A. W. ERICKSON.

MACHINE FOR GROOVING TYPE BARS.

APPLICATION FILED JULY 31, 1914.

1,366,313. **Patented Jan. 18, 1921.**

2 SHEETS—SHEET 1.

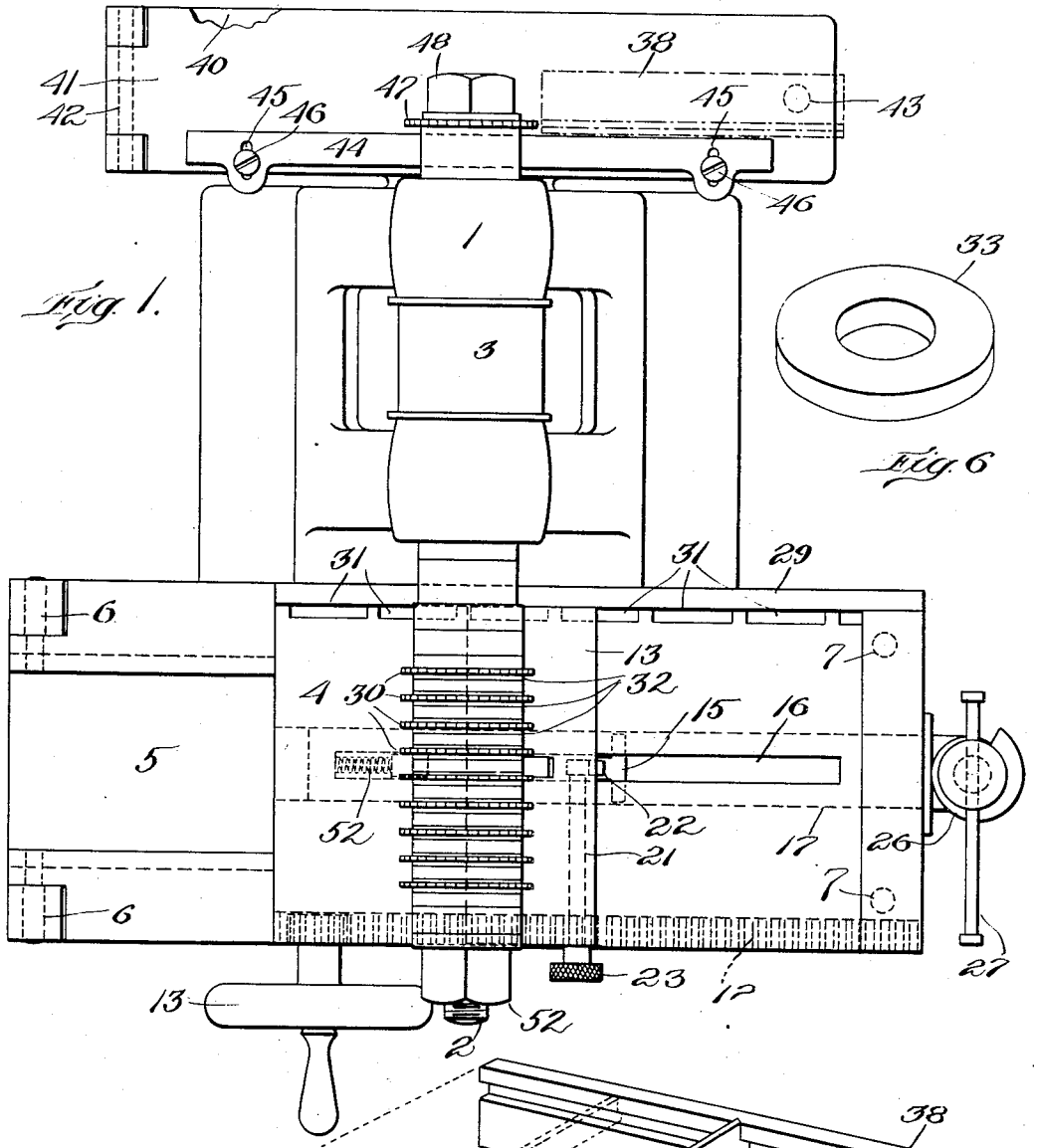


Fig. 1.

Fig. 6

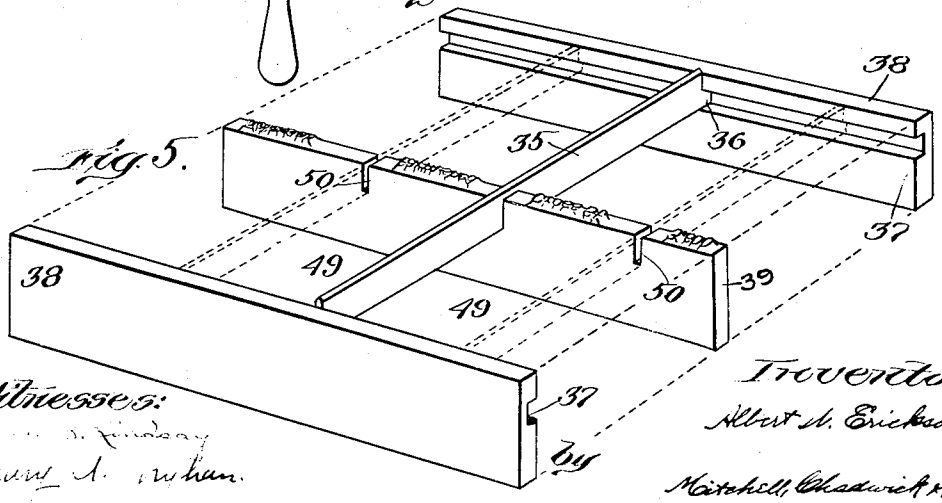


Fig. 5.

Witnesses:

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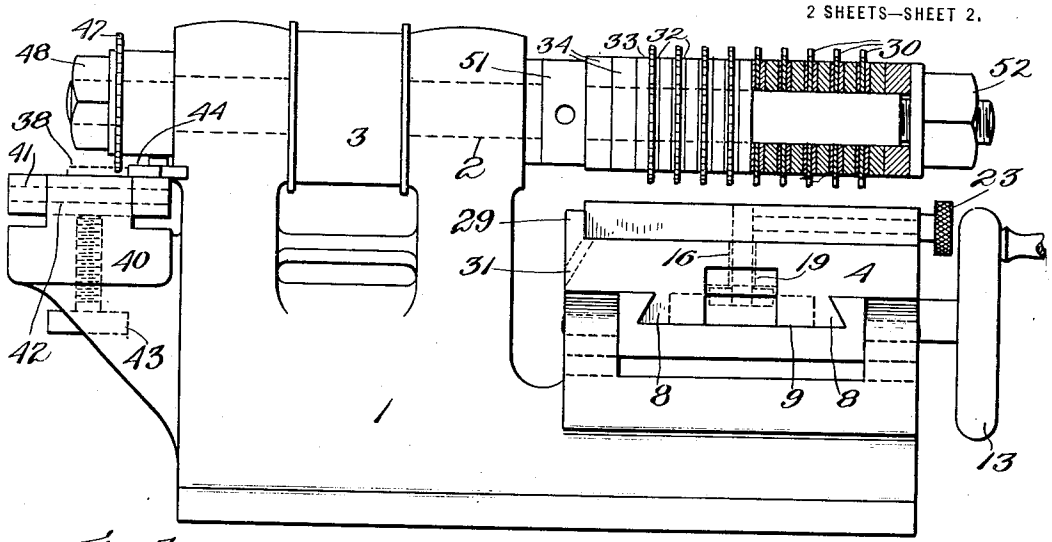


Fig. 3.

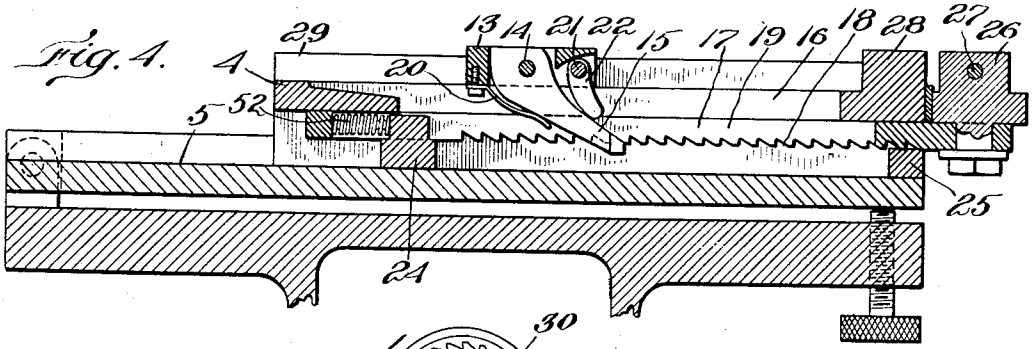


Fig. 4.

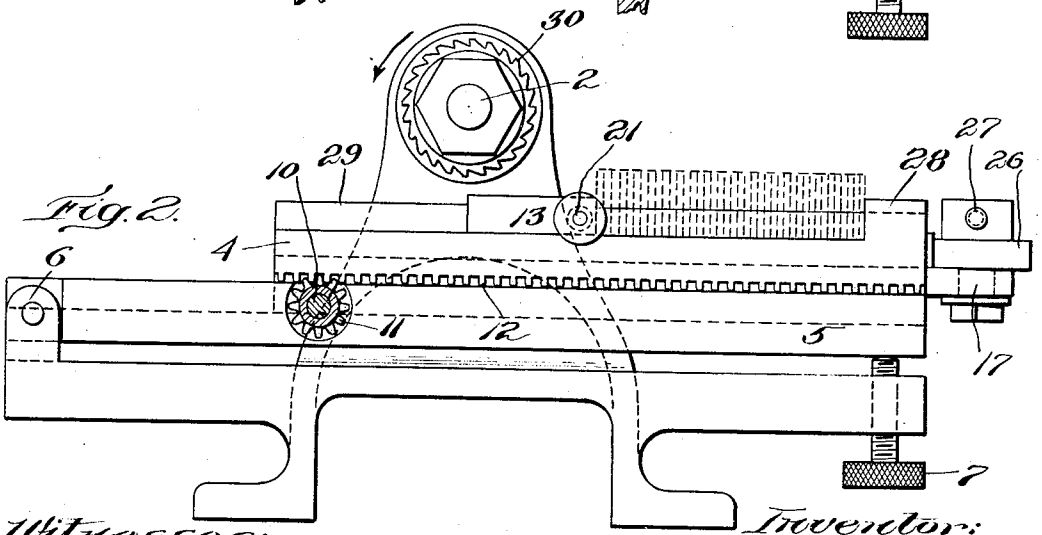


Fig. 2.

Witnesses:

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UNITED STATES PATENT OFFICE.

ALBERT W. ERICKSON, OF BOSTON, MASSACHUSETTS.

MACHINE FOR GROOVING TYPE-BARS.

1,366,313. Specification of Letters Patent. Patented Jan. 18, 1921.

Application filed July 31, 1914. Serial No. 854,386.

To all whom it may concern:

Be it known that I, ALBERT W. ERICKSON, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented new and useful Improvements in Machines for Grooving Type-Bars, of which the following is a specification.

My invention relates to a machine for use in making printing forms, particularly forms for tabular pages made up of bars of type cast in a linotype machine.

The type bars of forms for tabular pages are formed at their top edges with notches and the notches of the several assembled type bars of a form register and provide the form with one or more vertical grooves to receive rules which print vertical lines between the columns of characters. Heretofore it has been customary to employ what is known as "the Rogers system" which requires an extra set of matrices for the linotype machine which are substituted for the ordinary matrices when the linotype machine is to be used to produce type bars for tabular work. That is, the ordinary matrices must be taken out of the linotype machine and the Rogers matrices substituted every time tabular work is to be done with that system. This system is objectionable because it requires considerable time, usually about half an hour, to make the change in matrices, and this change must be made even when correcting errors. It is further objectionable because it requires a complete, separate set of matrices for each size of type to be used. While operating the linotype machine under this system to produce type bars for tabular work the operator must keep constantly in mind the exact points between the columns on each line where the grooves are to be located, and to drop the notch making matrices at exactly these points in order that when the several notched type bars are assembled in page form the notches of each bar will accurately register with the notches of the adjacent bars so as to provide straight perpendicular grooves upon the top face of the form to receive and hold the rules which print the vertical lines between the columns. This work of setting up lines on a linotype machine with the Rogers system is slow and requires skilled operators, for unless the notches of each of the several bars are exactly positioned and spaced either the rules cannot be inserted and the faulty bars or lines must be done over again, or, if it is possible to insert the rules the latter will be bent when the bars are clamped up in the form, with the result that they will print wavy lines.

The object of this invention is to provide a machine for use in making forms for tabular work comprising linotype bars, which will obviate the above noted objectionable features of the Rogers system and whereby such forms may be accurately and quickly made by any linotype machine operator of ordinary skill.

The machine which I have devised comprises a rotatable arbor; a set of thin rotary groove cutters or saws adapted to be mounted upon said arbor; a set of spacing collars of various widths, said widths being preferably made to accord with the standard point gage system by which type widths are measured by printers, and means for securing a number of said saws and space collars on said spindles.

The type bars are cast in the linotype machine in the ordinary plain or unnotched form and are then assembled and clamped in page form and relation upon a carriage movably mounted adjacent the spindle so that the page of type bars clamped on said carriage may be moved past the rotary saws or cutters and the latter caused to simultaneously cut all of the rule slots in the face of the page of assembled type bars thereby producing slots which are truly vertical, parallel and straight. Thus I dispense with the extra sets of slot forming matrices required with the Rogers system, so that while the operator is producing the tabular type bars in the linotype machine he only uses the ordinary spaces and has only to keep in mind the spacing of the columns. This enables him to work faster than with the Rogers system, and does away with the requirement for skilled linotype machine operators on tabular work. Also in case of corrections or alterations, the corrected or altered lines can be quickly, accurately and correspondingly slotted by means of the machine and, when finished, may be inserted in the page at the places where they belong.

In the best form of my invention the carriage on which the type bars are assembled and clamped for grooving, is adjustable toward and from the arbor and saws or cutters, so that any desired depth of slot may be made which is a feature of considerable

practical importance for the reason that a form well filled up with printing characters will not sink so deep into the paper on which the printing is done, as will a form having fewer printing characters, and, therefore, this provision for adjustment enables me to vary the depth of saw cut to suit the character of the form. That is, in the case of a form well filled with printing characters the rules should be set higher, and therefore the apparatus would be adjusted to cut a slightly shallower groove than in the case of a form having fewer printing characters. With the Rogers system it was impossible to vary the depth of groove produced.

Other features of my invention are hereinafter pointed out.

In the accompanying drawings:

Figure 1 is a plan view of my new machine for grooving type bars;

Fig. 2 is a front elevation of the machine shown in Fig. 1;

Fig. 3 is a side elevation, partly broken away, of the machine shown in Figs. 1 and 2;

Fig. 4 is a section on line 4—4 of Fig. 1;

Fig. 5 is a perspective view of part of a form for a tabular page showing a rule in position; and

Fig. 6 is a perspective view of one of the cutter spacing washers hereinafter described.

My new grooving machine comprises a frame 1 on which is journaled a spindle 2 that is driven in the direction indicated by the arrow, Fig. 2, by a belt, not shown, applied to a pulley 3. The spindle 2 overhangs a work holding carriage 4 slidably mounted upon a carriage support 5, said carriage 4 being provided upon its under side with a pair of longitudinal tongues 8, 8, occupying a groove 9 provided upon the top side of support 5. One end of carriage support 5 is pivotally connected at 6, 6, to a pair of lugs on frame 1 and at its opposite end said support rests upon a pair of vertically adjustable screws 7, 7, by means of which said support and carriage 4 may be swung on pivots 6 toward and from spindle 2. A shaft 10 mounted in support 5 has fixed to it a pinion 11 meshing with a rack 12 provided upon the under side of carriage 4. At its outer end the shaft 10 carries a hand wheel 13 by means of which said shaft and pinion 11 can be manually rotated to shift carriage 4 back and forth under spindle 2.

Upon the top side of carriage 4 is slidably mounted a clamp jaw 13 to which is pivoted at 14 a pawl 15 that extends downwardly from said jaw through a longitudinal slot 16 provided in carriage 4 and is made T-shaped at its lower end, said T-shaped lower end coöperating with a draw-bar 17 provided upon its under side with ratchet teeth 18. The draw-bar 17 is also made with a longitudinal slot 19 to accommodate the pawl 15. The pawl 15 is normally held in engagement with the toothed under side of draw-bar 17 by a spring 20. The jaw 13 carries a rock shaft 21 provided at its inner end with an arm 22 resting upon the top side of pawl 15. To the outer end of shaft 21 is fixed a small knurled hand wheel 23 by means of which the shaft can be turned to cause arm 22 to shove pawl 15 out of engagement with the teeth of draw-bar 17 when it is necessary to adjust jaw 13 to fit the work.

The draw-bar 17 is slidably mounted within the channel or space between the two tongues 8 and is held in position therein by two cross bars 24 and 25 forming part of carriage 4. One end of draw-bar 17 extends beyond the end of carriage 4 and carries a rotatable cam 26 which bears against the end of said carriage so that when said cam is rotated in a right hand direction by means of its handle 27 the draw-bar 17 is forcibly drawn toward the right, Figs. 1, 2 and 4, thereby causing the jaw 13 to firmly clamp the type-bars, indicated by dotted lines in Fig. 2, against a fixed jaw 28 that is provided upon the top side of carriage 4. The top of carriage 4 is provided along one side with a wall 29 which serves as a gage against which the ends of the type bars are pressed to line them up before clamping.

When a page of type bars is to be operated upon the bars making up the same are assembled in a bunch upon the top of carriage 4 so that one end of the bunch rests against fixed jaw 28 while the ends of all of said bars are lined up against the side gage 29. Then the operator slides the movable clamping jaw 13 by hand up against the opposite end of the bunch of type-bars where it is caught and held by pawl 15 engaging the teeth of draw-bar 17. Then the operator rotates the cam 26 in a right hand direction, thereby forcibly crowding the type bars together and locking them in that condition. While the type bars are thus held compactly clamped together in their proper relative positions by cam 26 acting through draw-bar 17, the operator rotates hand wheel 13 in a direction to cause pinion 11 to slide carriage 4 toward the left, Figs. 1, 2 and 4, and as the bunch of type bars passes under the cutters on spindle 2 the latter cut grooves in the top side of the form extending lengthwise of the latter, the arbor 2 having mounted thereon the proper number of cutters 30 to form the desired number of rule-receiving grooves in the form during one movement of carriage 4. By adjusting the screws 7 the carriage support 5 may be swung on pivots 6 to shift the path of carriage 4 toward or from arbor 2 to vary the depth of cut. It will thus be seen that all

that is required of the operator to produce all of the slots in the form is that the type bars be properly placed and clamped on carriage 4 and that he rotate hand wheel 13, and it will also be clear that these operations can be quickly performed and the slots accurately made by anyone of ordinary skill.

After a form is slotted the type bars are freed by turning hand wheel 23 in a right hand direction so as to swing pawl 15 out of engagement with draw-bar 17 and then shoving jaw 13 away from the bars.

The chips removed from the type bars by the cutters 30 fall, more or less, upon the carriage 4 and in order to prevent their lodging and packing in the corner at the junction of gage wall 29 with the top of carriage 4, the latter is made with channels 31 leading downward from said corner into which the chips are pushed by the type bars as they are slid into position on carriage 4.

The cutters 30 may, as herein shown, be circular saws having comparatively coarse teeth and a pecularity of my machine consists in having these saws arranged so that their cutting movement is not only opposed to the movement of the work past them but the cutting stroke of each tooth is made through the top of the form in an upward direction. This prevents jamming of the work under the saws and produces a clean cut.

The cutters 30 are, as usual, made with central apertures to receive the arbor 2 and are positioned and held in properly spaced relation on said arbor by means of spacing washers or collars 32, 33 and 34 which are different from ordinary washers in that each measures a definite number of "points" in thickness. That is, their thicknesses are measured by the same unitary basis, viz., the typographic point, as printers' type which permits of properly spacing and locating the grooves formed by the cutters whatever be the arrangement of the columns.

The arbor 2 is made with an enlargement or flange 51 whose outer face is in the same vertical plane with the inner face of gage 29 and between which and a nut 52 mounted upon the threaded extremity of said spindle, the cutters 30 and washers 32, 33 and 34 are clamped. The washers are made of different thicknesses, say, for example, two, six, twelve and twenty-four points, so that by proper selection and combination any desired spacing of the cutters may be secured.

One of the vertical rules of a form is shown at 35, Fig. 5, and it is made at its end with tangs 36 which are held in grooves 37 formed longitudinally upon the inner faces of end bars 38 between which latter are set up the linotype bars 39. For producing the grooves 37 in the bars 38 I provide a shelf 40 upon the rear of frame 1 which supports a work rest 41 that is pivotally connected at one end to said shelf by a pin 42 and adjustably supported at its opposite end by a screw 43. Upon the top side of work-rest 41 is a work-guide 44 formed with slots 45 to receive screws 46 by which said guide is fastened to work-rest 41 with provision for adjustment toward and from a single cutter 47 that is fastened to the rear end of spindle 2 by a nut 48. When an end bar 38 is to have its groove 37 formed in it, said bar is laid upon work-rest 41 with one edge against guide 44, as indicated by dotted lines in Fig. 3, and then slid endwise past cutter 47 which forms slot 37 as the bar passes under said cutter. By means of screw 43 work-rest 41 may be adjusted on pivot 42 toward and from cutter 47 to vary the depth of the groove 37 made by said cutter.

At 49, 49, Fig. 5, are indicated by dotted lines the rule receiving grooves that are made in the form by the cutters 30 on arbor 2, said grooves being made up of the registering notches 50 that are produced in each individual linotype bar.

Between the inner end of draw-bar 17 and the cross-bar 24 is arranged a spring 51 which yieldingly holds the cam 26 against the end of carriage 4.

What I claim is:—

1. The combination with a rotatable arbor and a plurality of cutters fastened thereon in spaced relation, of a work holding carriage supported so as to be movable back and forth beneath said cutters; a gage on said carriage for engaging the ends of the type bars to position the latter relatively to said cutters; a fixed clamping jaw at one end of said carriage; a movable clamping jaw mounted on said carriage; a spring pressed pawl carried by said movable jaw; a draw-bar movably mounted on said carriage and provided with a rack of ratchet teeth engaged by said pawl and a cam rotatably mounted on said draw-bar and engaging said carriage for clamping and holding said movable jaw against the linotype bars, said cam acting upon said movable jaw through the draw-bar and pawl.

2. A machine for grooving type bars comprising a frame; an arbor journaled on said frame; a plurality of cutters and cutter spacing washers mounted upon said arbor; means for securing said cutters and washers in place on said arbor with provision for removal and re-arrangement; a work holding carriage supported so as to be movable back and forth beneath said cutters; a gage on said carriage for engaging the ends of the type bars to position the latter relatively to said cutters; a fixed clamping jaw at one end of said carriage; a movable clamping jaw mounted on said carriage; a spring

pressed pawl carried by said movable jaw; a draw-bar movably mounted on said carriage and provided with a rack of ratchet teeth engaged by said pawl; means on said movable jaw wherewith to disengage the pawl from said rack so that said movable jaw can be quickly moved away from the fixed jaw; and a cam rotatably mounted on said draw-bar and engaging said carriage for clamping and holding said movable jaw against the linotype bars, said cam acting upon said movable jaw through the draw-bar and pawl.

Signed by me at Boston, Massachusetts, this 20th day of June, 1914.

ALBERT W. ERICKSON.

Witnesses:
JOSEPH T. BRENNAN,
MARY A. NYHAN.