Oct. 3, 1950 J. A. YERKES 2,524,582

PAPER PUNCH

Filed Dec. 8, 1945 2 Sheets-Sheet 1

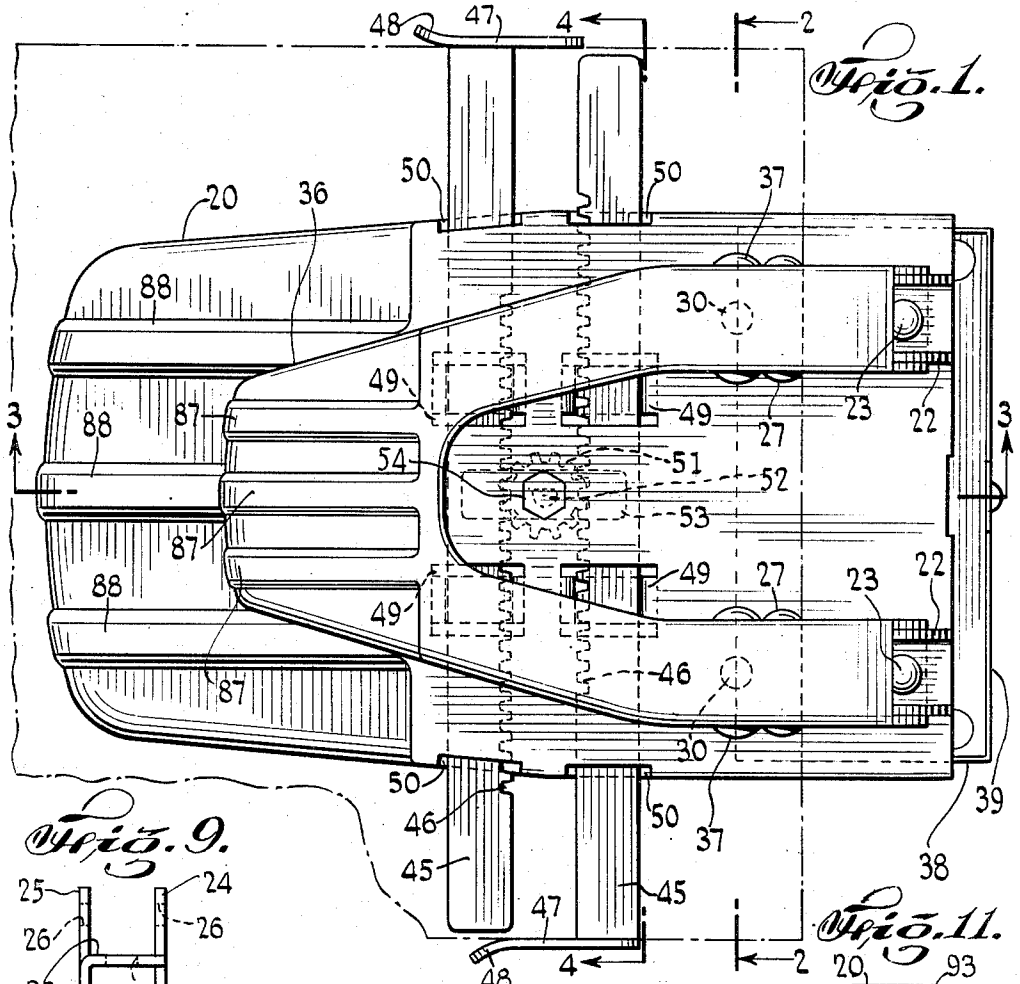



Fig. 1.

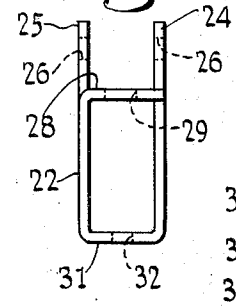



Fig. 9.




Fig. 2.




Fig. 11.

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Fig. 3.

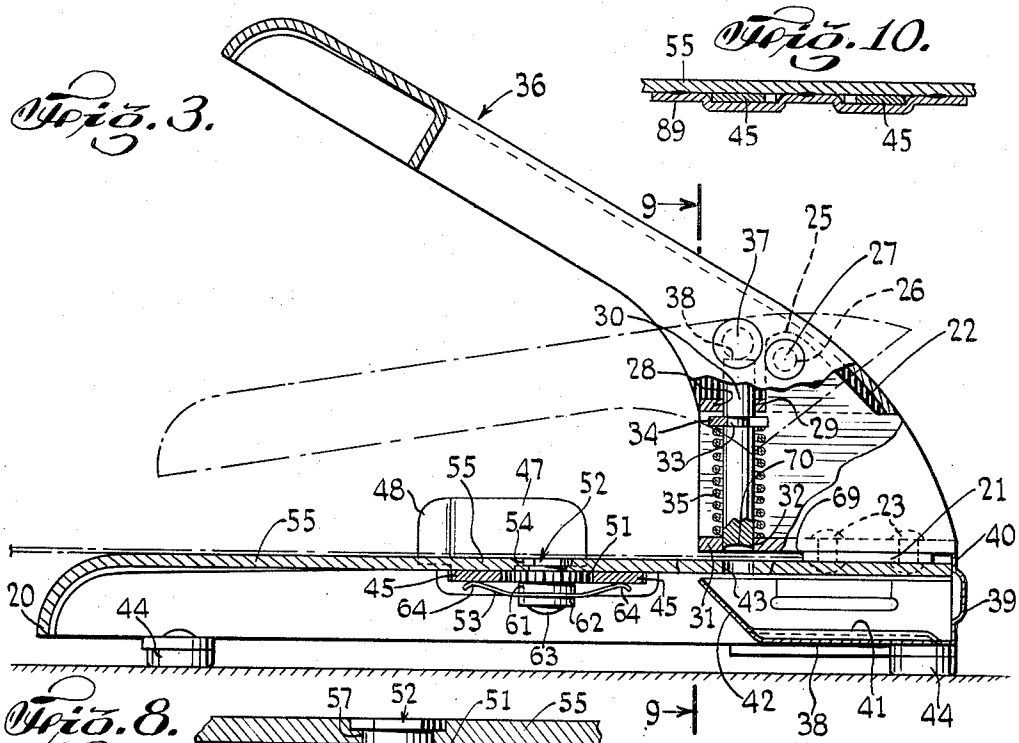



Fig. 10.




Fig. 8.

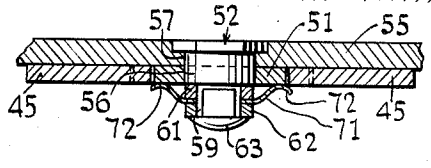



Fig. 4.

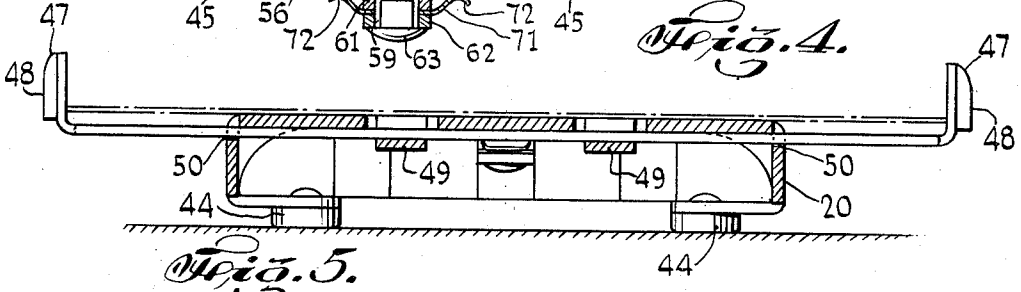



Fig. 5.

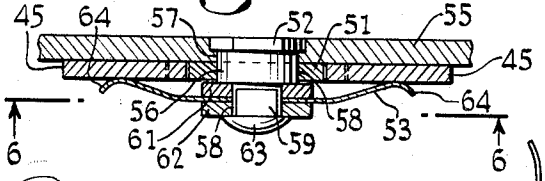



Fig. 7.

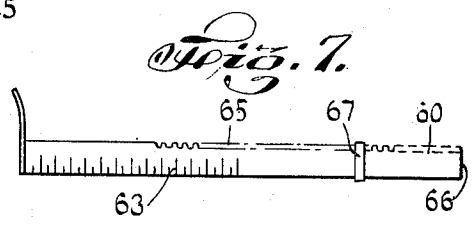
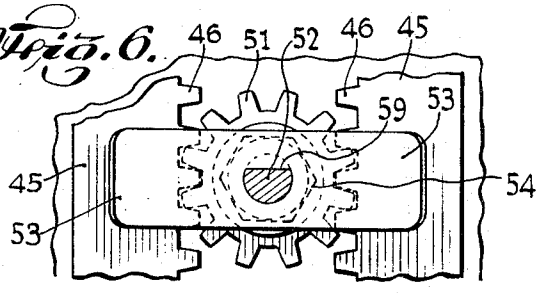



Fig. 6.




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# UNITED STATES PATENT OFFICE

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## PAPER PUNCH

John A. Yerkes, New York, N. Y.

Application December 8, 1945, Serial No. 633,636

16 Claims. (Cl. 164—91)

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This invention relates to a perforating device and particularly to an apparatus for punching holes in sheets of paper, cardboard, or similar material and is especially suitable for desk or office use.

When filing papers and similar materials, it is usually necessary to punch a pair of holes in them for the purpose of allowing insertion of a paper fastening or binding means such as a double pronged fastener or a pair of round-head paper fasteners. When papers are to be fastened into files or folders, it is desirable to center accurately the holes punched in the paper for convenience and for orderly arrangement. This requires that guide means be provided for holding the paper or stack of papers centrally of the punch arrangement to insure accuracy in the centering operation. If the centering is attempted by eye only, the results are uneven. Inasmuch as papers frequently are of various widths, a fixed guide arrangement is not satisfactory and means must be provided for easily, quickly, and accurately changing the width between the paper guides.

One of the objects of the present invention is to provide a pair of gauge bars which are adjustable with ease transversely on a base or parallel to the top edge of the paper when located in punching position so as to center the paper therebetween in relation to a punch or punches carried by the base. The gauge means also is arranged so that neither member thereof can be accidentally withdrawn and removed from the base as the gauges are operated. The gauge bars and assembly are fitted on the base in such a manner that they may be easily assembled and all play between parts eliminated.

Another object of the invention is to provide an assembly which is light and adapted for use as a portable desk type paper punch. The parts preferably are made of stampings, and the base is formed with indentations or bosses to provide bearing surfaces integral with the base itself. By such a construction, the paper punch described herein lends itself to economy and ease of manufacture.

Another object of the invention is to provide a friction device for the gauge arrangement which may be easily assembled to the base of the punch, the friction device serving to prevent accidental displacement of the gauges after setting and to take up lost play. The same pivot upon which the friction or locking device is mounted also may serve as the bearing for a pinion gear engaging the two gauge bars, the pinion interconnecting

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the gauge bars so that they will co-operate with each other when moved.

Other objects of the invention will become apparent from the following description and drawings which are merely exemplary:

Fig. 1 is a plan view of the device.

Fig. 2 is a fragmentary vertical section taken along the line 2—2 of Fig. 1.

Fig. 3 is a vertical section taken along line 3—3 of Fig. 1 but with the drawer or tray not partially removed.

Fig. 4 is a vertical section taken along the line 4—4 of Fig. 1.

Fig. 5 is an enlarged view partially in section of the pinion pivot of Fig. 1.

Fig. 6 is a bottom view taken along the line 6—6 of Fig. 5.

Fig. 7 is a view of a modified form of one of the gauge bars.

Fig. 8 is a sectional view of another form of frictional device engaging the pinion wheel.

Fig. 9 is a front view of one of the handle support brackets looking in the direction 9—9 of Fig. 3.

Fig. 10 is a fragmentary sectional view through the gauge bar supports showing an alternative construction thereof.

Fig. 11 is a fragmentary elevation view with the gauge bar in section showing one form of a locking catch which can be used if desired.

In a preferred form of the device, the base 20 is formed by stamping from a suitable sheet metal, although, of course, the base also may be made from a casting, die casting, or may be made of a plastic. Raised bosses 21 have handle brackets 22 (Fig. 3 and Fig. 9) mounted thereon, said brackets being fastened to raised bosses 21 of frame 20 by means of rivets 23 or other suitable fastening means. Brackets 22 may be made from single pieces of material by stamping and bending to shape the upstanding portions 24 and 25 (Figs. 3 and 9), apertures 26 being formed in said upstanding portions for reception of handle pivots 27. The front portion of handle bracket 22 may be bent over as at 28 to form an upper wall and an aperture 29 placed therein for guiding paper punch 30. Lower wall 31 of handle bracket 22 has an aperture 32 for receiving and guiding the lower end of paper punch 30.

Paper punch 30 has a groove 33 cut in the shank thereof to receive a split washer 34, spring 35 being held between the bottom wall 31 of the bracket and split washer 34. In assembling the punch to the handle support, the punch may be inserted through holes 29 and 32 and slid

through a spring positioned between said holes and then the split washer 34 inserted into the groove 33 of punch 30 as the spring is compressed by the fingers or otherwise. The handle bracket 22 thus serves as a simple means for holding and allowing easy assembly of the paper punch and its spring therewith as a unit.

Operating handle 36 is pivoted on shafts 27 and has punch engaging rods or elements 37 mounted thereon, said rods 37 contacting the tops 38 of punches 30, springs 35 normally holding the pinion and handle in the upper or normal position seen in Fig. 3. The handle 36 is preferably made by stamping from a suitable sheet metal but can be made in other manners and can have raised ridges 37 to assist in gripping it and to strengthen the handle.

At the rear end of the base 20 an opening is provided for receptacle or tray 38, the tray 38 being preferably made from a stamping and having a front face 39 with an upstanding portion 40 so that the tray may be engaged and easily removed. The tray has ribs 41 therein for strengthening purposes and to provide clearance for rivets which secure feet 44. The forward end 42 of tray 38 extends under die apertures 43 for collecting the punched discs of paper. Die apertures 43 are located under punches 30 and co-operate therewith for punching papers placed between the die apertures and the punches.

Base 20 may have portions turned thereunder to which can be attached rubber or other suitable feet 44 to support the base on a desk without scratching the desk. The base also can have ridges 88 thereon to strengthen the same and to decrease the friction as the paper is slid into position. The ridges are of the proper height to guide the papers at the correct level under the punches.

As previously stated, it is desirable to be able to center the paper or stack of papers relative to the paper punch. In the preferred form of the device, two gauges extending either side of the longitudinal center line of the base are shown.

Gauge bars 45 preferably are shaped by stamping from a flat piece of stock, rack or gear teeth 46 being formed therein and preferably stopping short of either end of the bar. Ends 47 are bent upwardly and formed at their leading edges 48 with an outwardly flaring portion so as to assist in guiding a piece of paper between the upstanding flanges 47, especially after they have been set for a particular width and other sheets of the same width are to be punched.

The upwardly bent flanges 47 are made of such a length as to overlap each other so that as paper is advanced on the base toward the punch it will contact parallel portions of both gauge flanges at substantially the same time.

Indentations 49 may be formed in the base 20 to serve as bearings or slideways for gauge bars 45. Openings or guideways 50 are provided at the junction of the vertical and horizontal faces of the exterior of the base 20, which also may serve as bearing surfaces for the gauge bars 45. The indentations and bearing surfaces as seen in Fig. 3 are arranged so that the teeth of the rack or bar will not rub against the edge of the bearings.

Pinion 51, which may be a stamping, is mounted between gauge bars 45 so that it engages the rack teeth 46 of both of said bars, pivot 52 being provided for carrying pinion 51 and also for supporting a friction device or spring 53. A hexagonal or other irregular shaped aperture 54 may



be formed in the top face 55 of base 20, said hole not passing entirely through the base so as to provide shoulder for supporting the pivot. Shank 56 passes through aperture 57 of the base and aperture 58 of pinion 51, pinion 51 being rotatable on circular shank 56. A further reduced shank portion 58 depends from circular shank 56, said circular shank 58 having a flattened portion 59 (Figs. 5 and 6) thereon.

Friction element, plate, or spring 53 is mounted on reduced shank 58, said spring having an aperture therethrough corresponding to the cross-sectional shape of reduced shank 58 so that the spring may be held in a fixed position relative thereto. Washers 61 and 62 may be located on either side of friction element 53 and the reduced shank portion 58 may be headed over at 63 to hold the washers, friction element, and pinion in position on base 20, although a screw threaded element or other equivalent fastening means may be used in place of the headed part 63. The ends 64 of the friction element 53 frictionally engage the under surfaces of gauge bars 45 and serve to hold said gauge bars against the underside of top face 55 of base 20. The friction elements thus serve to provide the necessary friction to prevent accidental displacement of the gauge bars after they are set and to take up play in the parts.

A positive lock may be provided as seen in Fig. 11 for positively locking the gauge bars in place. The base 20 has cam lever 91 pivoted at 90 with a suitable handle 92. Cam surface 93 of said lever will engage the under surface of the gauge bar 45 when the lever is pressed downwardly so as to prevent accidental displacement of the gauge bars after they have been set. The lever may be a stamping and, of course, can take shapes other than that specifically shown.

When it is desired to punch a sheet of paper, one or both of the gauge bars or guide flanges 47 is grasped and moved inwardly or outwardly in accordance with the size of the paper to be punched. The other flange 47 will be moved inwardly and outwardly relative to the first flange, motion being transmitted through the pinion 51. It thus is seen that if the gauge bars are centrally adjusted when assembled, the flanges 47 will always be equal distances from the longitudinal center line of the punch, the gauge bars moving on the base in a transverse direction relative thereto.

The construction of the gauge bar and assembly thereof with the base of the device is very simple and can be accomplished easily and without difficulty.

When the rack teeth do not extend to the ends of the gauge bars, a positive stop is provided so that the gauge bars cannot be withdrawn accidentally from the device and thus their setting relative to each other disturbed.

An alternative form of gauge bar is shown in Fig. 7 at 60 with the rack teeth 65 extending to the end 66 of the gauge bar and stop 67 may be provided to prevent the gauge bar shown in Fig. 7 from being withdrawn. The gauge bar of Fig. 7 also has index lines 68 thereon which may be provided for indicating purposes or to allow easy setting of the device when the width of the paper is known.

In operation, paper is inserted into the machine and the gauge bars adjusted until the edges of the paper contact their respective flanges of the gauges. The paper is moved inwardly until the forward edge engages surfaces 69 of raised bosses

21, said surfaces 69 being accurately positioned relative to the center line of the punch so as to position the holes in the paper a predetermined distance from the edge thereof. The paper having been centered, handle 36 is depressed causing rods 37 to engage the tops 38 of the punches 30, forcing the lower ends 70 of the punches to pass through the paper and into die apertures 43. Upon release of the handle 36, springs 35 will cause the handle to resume a normal elevated position and the punched discs of paper will fall into tray 38 which may be emptied when full or as necessary.

An alternative form of friction device is shown in Fig. 8 wherein parts identical to Figs. 1 and 6 are given the same numbers. Hexagonal head 52 of the pivot pin is inserted in a mating hexagonal hole in top face 55 of base 20, reduced shank 56 passing through the circular aperture 57 of top face 55 of the base 20. The flattened reduced shank 59 has washers 61 and 62 placed thereon with a flat spring or friction plate 71 held between washers 61 and 62 in a manner similar to friction plate or spring 62, the ends 72 of said friction plate engaging pinion 51. The friction plate 71 is prevented from turning on the pivot by having an aperture therein of the same shape as the flattened reduced shank 59. The pinion 51 will be rotated as gauge bars 45 are moved and end 72 of friction device 71 will be held stationary relative to the pivot pin and thus end 72 will frictionally engage the pinion and tend to resist its turning.

The indentations providing guide bearings or slideways for the gauge bars may be replaced by separate plates or brackets fastened to the bottom face of the base such as shown in Fig. 10 wherein bracket 89 is fastened to face 55 of the base in any suitable way. The bracket 89 is shaped to provide saddles or guides for the gauge bars 45.

Various combinations of punches, shapes of handles, and other details of construction may be used, and it is to be understood that various changes and modifications from those specifically mentioned may be made without departing from the spirit of my invention or the scope of the appended claims.

I claim:

1. In a paper punch, a base having an opening on each side; a pair of interconnected gauge bars with rack teeth, said bars being mounted on said base, said gauge bars having upturned paper engaging flanges at the outer ends on opposite sides of said base, said gauge bars being movable relative to each other and said base, portions of said gauge bars being projectable through said openings in said base, said paper engaging flanges being movable beyond the confines of said base; and a pinion carried by said base interconnecting said teeth, whereby said bars have simultaneous inward and outward movement relative to each other.

2. In a paper punch, a base; a pivoted lever mounted on said base; a punch operable by said lever; a pair of co-operating gauge members having rack teeth thereon; a pinion interconnecting said rack teeth; a pinion pivot; and frictional engaging means mounted on said base and engaging said gauge bar and pinion system.

3. In a punch, a base; a pivoted lever mounted on said base; a punch operable by said lever; a pair of cooperating gauge members having rack teeth thereon; a pinion interconnecting said rack teeth; a pinion pivot mounted on said base and rotatably carrying said pinion; and means carried by said pivot for frictionally engaging said gauge bars.



4. In a paper punch, a base; a pivoted lever mounted on said base; a punch operable by said lever; a pair of co-operating gauge members having rack teeth thereon; a pinion interconnecting said teeth; a pinion pivot non-rotatably mounted on said base and rotatably carrying said pinion; and means non-rotatably carried by said pivot and frictionally engaging said gauge bars.

5. In a paper punch, a base; a pivoted lever mounted on said base; punches operable by said lever; a pinion; a pair of co-operating gauge bar members having rack teeth mounted on opposite sides of said pinion and interconnected thereby; and a spring plate having ends frictionally engaging said bars.

6. In a paper punch, a base, a pivoted lever mounted on said base, a punch operable by said lever, a pair of cooperating gauge members having rack teeth thereon slidably carried by said base, a pinion interconnecting said rack teeth, a pinion pivot on said base, and a frictional engaging element between said base and the gauge and pinion system holding said gauge bars and pinions in adjusted position.

7. In a paper punch, a base, a pivoted lever mounted on said base, a punch operable by said lever, a pair of cooperating gauge members having rack teeth thereon slidably carried by said base, a pinion interconnecting said rack teeth, a pinion pivot on said base, and a spring frictional engaging element between said base and the gauge and pinion system holding said gauge bars and pinions in adjusted position.

8. In a desk-type paper punch, a unitary stamped metal base having gauge bar guideways on opposite sides thereof and guide indentations formed from the base, said guide indentations being continuous between margins and having passageways on either side thereof, a pivoted lever mounted on brackets carried by said base, a pair of punches operable by said lever, a pair of interconnected gauge bar members mounted on said base, each of said gauge bars being slidable on at least one of said indentations and through one of said guideways under the top surface of said base, and a pinion interconnecting said gauge bars, whereby the gauge bars are movable oppositely relative to each other and the base to accommodate and center paper of varying width relative to said punches.

9. In a desk-type paper punch, a unitary formed metal base having gauge bar guideways on opposite sides thereof, gauge bar slideways fastened to said base, a pair of unitary stamped metal gauge bars having an upturned gauge flange on one end of each and formed teeth along the edges of each, each of said gauge bars being slidable under said base and in the slideway therefor and through one of said guideways, and a pinion located between and interconnecting said teeth, whereby the gauge bars are moved oppositely relative to each other and the base to accommodate and center paper of varying width relative to said punches.

10. In a desk-type paper punch, a base having a pair of gauge bar slots in opposite sides thereof, gauge bar slideways on said base opposite said slots, a pivoted lever mounted on said base, a pair of punches operable by said lever, a pair of interconnected gauge bar members substantially longer than the width of said base with the gaug-

ing portion of each gauge bar projecting beyond the base, each of said gauge bars extending through a pair of slots in opposite sides of the base and a slideway therefor, said gauge bars being operable simultaneously in opposite directions to accommodate and center paper of varying width relative to said punches.

11. In a portable punch, the combination comprising, a metal base having an opening on each side, a pivoted lever mounted on said base, punches operable by said lever, a pair of interconnected gauge members, gauge member slideway means aligned with said openings, said gauge members being movable relative to each other and said base, portions of said gauge members being projectable through said openings in said base and said portions having paper engaging portions movable beyond the confines of said base, and connecting means between said gauge members to cause simultaneous movement of said gauge members toward and away from each other upon movement of said gauge members so as to center paper as it is fed to said punches.

12. In a portable punch, the combination comprising, a metal base having an opening on each side, a pivoted lever mounted on said base, punches operable by said lever, a pair of interconnected gauge members, gauge member slideway means aligned with said openings, said gauge members being movable relative to each other and said base, each of said gauge members being projectable through each of said openings on both sides of said base and having paper engaging portions movable beyond the confines of said base, and connecting means between said gauge members to cause simultaneous movement of said gauge members toward and away from each other upon movement of said gauge members so as to center paper as it is fed to said punches.

13. In a paper punch, a base, a pivoted lever mounted on said base, a punch operable by said lever, a gauge bar and pinion system including a pair of cooperating gauge members having rack teeth thereon and a pinion interconnecting said rack teeth; a pinion pivot, and an additional frictional engaging means engaging said gauge bar and pinion system.

14. In a paper punch, a unitary die-formed metal base having guideways on opposite sides thereof; a pivoted lever mounted on brackets carried by said base; paper punches operable by said lever; dies carried by said base; a pair of unitary stamped and bent metal gauge bars transversely slidably mounted on said base and having paper engaging portions of said bars protruding therefrom through said guideways; and means to positively interconnect said gauge bars mounted under the top surface of said base to provide simultaneous opposite inward and outward movement of said bars relative to each other upon movement thereof.



15. In a portable punch, the combination comprising, a base having an opening on each side, a pivoted lever mounted on said base, punches operable by said lever, a spring acting on said punches and lever to restore the punches and lever from operating position to normal position, a pair of interconnected gauge members, gauge member slideway means aligned with said openings, said gauge members being movable relative to each other and said base, portions of said gauge members being projectable through said openings in said base and said portions having paper engaging portions movable beyond the confines of said base, and connecting means between said gauge members to cause simultaneous movement of said gauge members toward and away from each other upon movement of said gauge members so as to center paper as it is fed to said punches.

16. In a portable punch, the combination comprising, a base having an opening on each side, a pivoted lever mounted on said base, punches operable by said lever, a pair of interconnected gauge members having rack teeth thereon, gauge member slideway means aligned with said openings, said gauge members being movable relative to each other and said base, portions of said gauge members being projectable through said openings in said base and said portions having paper engaging portions movable beyond the confines of said base, a pinion rotatably carried by said base interconnecting said rack teeth, and an additional mechanical means engaging said gauge and pinion system to prevent rotation of said pinion except when the gauge bars are being adjusted.

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