

1,035,637.

2 SHEETS--SHEET 1.



J. P. Bondin Fig. 7.
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PUNCHING MACHINE.
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2 SHEETS—SHEET 2.

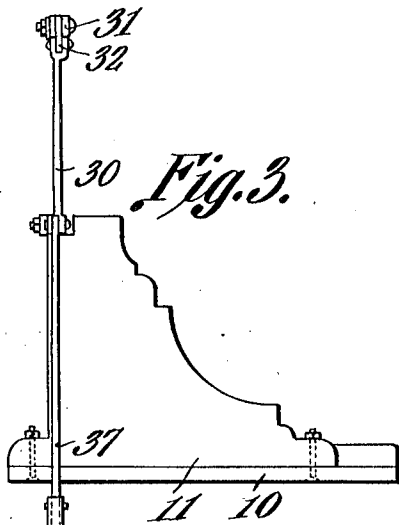


Fig. 3.

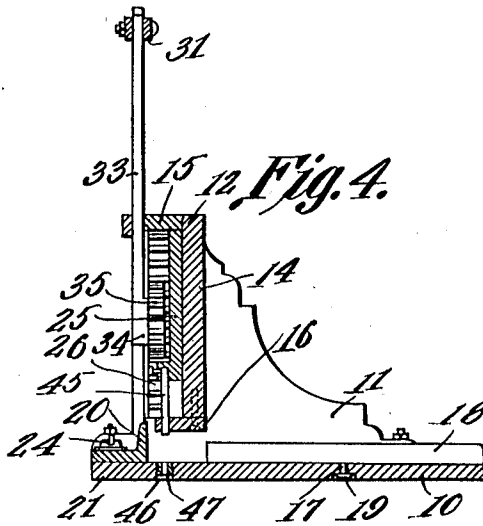


Fig. 4.

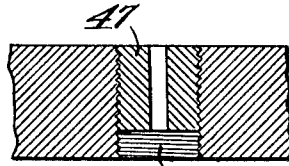


Fig. 5.

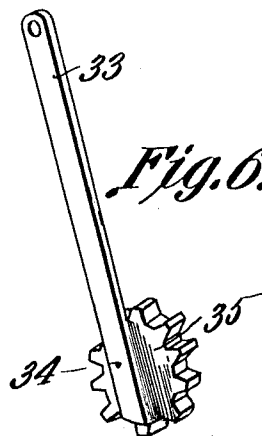
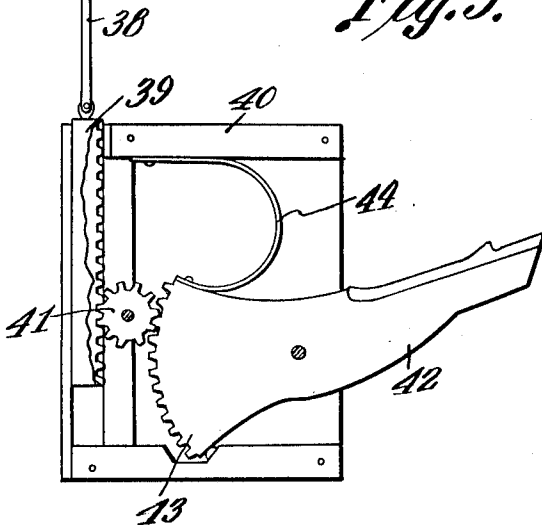


Fig. 6.

Witnesses

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UNITED STATES PATENT OFFICE.

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PUNCHING-MACHINE.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, WILBUR H. RADFORD, a citizen of the United States, residing at Athens, in the county of Athens and State of Ohio, have invented a new and useful Punching-Machine, of which the following is a specification.

This invention relates to punching machines for paper or other materials.

The primary object of the present invention is to provide an efficient gang punch for use in binding paper or other sheets such as way-bills.

A further object of the invention is to provide an efficient actuating mechanism for the punch bar.

A still further object is to provide a sectional punch bar the sections of which may be conveniently removed, the punches carried by said bar being supported by a removable guide bar.

Another object of the invention is to provide a supporting frame which will guide the punch bar sections in their vertical movement, said frame being provided with vertically extending members which serve as guides for the sections and which space said sections.

In the drawings:—Figure 1 is an elevation, one of the stationary rack bars and one of the movable rack bars being broken away to show the position of the actuating gear. Fig. 2 is a top plan view. Fig. 3 is an end elevation, showing the treadle mechanism in detail. Fig. 4 is a section on the line 4—4 Fig. 1. Fig. 5 is a detail view of one of the guides. Fig. 6 is a detail view of one of the gear carrying levers, and Fig. 7 is a section taken on the line 7—7 Fig. 1 showing the manner in which the stationary rack bar forms a guide for the bar sections and at the same time spaces the same.

In the drawings 10 designates a base plate at either end of which is secured a vertically extending bracket 11. These brackets support the housing 12 which consists of the longitudinally disposed plates 14 and 15 a guide plate 16 being removably secured to the lower end of the plate 14. The plate 10 is provided with a longitudinally disposed groove 17 and slidably arranged on said plate is a paper guide 18, the screw 19 carried by said guide traveling in the slot 17. This guide is adjusted longitudinally of the plate to properly support and center the

sheets which are to be punched. The longitudinally disposed guide 20 is arranged to move transversely of the plate the edge 21 of said plate being formed with slots 22 through which the screws 23 pass, said screws being provided with wing nuts 24, the guide 20 being clamped to the plate by means of said nuts. This guide 20 contacts with the sheets to be punched properly centering the sheet with respect to the punch.

The punch consists of a plurality of sections 25 supported to move vertically within the housing 12. Disposed vertically of the housing in spaced relation are a plurality of rack bars 26. These bars 26 have their tapered edge 27 disposed toward the plate 14, the bar 26 lying flush with said plate, the sections 25 adjacent the rack bar having their edge portions 28 beveled to agree with the tapering of said bar. Thus the rack bars serve to space the sections 25 and at the same time guide said sections in their vertical movement.

A rack bar 29 is disposed centrally of each of the sections 25 said rack bar being arranged parallel and in spaced relation to the adjacent rack bar 26. Pivotally supported adjacent one end of the frame is a bell crank lever 30, said lever being connected to a horizontally disposed bar 31 by a link 32. Secured to said bar 31 are a plurality of levers 33 shown in detail in Fig. 6. Secured to the terminals 34 of each of these levers is gear 35 which is disposed between a stationary rack bar 26 and a rack bar 29, the gears being of a number to correspond with the number of bar sections. Secured to the bell crank lever 30 is a lever 37 which has an adjustable connection with a second lever 38 which is secured to a rack bar 39. This rack bar is disposed for vertical movement within a casing 40 and is actuated by a gear 41 which is rotated by the lever 42, said lever being formed with the segmental gear 43 and maintained in the position shown in Fig. 3 by the spring 44. It will be noted that as the rack bar 39 is moved by means of the lever or treadle 42 the levers 33 will be moved to impart vertical movement as well as rotary movement to the gears 35. It will be noted that as the bar 31 travels to the left the gear 35 will be raised, said gear maintaining the same vertical center and imparting an upward movement to the punch bar section to which it is secured. As the bar

31 is moved to the right, it will be noted that the gear will descend feeding the punch bar sections downward. Each of the punch bar sections carry one or more punches 45, said punches being removably supported by said sections and guided by the removable guide bar 16. It will be noted that this guide bar may be readily displaced to facilitate the removal of the punch. The plate 10 is provided with screw threaded apertures 46 disposed in alinement with the punches 45, said apertures receiving guides 47.

The many advantages of a punching machine of this character will be clearly apparent and particular attention is called to the peculiar manner of actuating the punch sections as well as the manner in which said sections are spaced and guided during their vertical movement. It will also be seen that the guides which move longitudinally and transversely of the plate assure the accurate positioning of the sheets which are to be punched. It will also be noted that the entire structure is such as may be easily and economically manufactured and the various parts readily assembled.

Attention is called to the fact that any suitable driving mechanism may be employed, the driving mechanism shown being particularly adapted for machines of the portable type.

What is claimed is:—

1. A punching machine comprising a punch bar, racks movable with the punch bar, stationary racks, gears vertically movable between said racks, and means for imparting vertical movement to said gears to actuate said punch bar.

2. A punching machine comprising a sectional punch bar, a rack movable with each section of said bar, a plurality of stationary racks, gears engaging said racks, said gears

maintaining a fixed vertical center and assuming different longitudinal centers.

3. A punching machine comprising a frame, said frame including a plurality of vertically extending guides, a punch bar formed of a plurality of sections movable as one member, stationary rack bars spacing said sections and directing their vertical movement, racks movable with said sections, gears interposed between the stationary racks and the movable racks, said gears being vertically movable.

4. A punching machine comprising a frame, said frame including a plurality of vertically extending guides, a punch bar formed in a plurality of sections movable as one member, stationary rack bars spacing said sections and directing their vertical movement, said rack bars being formed with beveled edges contacting with the beveled edges of said sections, and gears interposed between the stationary racks and the movable racks, said gears being vertically movable.

5. A punching machine comprising a frame, a punch bar supported for movement by said frame, the said bar being formed of a plurality of sections said sections being supported for vertical movement by said frame, stationary racks supported by said frame, a rack secured to each of said sections, gears disposed between the stationary and movable racks, and means for imparting vertical movement to said gears to raise and lower the rack bar sections.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

WILBUR H. RADFORD.

Witnesses:

ANNA BURKE,
LENORA FOSTER.