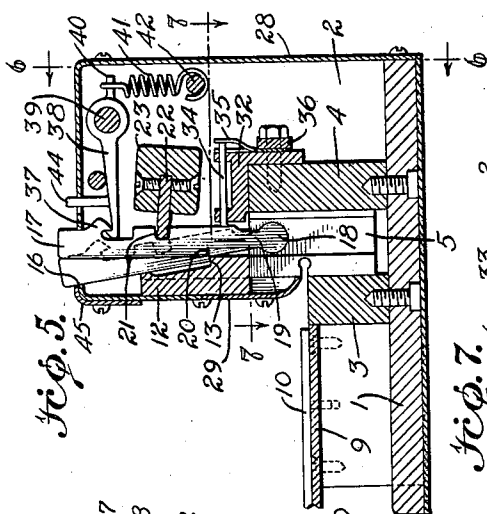


Fig. 5.

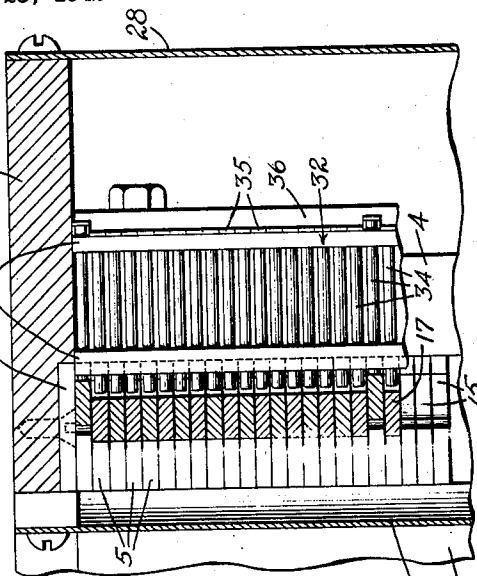


Fig. 7.

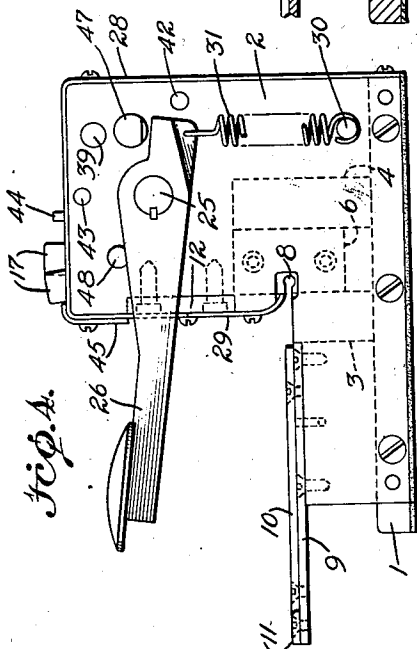


Fig. 4.

Fig. 6.

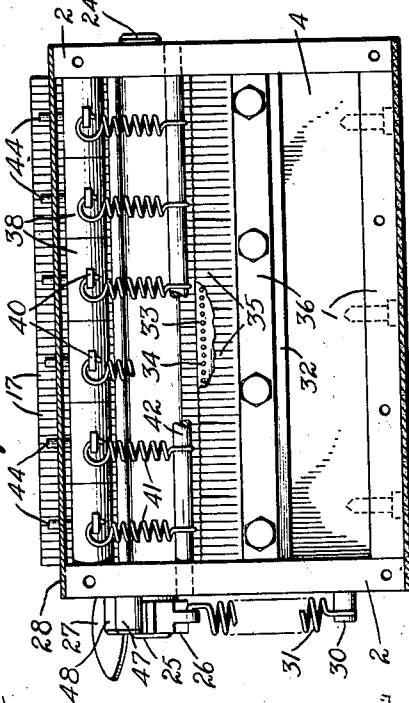
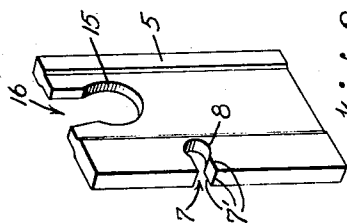


Fig. 8.



Carl F. Wolters

John T. Bink
Edwin C. Blodgett
Attorneys

UNITED STATES PATENT OFFICE

2,318,446

PUNCH

Carl F. Wolters, Kenmore, N. Y., assignor to Remington Rand Inc., Buffalo, N. Y., a corporation of Delaware

Application February 28, 1942, Serial No. 432,835

10 Claims. (Cl. 164—112)

This invention relates to punches, particularly punches adapted for notching the edges of paper sheets, cards and the like used in indexing and filing systems.

The invention provides a plurality of punches arranged in slidable relationship each with respect to its adjacent punches so that selected punches can be moved relative to the remaining punches for punching cooperation with a ledger blade and side cutting edges of adjacent punches to cut notches or the like in the edges of cards or other sheet material. The arrangement of the punches in contact each with adjacent punches provides for the punching of a greater number of notches in a given space than has heretofore been obtainable where punches required the use of stationary guide means between adjacent punches. In the present invention the punches are in slidable contact each with adjacent punches so that they have cutting cooperation with a ledger blade and side cutting edges of adjacent punches when one or more punches are moved relative to its adjacent punch or punches.

The invention further provides a punch wherein the punches may be selected for operation in any desired arrangement and in any desired number through the use of suitable selectors that normally control the movement of the punches and are operable to connect the punches with an operating means to punch the margins of sheet material in the relative movement of the punches by the operating means.

The invention further provides means for normally retaining the selectors for the punches in position to normally retain the punches in non-selected position against movement, while a suitable latching or retaining means is provided for engaging the punch selectors when they are engaged with the operating means for retaining them in engagement during operation of selected punches, these retaining means being suitably controlled so that the punches may be released either individually or in groups when the retaining means is moved into a disengaged position with respect to the punch selector.

The invention provides a punch wherein each punch provides a guide for its adjacent punch in the punching operation and provides a punch assembly that employs a simple frame construction for guiding and supporting the punches for their selective operation thereby reducing the cost of constructing a punch, making it rather simple to construct, assemble and operate, and at the same time securing an improved result in

the operation of the punch for notching the margins of sheet material in facilitating the provision of a greater number of differently spaced notches in a given length of margin.

In the drawings:

Figure 1 is a plan view of the improved punch with portions broken away to illustrate some of the details of construction, the punch having a number of the selectors or plungers arranged in position to engage the operating mechanism.

Figure 2 is a front elevation of the improved punch with portions broken away to illustrate some of the details of construction.

Figure 3 shows the punch operating bar in perspective.

Figure 4 shows the improved punch in end elevation looking from the right hand side of Fig. 1.

Figure 5 is a cross-section taken on line 5—5 of Fig. 1.

Figure 6 is a cross-section taken on line 6—6 of Fig. 5.

Figure 7 is a cross-section taken on line 7—7 of Fig. 5.

Figure 8 shows one of the punches in perspective on an enlarged scale.

The punch constructed according to this invention has a base 1 and side plates 2. A pair of spaced parallel front and rear guide bars 3 and 4 respectively, extend across the central portion of the base 1 and are secured at opposite ends to side plates 2 forming a transversely extending channel therebetween for slidably receiving a plurality of punches 5. Punches 5 have the front edges slidably engaged with the rear face of front guide bar 3 and the rear edge slidably engaged with the front face of rear guide bar 4. The side faces of each punch 5 are slidably engaged with the side faces of adjacent punches, a sufficient number of punches being mounted in the channel formed by guide bars 3 and 4 to completely fill the channel in transversely extending relation between the end plates.

An end guide plate 6 is mounted in a recessed portion on the inner face of each side member 2 at the ends of the channel formed by guide bars 3 and 4. Guide plates 6 are arranged to slidably engage the outer faces of the punches 5 at opposite ends of the series so as to hold the group of punches with their side faces in close but slidable contact with one another for relative vertical sliding movement in endwise relation in the structure as illustrated by the drawings. This vertical movement of the punches is sufficient to obtain the punching operation which

they perform in a manner that will be presently described. The central portions of the side faces of each punch 5 are recessed as shown in Fig. 5 to provide bearing faces at the front and rear edges for obtaining a better operating assembly of the punches.

The forward edge of each punch 5 is provided with a recess 7 which is enlarged at the inner end as indicated at 8. The portion of the punch adjacent the side edges of recess 7 and along the front edge thereof form the cutting edges 7' (Fig. 5) of the punch. These cutting edges 7' are arranged to have cutting cooperation with the cutting edges 7' of the next adjacent punches when one punch is moved and the punches adjacent to the moved punch are held stationary. The movement is made to such an extent that the cutting edges 7' of the punch at one side of the slot 7 will cooperate with the cutting edges 7' at the opposite side of the slot 7 in adjacent punches, thereby providing a shearing action between the punches when one is moved relative to others. At the front edge of each punch 5 the cutting edge 7' will cooperate with the rear upper edge of front guide and ledger blade bar 3 in the cutting operation. The punches are normally supported with slot 7 aligned in horizontal relation with that portion of the punches defining the bottom portions of slots 7 aligned with the upper surface of front guide bar 3, as shown in Figs. 4 and 5. Obviously, cutting along bar or ledger blade 3 may be omitted when desired and the punches employed to cut slots along only the side edges. In this case the punch would be useful in slotting the margin of a card into one or more of a selected series of perforations previously formed in the card along and spaced inwardly from the edge thereof to open the perforations through the edge of the card for selective indexing operation.

The forward upper edges of side plates 2 terminate in horizontal alignment with the upper surface of front guide bar 3 and forwardly of guide bar 3 are recessed slightly to receive and support table 9 provided with side guide 10 and positioning stops 11. Guide 10 and stops 11 cooperate to position a card or sheet so that one margin may be engaged in the aligned slots 7 of the punches for a punching or notching operation to provide one or more recesses or slots in the margin.

A punch supporting bar 12 is mounted in side plates 2 in transversely extending relation between the upwardly extending rear end portions thereof. These upwardly extending rear end portions extend substantially above the upper face of front guide bar 3 and table 9 as clearly illustrated in the drawings, particularly Figs. 4 and 5. Supporting bar 12 for the punches is positioned above the upper ends of the punches in the manner shown in Fig. 5 and has its rear face provided with an inclined and recessed portion to form shoulder 13.

Each punch 5 is provided with a circular aperture 15 in the upper end thereof opening through a slot of smaller dimension than the diameter of aperture 15, said slot being indicated at 16. This slot 16 opens through the upper end of each punch 5 in the manner illustrated in Figs. 5 and 8.

A plunger 17 is provided for each punch 5. Each plunger 17 has a circular head 18 on the lower end, as shown in Fig. 5, which engages in circular aperture 15 while shank portion 19 extends through slot 16 and has a transverse dimension less than the width of the slot to pro-

vide for the pivotal movement of the plunger into the two positions shown by two adjacent plungers in full lines in Fig. 5. Each plunger 17 is formed to provide a shoulder 20 for engaging shoulder 13 of supporting bar 12 when the plunger is in the forwardly extending position, as illustrated in Fig. 5.

Plunger 17 is also formed to provide a slot 21 in the rear edge for receiving the rounded free edge of a flange 22 forming part of operating bar 23. The ends of operating bar 23 are provided with trunnions 24 as shown in Fig. 3, rotatably engaged in side plates 2 to support operating bar 23 for oscillating movement to operate the punches. A reduced extension 25 is provided on one of the trunnions 24 at the right hand end of the operating bar as illustrated in Fig. 3. This extension 25 is located to extend beyond side plate 2 at the right hand side of the machine, as shown in Figs. 1, 2 and 4. Extension 25 receives and mounts operating handle 26 suitably keyed to extension 25 as clearly shown in Fig. 4. The operating handle 26 extends forwardly from extension 25 in the manner illustrated in Figs. 1 and 4 and is provided at the front end with a button 27 adapted to be manually engaged for operating the handle and the operating bar.

Plungers 17 extend upwardly above operating bar 23 and supporting bar 12 to provide free ends extending above the upper ends of side plates 2. This construction of plunger 17 is clearly illustrated in the drawings, particularly Figs. 2, 4 and 5.

A sheet metal cover plate 28 forms a housing between the rear upper ends of side plates 2 extending from the central portion of supporting bar 12 upwardly over the front edges of side plates 2, across the upper edges thereof and down the rear edges with the bottom edge secured to the rear edge of base 1. This is shown clearly in Figs. 4 and 5. A guide lip 29 formed of sheet metal has its upper edge secured to front supporting bar 12 in abutment with the free edge of cover 28 as shown in Fig. 5, while the lower edge is curved rearwardly and terminates in registry with the portion of punches 5 defining the upper portion of slots 7 when the punches are supported in position to receive a card for punching with plungers 17 engaged with supporting bar 12. Guide lip 29 facilitates the insertion of the margins of cards in slots 7 of the group of punches when it is desired to notch the edges of such cards.

A stud 30 mounted on side plate 2 at the right hand side of the punch as illustrated in Figs. 1 and 2 provides an anchor for tension spring 31 having one end engaged on the stud and the opposite end secured to operating lever 26 through connection with a portion extending rearwardly of extension 25 in the manner shown in Fig. 4. This tension spring normally tends to rotate operating member 23 in a clockwise direction as illustrated in Figs. 4 and 5 for normally moving the punches connected therewith to the upper position where the upper ends engage the bottom edge of supporting bar 12.

Means are provided for normally moving plungers 17 to a forward position in which shoulders 20 of plungers 17 seat on shoulder 13 of supporting bar 12. In this position plungers 17 support punches 5 at the upper limit of their sliding movement with the upper ends engaged with the lower edge of bar 12. The means for obtaining this normal positioning of each plunger

17 comprises an angle supporting member 32, see Figs. 5 and 7, formed with guide flanges 33 extending upwardly therefrom in spaced parallel relation and slidably receiving a plurality of spaced parallel actuating pins 34. Leaf springs 35 are clamped against the rear face of bar 32 by means of securing bar 36. Each leaf spring 35 slidably projects one pin 34 forwardly to engage a plunger 17 aligned therewith and move the same to the forward position. Member 32 is mounted on the upper edge of rear guide bar 4 in the manner shown in Fig. 5.

Means are also provided for retaining plungers 17 engaged with flange 22 of operating member 23 for securing the operation of selected punches. For this purpose, each plunger 17 is provided on the rear face with a projecting part 37 adapted to provide a dog or catch for cooperation with the laterally extending end of latch finger 38 rotatably mounted on bar 39 having the ends mounted in side plates 2.

In the punch illustrated six latch fingers 38 are provided for cooperation with any one of a group of plungers 17 in a manner that will be clear from an inspection of Figs. 1, 2 and 6. Each latch finger 38 has a projection 40 extending rearwardly therefrom as shown in Fig. 5, for receiving one end of a tension spring 41 having the opposite end secured to rod 42 mounted on side plates 2 at the rear portion of the punch below rod 39. These tension springs normally operate latch fingers 38 in a clockwise direction as shown in Fig. 5, so that they are normally operated to cooperatively engage with projecting parts 37 on plungers 17 for retaining them in selected position for operation by operating member 23.

A stop rod 43 located above fingers 38 in advance of bar 39 as shown in Fig. 5, limits the movement of fingers 38 so they are retained in the proper position for cooperative latching engagement with projections 37 on plunger 17. A handle projection or finger piece 44 is provided on each latch finger 38 so it may be manually depressed to disengage the end thereof from projection 37 on any and all plungers 17 that may be engaged therewith.

The six fingers 38 provided for latching engagement with a group of adjacent plungers 17 are arranged so the punches and plungers may be used to designate different digits in punching apertures or slots in the margins of cards corresponding with a numerical index system. For this purpose an index plate 45 is mounted on the upper front corner portion of cover 28, as shown in Figs. 1, 2 and 4. This index plate is provided with a scale as shown in Fig. 2 divided off into units of 10 so that the punches illustrated in the structure disclosed by the drawings will have six groups of ten punches to represent any number including from one to six digits. The six latching fingers 38 will latch any one of the plungers for punches 5 representing any digit in any group. In this way successive cards may be punched and the digit representation for successive numbers may be changed by changing one or more of the punches and plungers corresponding with the respective digits of the numbers to be represented.

Upon the operation of any of the handle or finger projections 44 to depress latching fingers 38, the plungers latched in operative position thereby will be projected into forwardly extending position to disengage flange 22 of operating member 23 by the operation of spring fingers 35

and rods 34. The upper front edge of each plunger 17 is provided with a small depression as illustrated at 46 in Fig. 2 so that a stylus of desirable form may be engaged therein for pushing the plunger 17 rearwardly into latched position in engagement with operating bar 23.

When it is desired to punch the edge of a sheet or card, the desired plungers 17 are first operated from the forward position in engagement with supporting bar 12, into the rearward position shown in Fig. 5 where the selected punches to represent the desired digits according to the scale on index plate 45 are held in latched operative position to secure movement of the corresponding selected punches. The card or sheet to be punched is then inserted with one marginal edge in the aligned slots 7 in punches 5. One edge of the card is engaged with side guide 10 and the adjacent front edge of the card is then moved into engagement with positioning stops 11. With the card or sheet in this position button 27 may be manually engaged and depressed for operating lever 26 and the punches.

Depression of lever 26 at the end carrying button 27 will rotate operating bar 23 and through the medium of flange 22 will move the selected plungers 17 downwardly and force the connected punches 5 downwardly therewith. Downward movement of selected punches 5 will cause the top cutting edges 7' to move downwardly to engage the top surface of the card to be punched and in cooperation with the bottom cutting edges 7' of adjacent punches and the edge of bar 3, a shearing action will be obtained to notch the margin of the card. This operation should be clear from the illustrations of the structure in the drawings, particularly in Figs. 4 and 5.

The selected punches 5 are moved downwardly so that the slotted portions 7 of the selected punches move below the corresponding slotted portions of adjacent punches which are held stationary and supported by the non-selected plungers 17 thereof which remain engaged with supporting bar 12 through cooperation of shoulders 13 and 20.

Stop 47 on end plate 2 at the right hand side of the punch projects over the rear end of lever 26 and limits the downward movement of button 27 while stop 48 engages lever 26 in front of bar 23 and limits the upward movement of the front end of the lever and button 27.

When button 27 of lever 26 is manually released, tension spring 31 will return lever 26, operating bar 23 and the selected punches to the upper limit of movement where the punches engage the lower edge of supporting bar 12. If it then be desired to release the selected punches to make a new selection, buttons 44 are depressed to disengage latch fingers 38 from projections 37 of the selected plungers. This releases the selected plungers for movement by springs 35 and pins 34 to the forward position where shoulders 20 of the selected plungers will then engage shoulders 13 of supporting bar 12 and retain the punches in supported position at their upper limit of movement. The operation of tension springs 41 on latch fingers 38 also aids in retaining selected plungers 17 with their connected punches at the upper limit of movement.

With the punches in slidable surface contact with one another it will be seen that any portion of a card having a margin of a length equal to or less than the length of the assembled group of punches can have any portion of the margin thereof notched in any position or combination

of positions. These notches may be used for indexing purposes of any desired character well known in the art or for any other purpose that may be desired. For indexing purposes, the index shown in the drawings will materially aid in indexing cards numerically with index numbers running up to six digits.

Where two adjacent plungers are selected for punching operation it will be understood that when the adjacent punches are operated they cooperate with guide bar 3 and the adjacent stationary punches at either side of the selected ones to cut a larger notch in the margin of a card than is cut by one punch. The notch will be a single notch equal to the width of two punches due to their contact with one another and simultaneous operation. The size of the notch cut in a margin can be increased by operating two or more plungers simultaneously when they are arranged in adjacent relation to one another as adjacent punches will operate jointly in notching the edge of a card the same as if a single punch were used. This is a desirable feature and advantage of the punch construction disclosed when applied to other uses than the indexing use hereinabove described.

Operating bar 23 together with its associated operating parts forms the operating means for the punches while plungers 17 form the selector means for selecting the desired punches for the punching operation.

The invention claimed is:

1. A punch comprising a frame formed with guideways, a plurality of punches slidably mounted in said guideways in aligned slidable contact each with adjacent punches for movement of each punch relative to the adjacent punches for cutting cooperation with adjacent punches and a ledger blade, and means for individually and selectively operating said punches.

2. A punch comprising a frame having guideways, a plurality of punches slidably mounted in said guideways in slidable engagement each with adjacent punches for punching cooperation of each punch with its adjacent punches in relative movement of each punch to its adjacent punches, operating means for moving said punches to perform a punching operation, and selectively operative means for individually and selectively connecting one or more of said punches to said operating means for selective punching operation.

3. A punch comprising a frame having guideways, a plurality of punches slidably mounted in said guideways in slidable engagement each with adjacent punches for punching cooperation of each punch with its adjacent punches in relative movement of each punch to its adjacent punches, operating means for moving said punches to perform a punching operation, and means for selectively disconnecting said punches from said operating means and for retaining said punches against movement.

4. A punch comprising a frame having guideways, a plurality of punches slidably mounted in said guideways in slidable engagement each with adjacent punches for punching cooperation of each punch with its adjacent punches in relative movement of each punch to its adjacent punches, operating means for moving said punches to perform a punching operation, selectively operable means for connecting selected punches to said operating means, and releasable means for normally engaging said selectively operable means for retaining said means in po-

sition to maintain selected punches connected to said operating means.

5. A punch comprising a frame having guideways, a plurality of punches slidably mounted in said guideways in slidable engagement each with adjacent punches for punching cooperation of each punch with its adjacent punches in relative movement of each punch to its adjacent punches, operating means for moving said punches to perform a punching operation, a plunger for each punch movably connected thereto, each plunger being formed for engagement in one position with said operating means for selectively connecting the attached punch to said operating means for operation thereby and having means for engagement with said frame in another position for retaining said punch in a stationary position.

6. A punch comprising a frame having guideways, a plurality of punches slidably mounted in said guideways in slidable engagement each with adjacent punches for punching cooperation of each punch with its adjacent punches in relative movement of each punch to its adjacent punches, operating means for moving said punches to perform a punching operation, supporting means on said frame for said punches, a plurality of plungers, one for each punch pivoted on the punch, each plunger having parts formed for cooperative engagement in one position with said supporting means for retaining said punch against movement and in another position having said parts cooperatively engage said operating means for transmitting the motion thereof to said punch for a punching operation.

7. A punch comprising a frame having guideways, a plurality of punches slidably mounted in said guideways in slidable engagement each with adjacent punches for punching cooperation of each punch with its adjacent punches in relative movement of each punch to its adjacent punches, an operating bar mounted in said frame for rocking movement over said punches, a supporting bar on said frame, a plurality of plungers, one for each punch pivoted on said punch, each plunger having parts formed thereon for cooperation with parts on said supporting bar in one position of said plunger to support a punch in said guideways against movement, said plunger being movable to another position and having parts cooperating with parts on said operating bar for transmitting the motion of said bar through said plunger to said punch for moving said punch to perform its punching operation, and means for moving said operating bar.

8. A punch comprising a frame having guideways, a plurality of punches slidably mounted in said guideways in slidable engagement each with adjacent punches for punching cooperation of each punch with its adjacent punches in relative movement of each punch to its adjacent punches, operating means for moving said punches to perform a punching operation, a punch supporting bar on said frame, a plurality of plungers one for each punch pivotally connected to the punch, means for normally moving each plunger toward the supporting bar, cooperating parts on each plunger and the supporting bar to support the plunger and its punch against movement in said guides, each plunger and said operating means being formed with cooperating parts for interengagement to transmit the movement of said operating means through said plungers to said punches for punching operation thereof, and releasable means for retaining said

plungers with the cooperative parts thereof in engagement with said operating means.

9. A punch comprising a frame having guideways, a plurality of punches slidably mounted in said guideways in slidable engagement each with adjacent punches for punching cooperation of each punch with its adjacent punches in relative movement of each punch to its adjacent punches, an operating bar mounted in said frame for oscillating movement, means for normally moving said operating bar toward and retaining it at one end of its stroke of oscillatory movement, a punch supporting bar, a plurality of plungers one for each punch pivotally mounted on a punch, each plunger being formed to provide parts for cooperation with the punch supporting bar and the operating bar respectively in two different positions of each plunger for supporting a punch against movement in said guideways when engaged with said punch supporting bar and for connecting said punch with said operating bar in another position in cooperative engagement therewith, means for normally actuating said plungers to engage said punch supporting bar, and releasable means for normally retaining selected plungers in engagement with said operating bar for punching operation of selected punches thereby.

10. A punch comprising a frame having guideways, a plurality of punches slidably mounted in said guideways in slidable engagement each with adjacent punches for punching cooperation of each punch with its adjacent punches in relative movement of each punch to its adjacent punches, operating means for moving said punches to perform a punching operation, supporting means on said frame for said punches, selectively operable individual attaching means for each punch for connecting each punch individually to said supporting means for normally retaining said punches against movement in said guideways, said selective means being operable to disengage the connection of each punch individually from said supporting means for connection to said operating means for punching operation of the punch by said operating means, and means associated with said connecting means in selected groups for normally retaining selected connecting means in operative engagement with said operating means, said last mentioned means being manually operable to release selected connecting means engaged with said operating means for return movement into engagement with said supporting means.

CARL F. WOLTERS.