

Aug. 28, 1928.

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G. E. WALLIN ET AL
RULE PUNCHING MECHANISM

Original Filed May 2, 1923 4 Sheets-Sheet 1

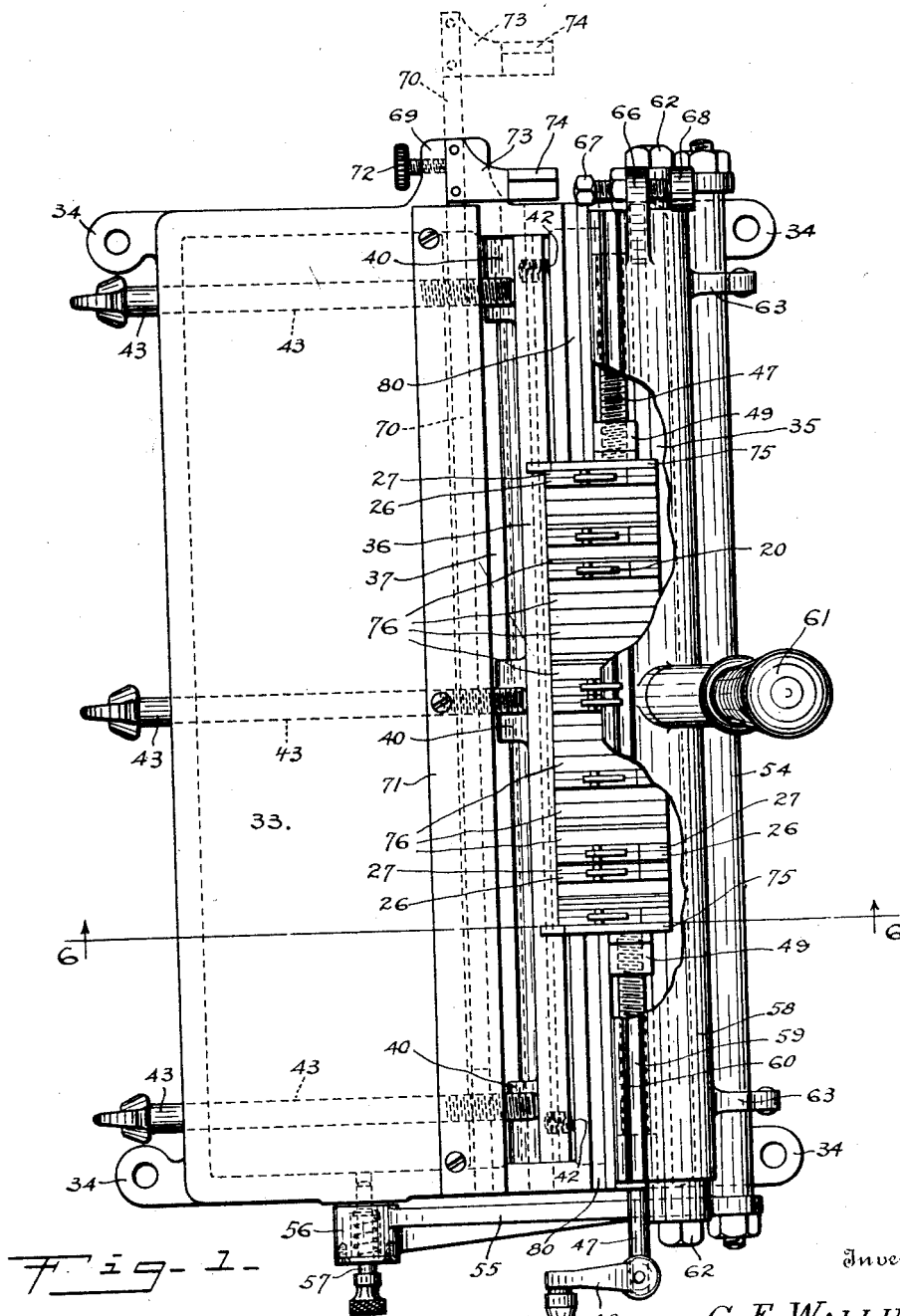


Fig. 1

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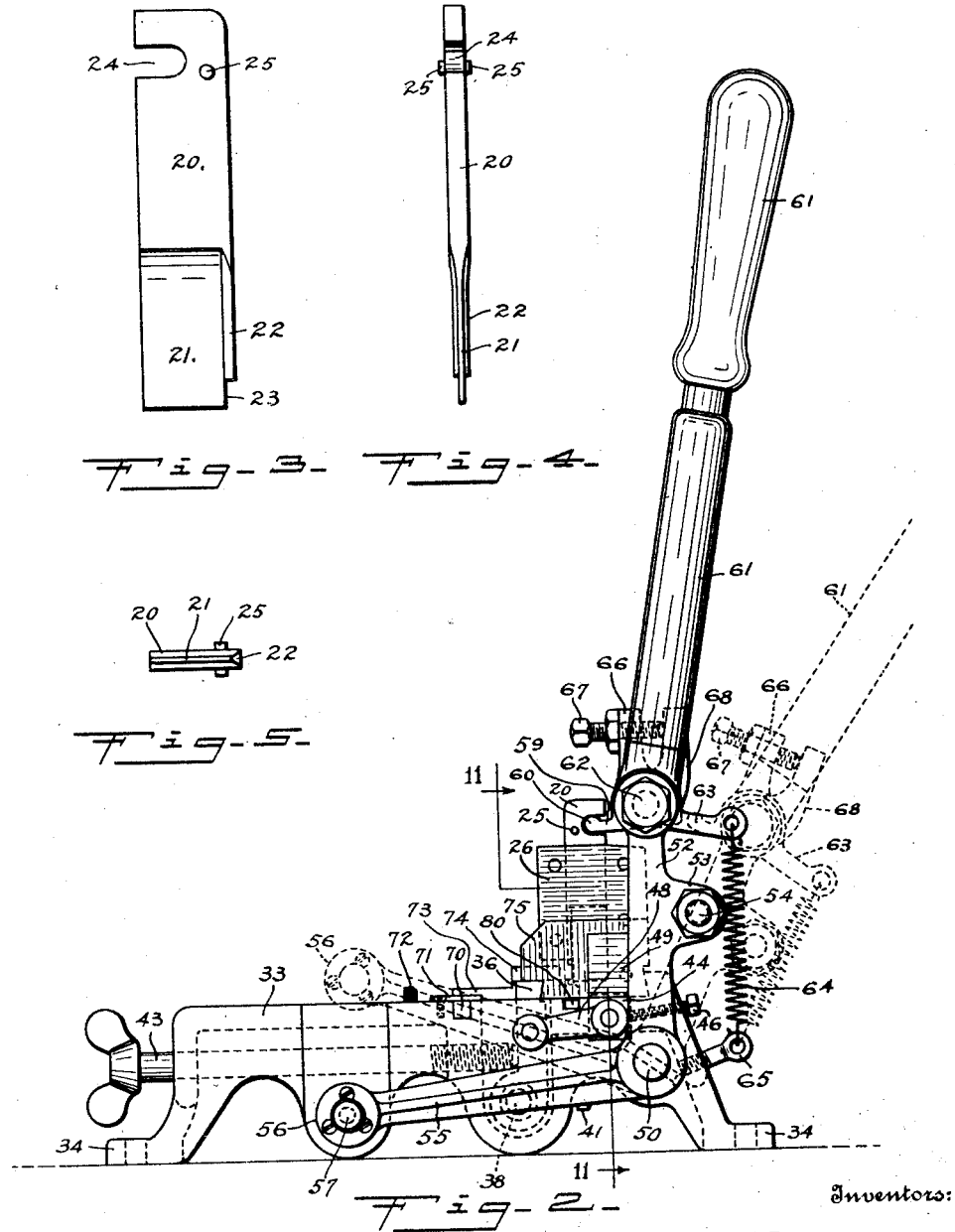
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RULE PUNCHING MECHANISM

Original Filed May 2, 1923 4 Sheets-Sheet 3

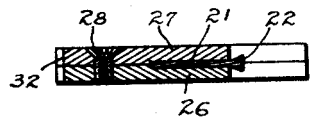


Fig-10-

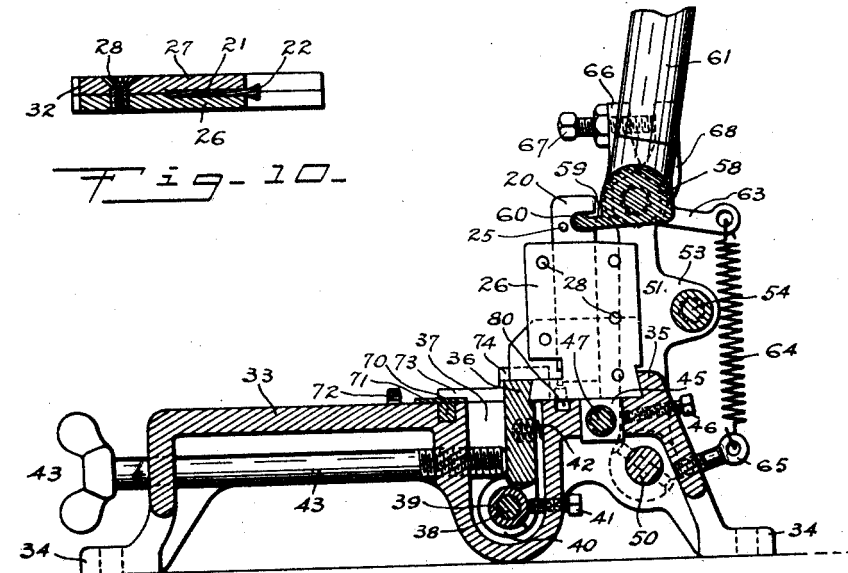


Fig-6-

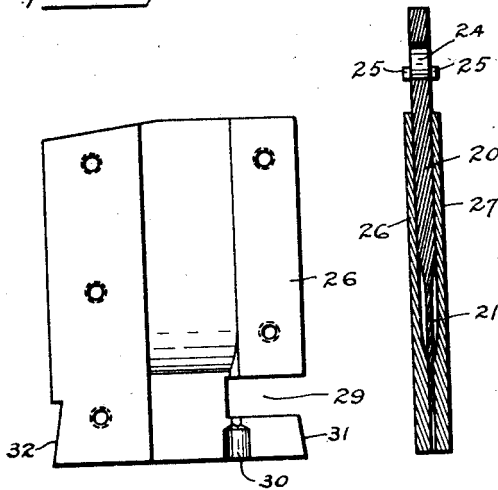


Fig-8-

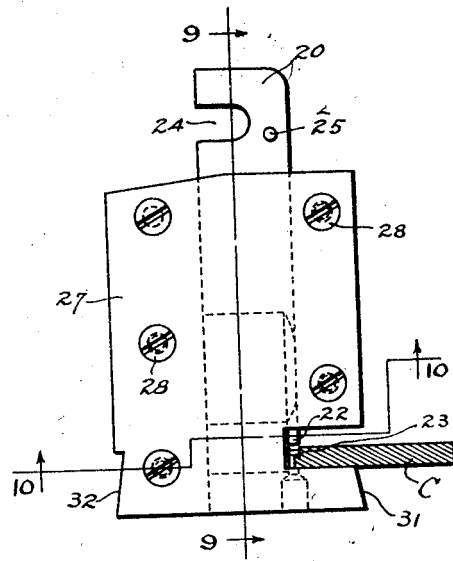


Fig-9-

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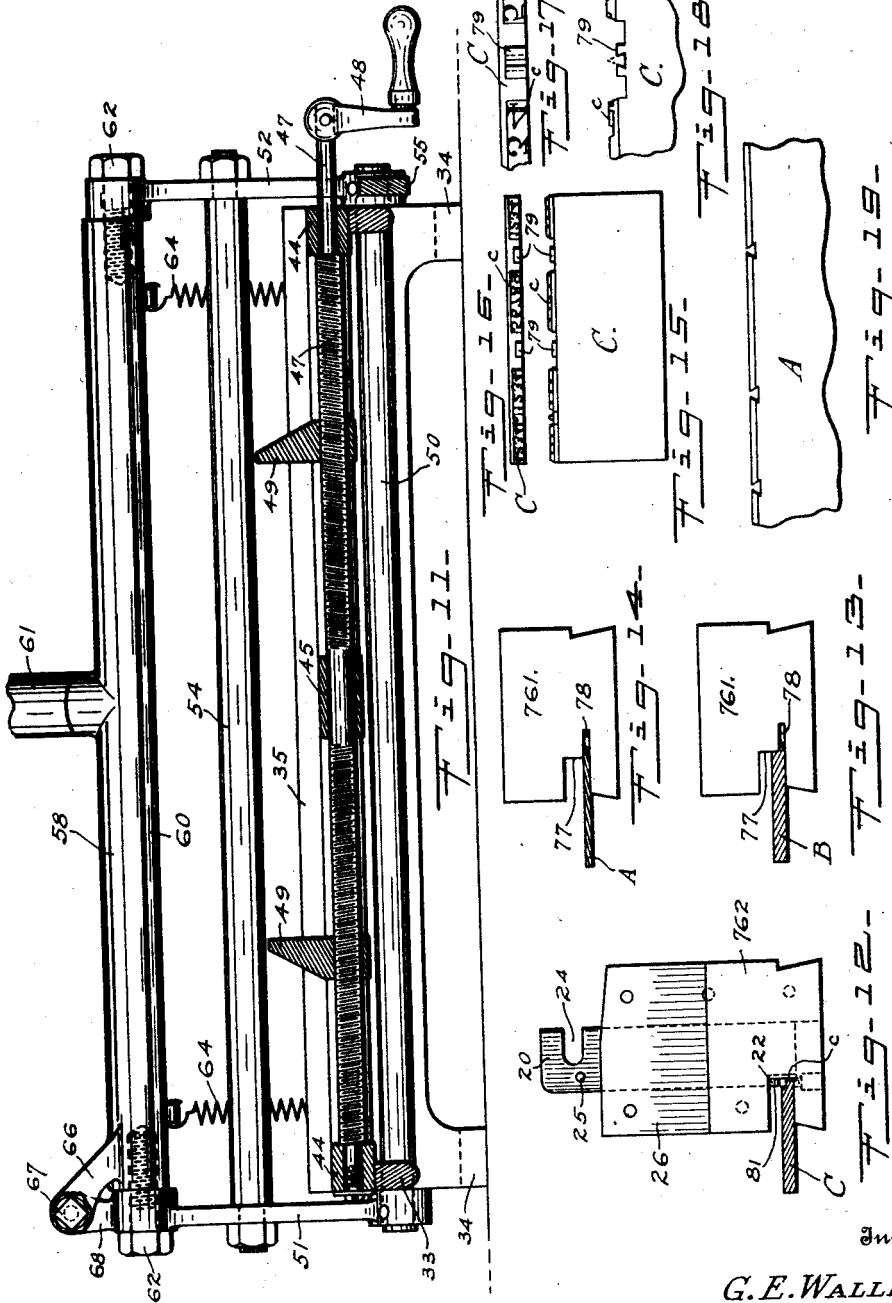
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RULE PUNCHING MECHANISM

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UNITED STATES PATENT OFFICE.

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RULE-PUNCHING MECHANISM.

Application filed May 2, 1923, Serial No. 636,106. Renewed April 4, 1927.

Our invention relates to devices for punching or notching type-bars, slugs and rules to receive inserted column-rules of the so-called "lino-tablar" form, extending transversely of the punched type-bars and rules. It is the particular object of our invention to provide a punch for producing small triangular or wedge-shaped notches opening to the printing face of a type-metal rule or rule-slug, in which the punch or perforating member is so guided and supported as not to be liable to deflection, bending or breakage, by continued use for the purpose for which it is intended. A further object of our invention is to provide a rule-notching punch mechanism wherein the depth of the notches is gaged solely with respect to the printing faces of the rules or slugs, so that variations in the height of the punched members will not affect the relative height of the inserted column-rules, and the printing faces of the latter will be always perfectly alined with other printing-faces of a form. A further object of our invention is to provide a simple and convenient mechanism adapted to securely hold an assemblage or gang of punch-units, together with a plurality of spacing-plates and gages, in positive and definitely alined relation to each other, whereby any desired number of notches may be made simultaneously in a type-metal rule, type-bar or slug, the notches being accurately located longitudinally of the rule or slug and also with reference to the printing-face thereof, and the punching operation repeated to produce any number of parts notched in exact duplication of each other. Our invention further comprises means by which a plurality of punch-units may be assembled and held in a definitely measured relation to each other, determined by the thickness of spacing members interspaced with the punch-units, the spacing members being of standardized thickness and varying only in multiples of a fixed unit-thickness. More particular objects of our invention will appear hereinafter.

In the accompanying drawings Fig. 1 is a plan view of a mechanism embodying our invention, a portion of the punch-actuating lever being broken away. Fig. 2 is an end view of the machine, Fig. 3 is a detail side view of one of the punch-bars, Fig. 4 is a rear edge view of the same, Fig. 5 is a bottom end view thereof, Fig. 6 is a transverse vertical section of the machine on the line 6—6

of Fig. 1, Fig. 7 is a detail side view of one of the punch-units, Fig. 8 is a detail side view showing the inner side of one part of the punch-guide or housing, Fig. 9 is a detail vertical section on the line 9—9 of Fig. 7, Fig. 10 is a horizontal section on the line 10—10 of Fig. 7, Fig. 11 is a longitudinal section on the line 11—11 of Fig. 2, Fig. 12 is a side view of one of the punch-units, together with a special spacing and gage plate and a type-slug in position for punching, Fig. 13 is a side view of one of the gage and stripping plates, Fig. 14 is a similar view showing the relation thereto of a thin rule during the punching operation thereon, Fig. 15 is a side view of a type-slug with lugs for punching, Fig. 16 is a plan view of the same, Fig. 17 is a detail plan view of a portion of a slug after being punched, Fig. 18 is a detail side view of the same, and Fig. 19 is a detail side view of a portion of a rule with punched notches therein.

In carrying out our invention according to the illustrated embodiment thereof, we provide a plurality of punches each of which is formed from a flat steel bar 20 of rectangular sectional form, the thickness of the bar being slightly more than the greatest width of the notches to be formed. The lower rear portion of the bar is recessed at each side to leave a thin flat blade 21 of which the front edge merges into the triangular or wedge-shaped part 22, the latter comprising the punch proper or perforating member, and the widest portion thereof being alined with the front edge of the bar 20, as shown in Fig. 3. The blade 21 projects for a short distance below the lower end of the triangular part 22, and the front edge 23 of said projecting portion forms a gage for limiting the distance to which a rule or slug may be inserted beneath the cutting edges at the lower end of the part 22. Near the upper end of the bar 20 a notch 24 is formed in the rear side thereof for receiving the actuating member. At about the level of the lower side of the notch 24 there is a transversely extending stop-pin 25 which projects slightly at each side of the bar. The guide or housing for the punch is formed by two symmetrical parts 26 and 27 which are secured together by a plurality of screws 28, said screws entering threaded openings in the part 26, and the flat heads of the screws being countersunk in the part 27.

The adjacent sides of the parts 26 and 27 are channeled to form a passage for receiving the punch-bar slidably between them, the width of the channel being greater at the upper portion than at the lower portion, so that both the main upper portion of the bar 20 and the thin web or blade 21 at the lower portion are guided and supported laterally as shown in Fig. 9. At the front side of the housing, near the lower end thereof, is a rectangular transverse recess 29 which intersects the front portion of the channel for the punch-bar, so that the rear end of said recess 29 is slightly behind the gage-surface 23 at the front edge of the blade 21, as best indicated in Fig. 7. The portion of the housing beneath said recess 29 forms the die-block which supports the work and into which the lower end of the part 22 passes at the completion of a punching operation. The opening for said part 22 fits the same closely for a short distance below the recess 29, and a larger clearance-opening 30 extends therefrom to the bottom of the housing, as best shown in Fig. 8. The punch-bar may be withdrawn from or inserted into the upper end of the housing, and the stop-pin 25 limits the depth to which the bar may enter the housing. Below the recess 29 the front face 31 of the housing is inclined forwardly, and a corresponding rearwardly inclined face 32 is formed at the back of the housing, said inclined faces 31 and 32 being accurately positioned with respect to the punch, so that when said faces are engaged by the hereinafter described clamping means a series of the punch-units may be properly alined with each other.

Referring now to the holding and actuating means for the described punch-units, in the preferred and illustrated embodiment thereof we provide an integral base-member 33 having perforate foot-portions 34 adapted to be secured by bolts or screws to a suitable support. The upper side of said base-member is a plane-surfaced table, except at the rear edge where there is an upwardly projecting flange or gib 35, the front face of which is undercut so as to fit against the rear inclined faces 32 of the punch-housings when the lower ends of the latter rest upon the table. Said flange or gib 35 thus forms a fixed clamp-member which serves to accurately aline any number of the punch-units. A parallel, coacting, movable clamp-member is formed by a bar 36 which is mounted pivotally in a recess or trough 37 extending longitudinally of the base intermediate its front and rear sides. The clamp-bar 36 extends above the table sufficiently to engage the inclined faces 31 at the front sides of the punch-housings, the rear side of the bar being undercut to fit against said faces. In the lower portion of the trough 37 is a rod 38 of which the ends are held in the end-portions of the

base, and a tubular sleeve 39 is disposed upon the rod intermediate said end-portions. Lugs 40 on the lower portion of the clamp-bar 36 fit pivotally about said sleeve 39, and the central one of said lugs 40 is cut away at the rear side so that a screw 41, which extends through the rear side of the trough, may engage the sleeve as shown in Fig. 6. A plurality of small coil springs 42 are disposed in pockets formed in the rear side of the clamp-bar, said springs engaging the rear side of the trough and tending to swing the bar forwardly away from the punch-housings. Clamp-screws 43 extend through the base from the front side thereof, said screws having winged heads, as shown, and the rear ends thereof being engageable with the clamp-bar to press the same firmly against the faces 31 of the punch-housings. As said clamp-screws engage the bar 36 at points intermediate the punch-housings and the fulcrum-rod 38, there is a tendency to bend said rod rearwardly, and the screw 41 is used to prevent such bending of the rod.

Between the gib 35 and clamp-bar 36 the table is slotted from end to end, the slot being parallel with the clamping members. In said slot at the ends of the base are fitted bearing blocks 44, and a similar block 45 is disposed at the middle of the slot, said blocks being fixedly held in place by means of set-screws 46 extending through the base from the rear side, as shown. Said bearing-blocks support revolubly the ends and central portion, respectively, of a shaft 47, of which one end is extended beyond the base and carries a crank 48. The portions of said shaft intermediate the center-block 45 and end-blocks 44 are threaded to form right-hand and left-hand lead-screws, on which are mounted the vice-jaws 49. The lower portions of the vice-jaws fit slidably in the slot of the table, and the upper portions of said jaws extend above the surface of the table, as shown in Fig. 11. By rotation of the crank 48 the jaws are moved toward or away from each other, according to the direction of rotation.

A rocking-shaft 50 extends longitudinally through the rear portion of the base, beneath and parallel with the gib 35, and upon the projecting end-portions of said shaft are fixedly secured the arms 51 and 52 which extend upwardly therefrom. Said arms have rearwardly projecting lugs 53 intermediate their upper and lower ends, and between said lugs the cross-rod 54 is fixedly secured. An arm 55 is formed integrally with the arm 52, and extends forwardly from the rocking-shaft, alongside the end of the base and beneath the projecting end of the vice-screw-shaft 47. At the front end of the arm 55 is a head 56 in which a latch-pin 57 is slidably held. A small coil spring, indicated by dotted lines in Fig. 1, is arranged around the latch-pin within the head 56, said spring en-

gaging a shoulder on the pin and pressing the same toward the base. An opening is formed in the end of the base for receiving the inner end of the latch-pin, and when the same is entered in said opening it holds in fixed normal position the rocking frame comprising the arms 51, 52 and 55, the shaft 50, and the cross-rod 54. The punch-actuating lever is mounted pivotally between the upper ends of the arms 51 and 52, said lever comprising a bar 58 having an integral forwardly extending lip 59, terminating in a rounded bead 60 adapted to fit within the notches 24 of the punch-bars, and a handle 61 secured upon the central portion of said bar 58 and extending upwardly therefrom. Screws 62 extend through the frame-arms 51 and 52 into the ends of the bar 58 to form the pivotal connection of said members. Near the ends of the bar 58 are rearwardly projecting fingers 63, and from said fingers the tension springs 64 extend downwardly to connect with eye-bolts 65 on the rear side of the base. At one end of the bar 58 is an upwardly extending lug 66 having a threaded opening therein to receive an adjusting-screw 67, the rear end of said screw being adapted to engage a stop-lug 68 on the arm 51, whereby to limit the lifting movement of the actuating-lever, as effected by the springs 64. By grasping the head of the latch-pin 57 and pulling said pin outwardly to disengage the same from the base, the rocking frame is released and may then be tilted backwardly to a position such as shown by dotted lines in Fig. 2. The punch-actuating lever is thereby disengaged from the punch-bars, and the space above the clamping devices is cleared to provide easy access to the parts held thereby.

In the table or top of the base, in front of the trough 37, there is a rectangular groove which extends at one end through a lug 69 on the end of the base. In said groove is slidably disposed a bar 70, the same being retained in the groove by a thin cover-plate 71. At the front side of the lug 69 is a knurled-head set-screw 72 which may be tightened against the bar 70 to hold the same in longitudinally adjusted positions. To the upper side of the bar, adjoining said lug 69, there is secured a finger-plate 73 which extends rearwardly and has a vertical lug 74 integral therewith. Said lug 74 forms an end-gage for positioning long rules or the like with respect to punches held by the vice-jaws and clamped between the gib 35 and clamp-bar 36. For short rules, and for type-slugs and the like, the longitudinal position with respect to the punches is gaged by means of plates 75 which are clamped in the holding devices in the same manner as the punch-housings. One of said gage-plates 75 is indicated in Fig. 1, adjoining each of the vice-jaws. The thickness of the punch-housings is preferably a unit of printer's measure,

usually one pica, so that if a series of the housings are assembled in the holding means alongside each other, the punches will be positioned for notching rules and the like at points spaced apart one pica. When a series of the punch-housings are so assembled, if it should be desired to omit the notches at one or more points on the rule, the punches may be removed from the respective housings, and the remaining punches then operated without changing the assembly of the housings. To avoid the use of an excessive number of the punch-housings for filling out the desired longitudinal spacing of the punches to be operated, we also provide a plurality of spacing-plates 76, which are of the same outline form as the lower portions of the punch-housings, so as to fit between the clamping members 35 and 36, but of which the thickness is varied so that by suitable combinations of the plates any desired spacing of the punches may be attained. Preferably, the thickness of the spacing-plates is varied in multiples of the "point" unit of printer's measure, some of the plates being, for example, two-points thick, others six-point, and others twelve-point or one pica. The ordinary spacing-plates 76 are recessed at their front edges to the same depth as the recesses 29 of the punch-housings, so that when a rule or rule-slug with a thin "hair-line" printing-face is inserted for punching, said printing-face will not be marred or deformed by engaging the ends of said recesses, but will engage only the gage-faces 23 of the punch-blades 21. As the portions of the printing-faces so engaged with the faces 23 are cut away by the operation of the punches, it will be apparent that the remaining portions of the printing-faces of the punched rules will show no deformation, even if the rules should be pushed against the gage-faces 23 with unnecessary force.

Referring to Figs. 13 and 14, there is shown a special form of the spacing-plates, 761, wherein the recesses are formed with a shoulder or offset 77, beneath which a thin slot 78 extends back to at least the depth of the recesses 29 of the punch-housings. When punching thin rules A, one of said special plates 761 is preferably disposed alongside each of the punch-units, so that, when a rule is inserted for punching, the same will extend into the slot 78 as shown in Fig. 14. The plates 761, when so employed, serve as strippers to prevent lifting of the rule during the withdrawal of the punches therefrom, which might deform the notches or the printing-face of the rule. The special plates 761 are also employed when punching a type-bar or slug B with a rule-face, such as indicated in Fig. 13. For this purpose the shoulder 77 is so located as to engage the shoulder of the slug B when the same is inserted to the proper depth beneath the punches. It should

be noted that the slug B is of the character formed by linotype and similar type-bar casting machines, wherein the shoulder of the slug is always at a uniform distance from the printing-face, although the over-all dimension of the slug may not be exactly type-high. It will thus be seen that when the punched notches are gaged from the shoulder of the slug the notches will be located in the same relation to the printing-face as if gaged directly from said face, and without liability of the printing face being marred by the gage.

In the preparation of ruled printing-forms it is often desirable to employ type-slugs C of the character indicated in Figs. 15 and 16, having at one or more places intermediate the type-faces *c* lugs 79 which may be punched or notched to receive linotabular column-rules of which the base-positions will rest upon the shoulders of the slugs. For use with type-slugs of this kind, we provide special gage and spacing-plates 762, one of which is shown in Fig. 12, in connection with one of the punch-units. Said plate 762 has in the front side thereof a rectangular recess similar to the recess 29 of the punch-housing, but with the end 81 of said recess slightly in front of the end of the recess 29, which is indicated by a dotted line in said Fig. 12. When the plates 762 are assembled with the punch-units in the clamping mechanism, said end-faces 81 are alined with the gage-faces 23 of the punches. When the slug C is inserted for punching, the type-faces *c* engage the surfaces 81, and the lugs 79 are thus positioned with respect to the punches as shown in Fig. 7, so that the notches punched in said lugs are properly positioned for holding the inserted rules with their printing faces at the same level as the type-faces.

From the foregoing the general operation of the mechanism will be apparent. When changes are to be made in the arrangement of the punch-units, the latch-pin 57 is pulled out to release the rocking frame which carries the punch-actuating lever, and said frame is tilted backward to disengage the lever from the punches. The crank 48 is then turned to move the vise-jaws 49 apart, and the clamp-screws 43 are turned to relieve the pressure of the clamp-bar 36 against the punch-housings and spacing-plates. Said members can then be removed or additional members inserted in the holding mechanism in the proper arrangement according to the work to be done, after which the crank 48 is turned to press the vise-jaws lightly against the ends of the assemblage, then the clamp-screws 43 turned to press the parts lightly against the gib 35 to properly aline them, and finally both the vise or side-clamping means and the bar 36 or end-clamping means tightened up to securely hold the parts in alined and adjusted relation. For short

rules, and for type-bars and slugs, the longitudinal relation thereof to the punches is gaged by means of the plates 75, which are arranged at the proper distance from the punches. For rules of which the length is greater than can be accommodated by one of the plates 75 held between the vise-jaws, the lug 74 is employed as an end-gage, the bar 70 being adjusted to hold the lug in the desired position, and the bar being secured in adjustment by the screw 72. After clamping the punch-units, spacing-plates and gages in the desired positions, the rocking-frame is swung forward to engage the bead 60 of the punch-actuating lever in the notches 24 of the punch-bars, said frame being retained in operating position by the latch-pin 57. The rules or type-bars to be punched are then inserted beneath the punches, being pushed lightly rearward against the gage-faces, and the lever-handle 61 then pulled forwardly to force the punches down through the work. The chips or punchings pass down through the clearance-openings 30 into a longitudinal groove 80 in the table, from which they may be removed from time to time, as necessary.

It will be obvious that by the formation of the perforating members 22 integrally with the blades 21, and the guiding and supporting of said blades at their sides and rearward edge, the members 22 are effectually prevented from being deflected, bent or broken by normal and proper usage of the mechanism. It will also be apparent that by the use of the spacing-plates 76 of standardized thickness, and the use of the vise-jaws to press the assemblage firmly together longitudinally of the alining clamp members 35 and 36, the punches may be easily located in exact and measured relation to each other, and retained in such relation during operation upon any number of parts.

Now, having described our invention, what we claim and desired to secure by Letters Patent is:

1. In a mechanism for punching column-rule notches in type-slugs and rules, a punch-unit comprising a longitudinally channeled housing, a punch-bar fitting slidably in the channel of said housing, and a perforating member adapted to traverse a recess extending into the housing from one side thereof, said perforating member being integrally united throughout its length with one edge of the punch-bar whereby to be guided and supported thereby.

2. In a mechanism of the class described, the combination with punch-units each comprising a flat housing having a vertical channel and a transverse recess extending from one edge to intersect said channel, and a punch-bar slidable in said vertical channel so that a portion thereof may traverse said recess, of holding means having opposed

clamping-bars adapted to engage opposite edges of the punch-unit housings to aline a series thereof, vise-jaws movable longitudinally of the clamping-bars to press together a series of the housings, and an actuating-lever mounted on the holding means and movable into and out of position for operatively engaging all the punch-bars of a series of punch-units held by the clamping-bars and vise-jaws.

3. In a mechanism of the class described, a base member having a flat table-surface and a longitudinal fixed gib adjoining the same, a movable clamp-bar extending parallel with said gib, vise-jaws disposed between said clamp-bar and gib and movable longitudinally thereof, and an actuating-lever having a longitudinal lip extending parallel with said gib and clamp-bar, said lip adapted to operatively engage punch-bars of a series of punch-units held upon the table-surface by the clamp-members and vise-jaws.

4. In a rule-notching punch-mechanism, a series of punch-units, housings for the punch units, spacing-plates contoured identically with portions of the housings of the punch-units, clamping means for engaging opposite edges of the spacing-plates and housings to aline an assembled series thereof, means for pressing the series of members together longitudinally of the clamping-means, and an actuating member operatively engageable with the punch-bars of the entire series of punch-units to actuate the same simultaneously, the punch-units and some of the spacing-plates having alined gage-faces for contact with the printing-faces of rules, whereby to gage the position of the punched notches with respect solely to said printing-faces.

5. In a mechanism for punching rule-receiving notches in the edges of rule holding strips, punch-units each comprising a housing having a vertical channel and a transverse recess extending from one edge to intersect said channel, a punch-bar slidable in said channel and arranged so that a portion thereof may traverse said recess, holding means for said punch-units having opposed clamping-bars adapted to engage opposite edges of the punch-unit housings to aline a series thereof, and an actuating-lever mounted on the holding means and movable into and out of position for operatively engaging all the punch-bars of a series of punch-units held by the clamping-bars.

6. In a mechanism for punching rule-receiving notches in the edges of rule holding strips, a base member having a flat table-surface and a longitudinal fixed gib bordering said surface, a movable clamp bar extending parallel with the gib, punch-units adapted to be clamped upon said surface by said clamping members each punch-unit comprising a housing and a punch-bar slidable therein, and an actuating lever having a longi-

tudinal lip extending parallel with the gib and clamp-bar, said lip adapted to operatively engage the punch-bars of a series of punch-units held upon the table surface by the clamping members.

7. In a mechanism for punching rule-receiving notches in the edges of rule holding strips, a base member having a flat table-surface and a longitudinal fixed gib bordering said surface, a movable clamp bar extending parallel with the gib, punch-units adapted to be clamped upon said surface by said clamping members each punch-unit comprising a housing and a punch-bar slidable therein, and an actuating lever having a longitudinal lip extending parallel with the gib and clamp-bar, said lip adapted to operatively engage the punch-bars of a series of punch-units held upon the table surface by the clamping members, and said actuating lever being mounted for movement bodily toward and from the punch-bars for engaging and disengaging same.

8. In a mechanism for punching rule-receiving notches in the edges of rule holding strips, a base member having a flat table-surface and a longitudinal fixed gib bordering said surface, a movable clamp bar extending parallel with the gib, punch-units adapted to be clamped upon said surface by said clamping members each punch-unit comprising a housing and a punch-bar slidable therein, and a lever for actuating the punch-bars of the several punch-units, the actuating lever and the punch-bars provided with co-operating openings and projections for effecting operative engagement thereof.

9. In a mechanism for punching rule-receiving notches in the edges of rule holding strips, a base member having a flat table-surface and a longitudinal fixed gib bordering said surface, a movable clamp bar extending parallel with the gib, punch-units adapted to be clamped upon said surface by said clamping members each punch-unit comprising a housing and a punch-bar slidable therein, and a lever for actuating the punch-bars of the several punch-units, the actuating lever and the punch-bars provided with co-operating openings and projections, and said actuating lever mounted for bodily movement toward and from the punch-bars for effecting operative engagement thereof.

10. A punch unit for use in mechanism of the kind described, and comprising a flat housing adapted to be secured in vertical operative position, the housing having a vertically extending punch receiving and guiding opening adjacent to its forward edge, a punch member movable up and down in said opening, a transverse notch in the forward edge of the housing and intersecting said guide opening, the lower end of the punch member being adapted to traverse said notch, and a shoulder in said notch adapted to serve

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as a stop in the setting of rule holding material provided with shoulders below their upper edges.

5 11. A punch unit for use in mechanism of the kind described, and comprising a flat housing adapted to be secured in vertical operative position, the housing having a vertically extending punch receiving and guiding opening adjacent to its forward edge, a
10 punch member movable up and down in said opening, a transverse notch in the forward edge of the housing and intersecting said guide opening, the lower end of the punch member being adapted to traverse said notch,
15 the forward side of the punch which forms the bottom of the notch serving as a shoulder in said notch adapted to serve as a stop in the setting of rule holding material provided with shoulders below their upper edges.

20 12. A punch unit for use in mechanism of the kind described and adapted to punch rule receiving openings in the upper edges of line printing slugs and other printing material having top shoulders spaced a specified distance below their printing faces, said unit
25 comprising a flat housing adapted to be secured in vertical operative position, the housing having a vertically extending punch receiving and guiding opening adjacent to its
30 forward edge, a punch member movable up and down in said opening, a transverse notch in the forward edge of the housing and intersecting said guide opening, the lower end of the punch member being adapted to traverse
35 said notch, and a shoulder in said notch against which the shoulders of the printing material can be placed for setting the printing material to cut the notch the right depth, said shoulder in the notch being fixed as regards
40 movement horizontally of the housing.

13. In a machine of the kind described, a pivotally mounted punch operator, the operator movable into engagement with and disengagement from a series of punches, the operator adapted to move the punches up and
45 down, stops limiting the up and down movements of the operator while in engagement with the punches and permitting the operator to be swung up out of the path of the punches when free therefrom, and a spring
50 arranged for normally holding the operator at the upper limit of its movement when in engagement with the punches, said spring permitting the free swinging of the operator out of the path of the punches when free from
55 the same.

14. In a multi-punch punching machine, punches movable up and down, a punch operator movable forward and back for engagement with and disengagement from the
60 punches, and also movable up and down for operating the punches, and cooperating stops on the operator and the frame of the machine for limiting the upward movement of the operator while in its forward position in engagement with the punches.
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15. In a multi-punch punching machine, punches movable up and down, a punch operator movable forward and back for engagement with and disengagement from the
70 punches, and also movable up and down for operating the punches, cooperating stops on the operator and the frame of the machine for limiting the upward movement of the operator while in its forward position in engagement with the punches, and said operator
75 being free of said stops in its rear position.

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