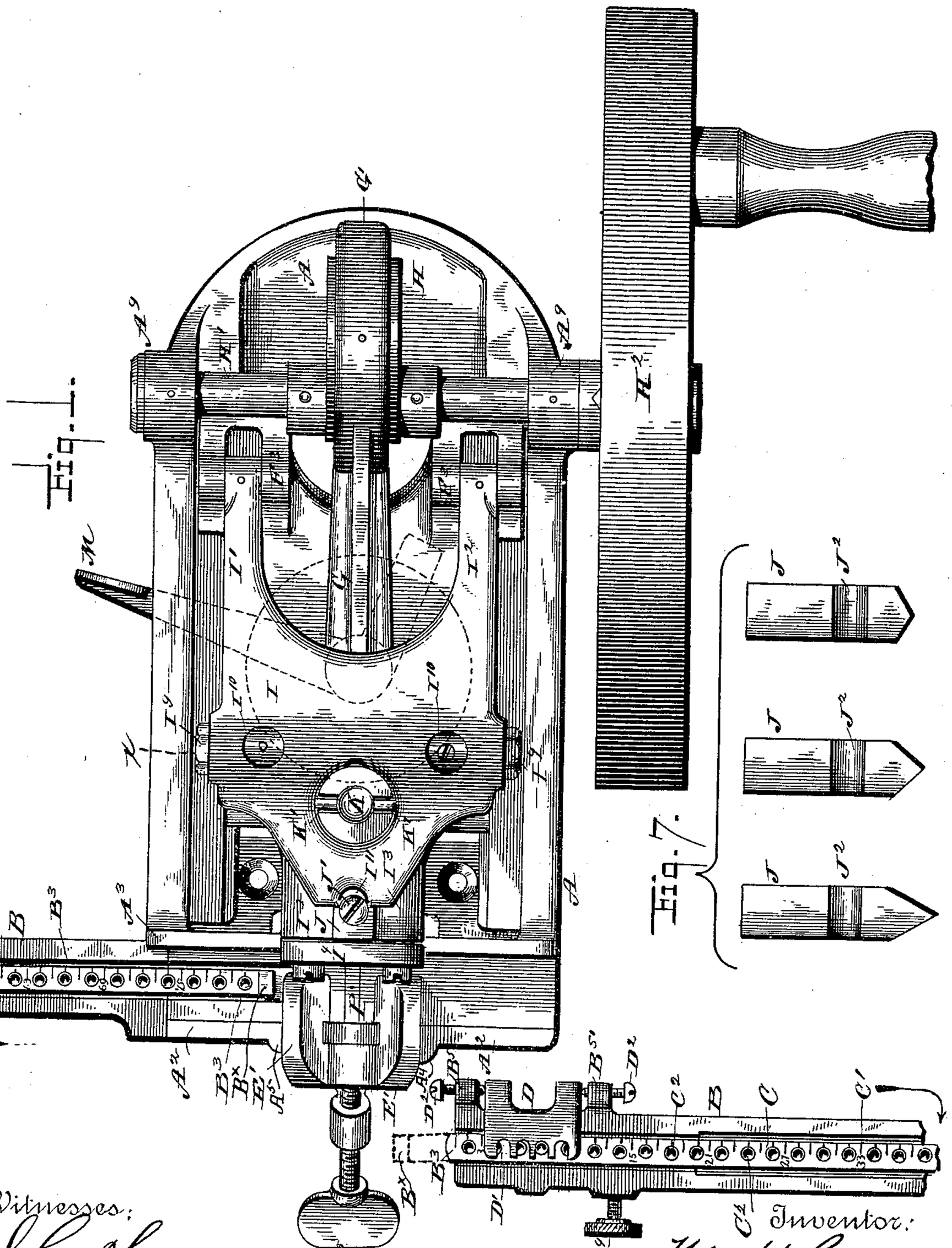
(No Model.) 3 Sheets—Sheet 1.

W. H. GOLDING.

MACHINE FOR MITERING PRINTERS' RULES.

No. 379,778. Patented Mar. 20, 1888.



(No Model.) 3 Sheets—Sheet 2.

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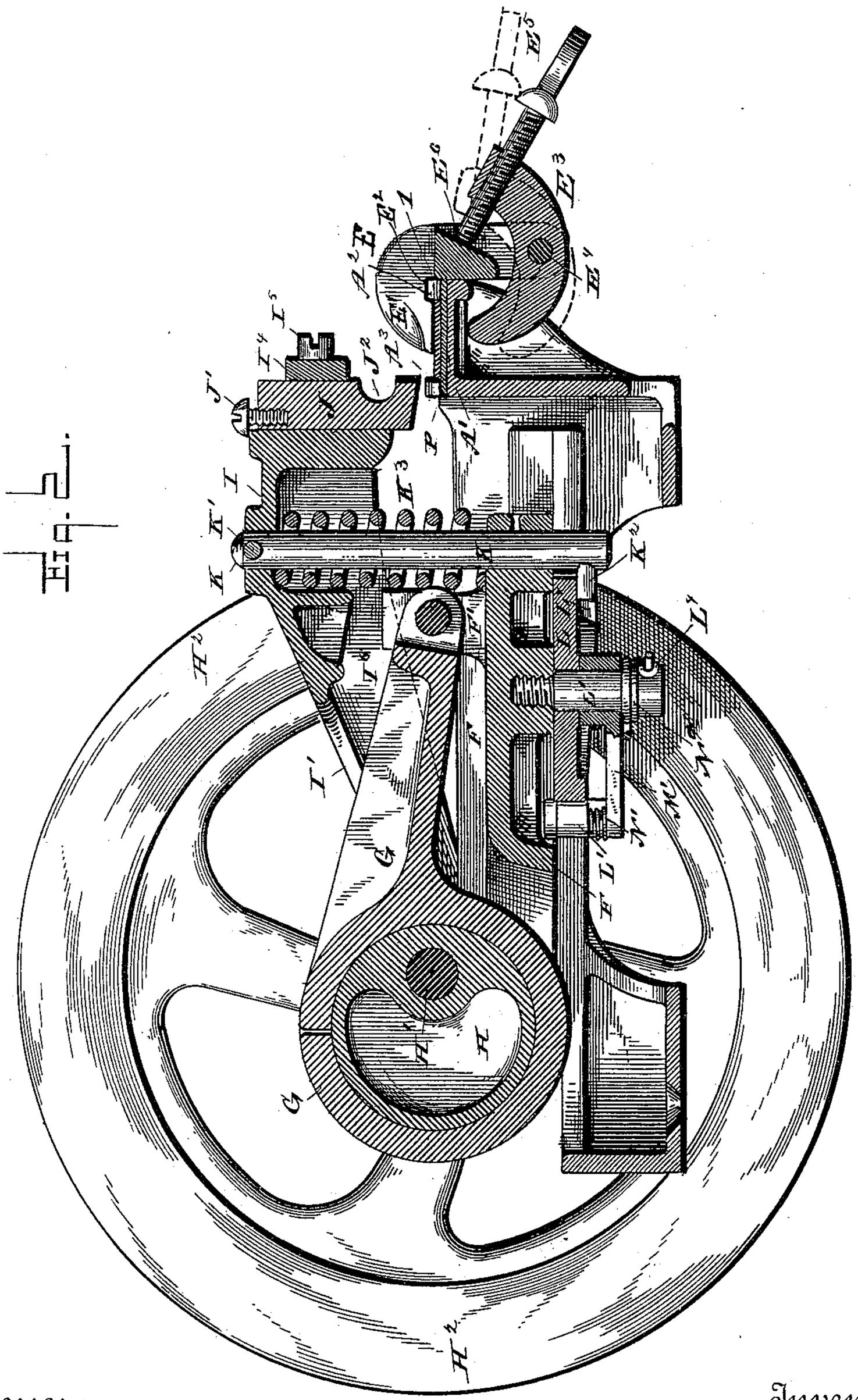
Fig. 2.



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(No Model.) 3 Sheets—Sheet 3.

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MACHINE FOR MITERING PRINTERS' RULES.

No. 379,778. Patented Mar. 20, 1888.

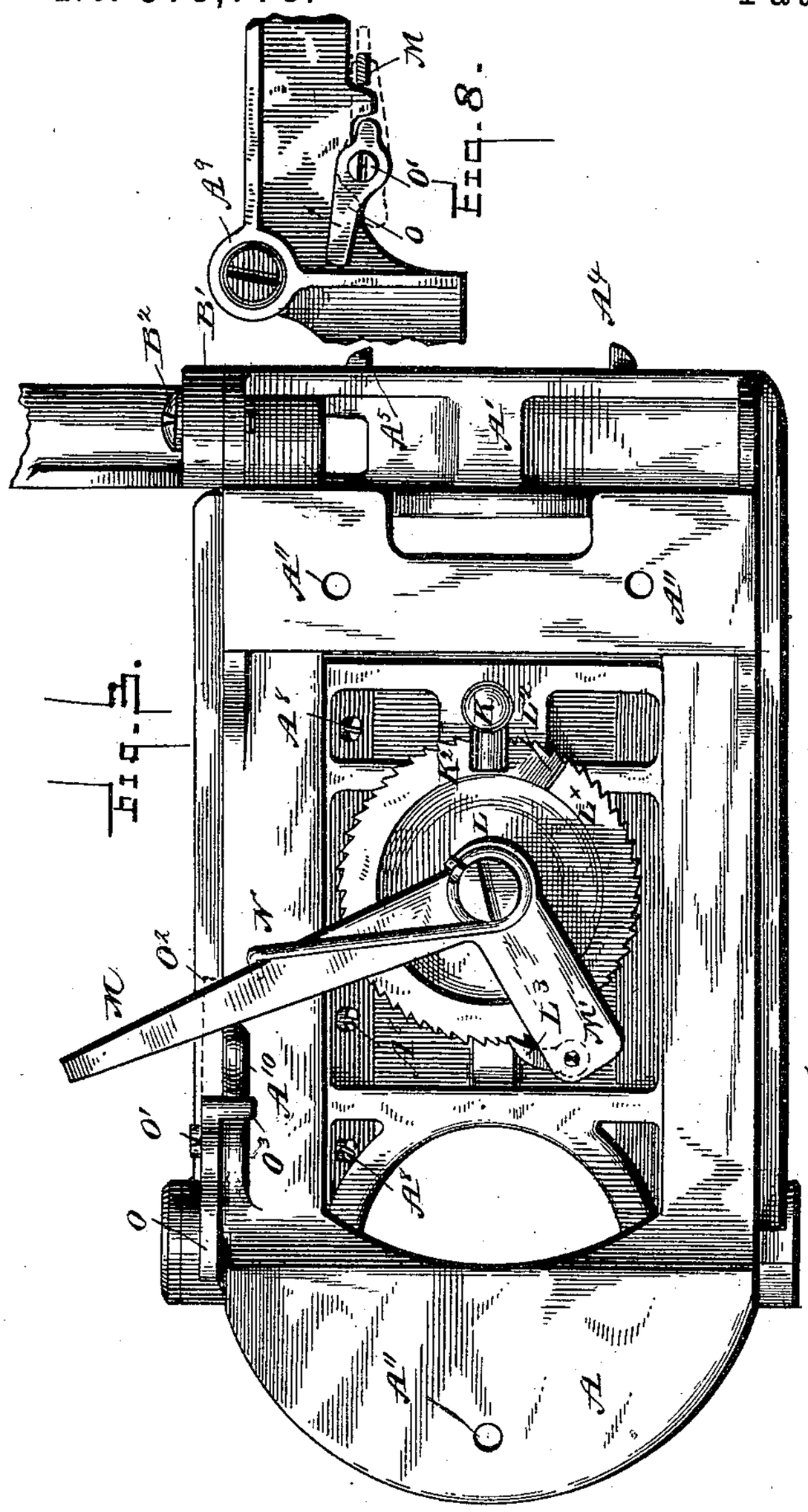

Fig. 8.

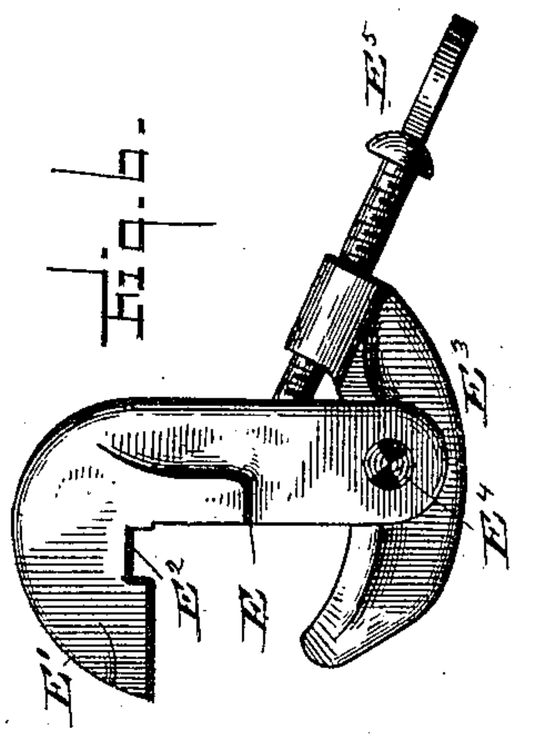

Fig. 6.

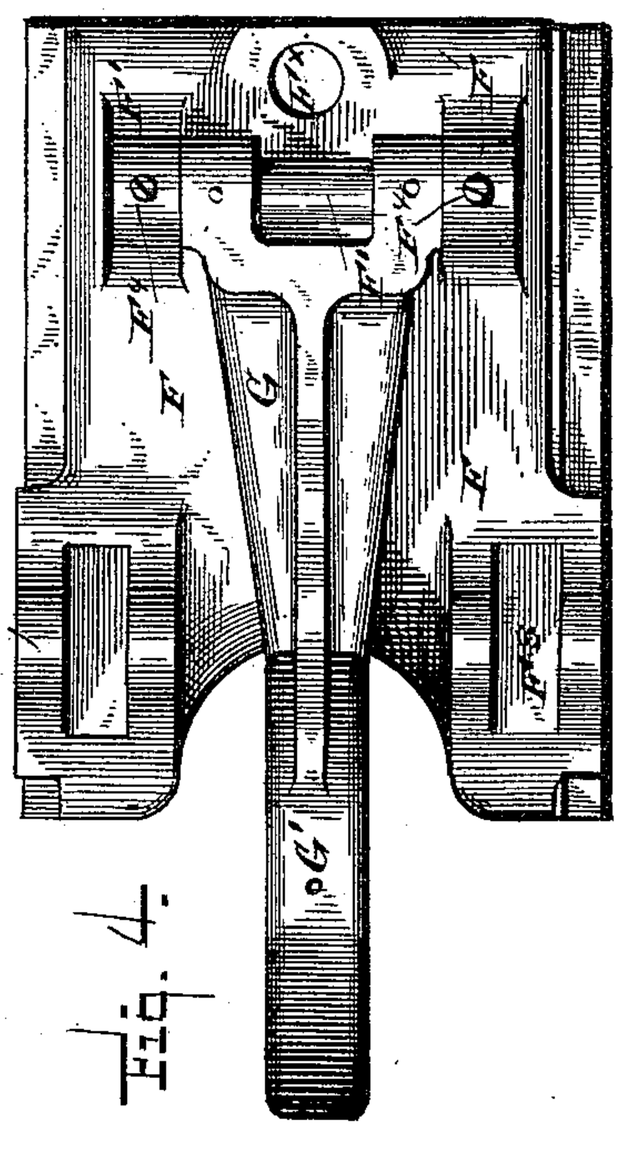

Fig. 4.

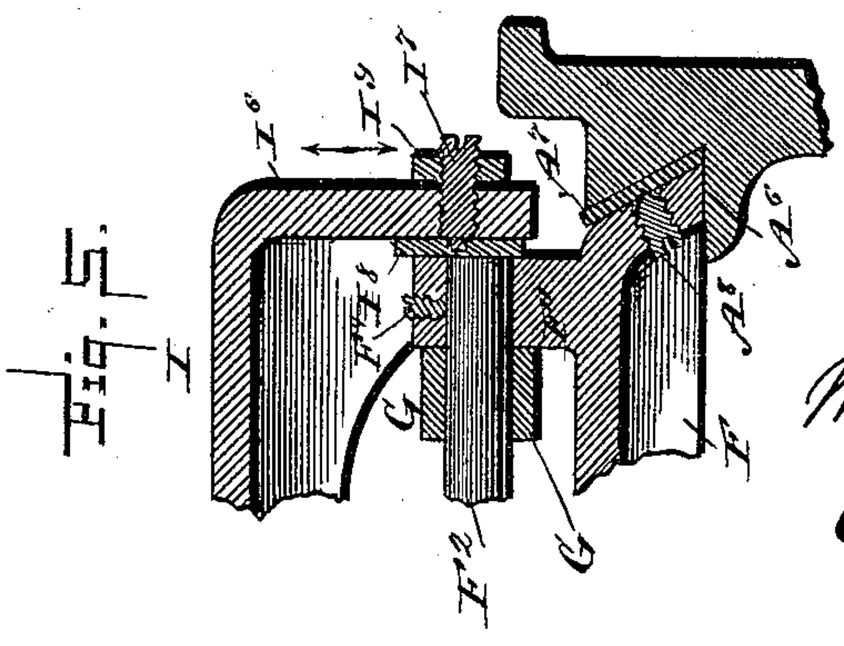

Fig. 5.

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UNITED STATES PATENT OFFICE.

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MACHINE FOR MITERING PRINTERS' RULES.

SPECIFICATION forming part of Letters Patent No. 379,778, dated March 20, 1888.

Application filed June 4, 1887. Serial No. 240,330. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. GOLDING, a citizen of the United States, residing at Chelsea, in the county of Suffolk, State of Massachusetts, have invented certain new and useful Improvements in Machines for Mitering Printers' Rules, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention has relation to a machine for cutting or mitering printers' rules; and the invention refers more particularly to that particular form of such machines in which is employed a bed provided with means for holding the rule, and a cutter for severing or mitering the rule while on the bed, and means for controlling the depth of cut made in the rule.

Among the objects of my invention are: to provide a rigid fixed bed; means for firmly securing a rule thereon, so that neither the bed or rule is liable to move during the operation of cutting the same; to construct and arrange a cutter-controlling mechanism which shall be positive in its operation and have the most immediate and accurate government of the depth of the cut, and to provide a strong, serviceable, adjustable, and accurate mechanism for holding the cutting-tool, and a gage for determining different lengths of rules.

Other objects and advantages of my invention will appear in the following description, and the novel features thereof will be particularly pointed out in the claims.

Referring to the drawings, Figure 1 is a top plan of a rule-cutter embodying my invention, a portion of the gage and its support being broken off and represented detached. Fig. 2 is a substantially central vertical longitudinal section of Fig. 1. Fig. 3 is a bottom plan of the machine. Fig. 4 is a plan of the reciprocating tool-carrying carriage. Fig. 5 is a vertical partial transverse section on the line X of Fig. 1. Fig. 6 is a side elevation of my rule-clamp, and Fig. 7 represents different forms of cutters in front elevation. Fig. 8 is a partial side elevation showing the location of a latch.

Like letters indicate like parts in all the figures.

A represents a suitable base or frame-work adapted by certain features of construction, hereinafter described, for the reception and operation of the moving parts of the machine. At one end, extending across the frame-work and formed as a part thereof, is the rule-bed A′, which is provided at its front and rear edges with guide-flanges A^2 A^3, respectively, both of which are notched or cut away to permit the passage of the cutting-tool, as will hereinafter appear. At one end of the bed, and extending in line therewith, is a gage-support, B, which terminates at one end in the form of a bracket, B′, (see Fig. 3,) and is secured to the bed by a screw or bolt, B^2. The upper surface of the gage-support is grooved, as at B^3, for the reception of a gage-rod, C, as is also that portion of the bed adjacent to the gage-support. The outer end of the gage-rod support is provided with one or more set-screws, B^4, which serve the purpose of retaining the gage within the groove B^3, so that the inner end of the gage-rod shall be a desired distance from the cutting-line of the bed, and thus serve to determine the length of a rule after it is mitered. The gage-rod C is provided on its upper surface with a scale, C′, of pica divisions, and along the scale is a series of properly-spaced indentations or holes adapted to receive a pin similar to the set-screw B^4, though not necessarily threaded.

One end of the gage-rod C is bent up or otherwise provided with a stop, $B^\times$, (see Fig. 1,) which (as the rod rests within the groove B^3 of the support B and a lead or rule is laid upon the support) abuts against the end of the rule. To measure for cutting rules longer than the support, the rod C is reversed, as shown by dotted lines at the end of the detached portion of the support in Fig. 1, when the rule would abut against the stop $B^\times$. By thus reversing the gage-rod rules twice the length of the support may be supported and measured.

D represents a supplementary gage-plate, the front edge of which is provided with a series of notches, D′, having such relation to the indentations or apertures of the gage-rod as to subdivide the measurements thereof when a pin—such as above mentioned—is inserted in any one of the holes of the gage-rod, and is moved from one notch to the other of the supplementary gage-plate. In other words, a movement of the gage-rod from one of the apertures or holes C^2 to another makes a difference of one pica in length of the rule being mitered, while the difference in length of such a rule, caused by moving the pin from one

notch to another of the supplementary gage-plate, is a nonpareil. By the provision of the supplementary gage, finer subdivisions are possible and with greater accuracy than when attempted by merely a slight measurement with the gage-rod C alone. By means of the pivot-screws D^2 the position of the gage-plate D with relation, longitudinally, to that of the gage-rod C may be adjusted to a finer degree than the distance between the notches D′ of the plate, and thus a very exact adjustment of the gage devices as a whole can be accomplished.

My rule-clamp is shown in plan in Fig. 1, in side elevation and detached in Fig. 6, and in Fig. 2 in side elevation in position on the bed, and on a rule, *l*, arranged on the bed. The dotted line in Fig. 2 represents the position assumed by the movable jaw of the clamp in the act of removing the same from the bed.

My clamp consists of a relatively-fixed jaw, which is bifurcated, forming two binding-arms, E′, which arms are each grooved, as at E^2, to ride the front flange, A^2, of the bed. Said front flange is provided with two forwardly-projecting lugs, A^4 A^5, which assist in determining the proper position of the clamp on the bed in order that the tool may reciprocate between the bifurcations thereof, and without coming into contact therewith. The fixed jaw of the clamp is also bifurcated at its lower end for the reception of the movable jaw E^3, which is pivoted, as at E^4, within said lower bifurcations.

The outer end of the movable jaw is provided with a binding-screw, E^5, which takes bearing upon the portion of the fixed jaw between the bifurcations thereof, which portion is preferably inclined, as at E^6, to form a bearing-surface at substantially a right angle to the binding-screw.

It will be apparent that when the bearing-arms E′, of the clamp rest upon the rule *l*, as shown in Fig. 2, the pivoted jaw of the clamp may be forced into contact with the under surface of the bed by means of the binding-screw E^5, so as to firmly hold the clamp and rule in a desired position. In order to remove the clamp, the binding-screw is loosened, and it and the movable jaw are swung into the position indicated by dotted lines in Fig. 2, when the clamp may be bodily removed from the bed. In actual practice, however, it is unnecessary to completely separate the clamp from the bed, as when the clamp is merely loosened a lead or rule can be moved lengthwise along the bed to bring a new point thereof to the cutting-line of the machine.

The supplementary gage-plate D, it will be observed, is supported pivotally by the screws D^2, mounted in brackets B^5, formed on the gage-rod support B, so that said plate may be swung upwardly and away from over the gage-rod, so as to bring a pin in any of the holes of the rod opposite any one of the notches in the plate, and said plate may be turned completely away from the rod, so as not to interfere with any desired adjustment of the same, independent of said plate.

Within the frame-work A, and along each side thereof, there are formed tracks or ways A^6, (see Fig. 5,) on which a carriage, F, is mounted for reciprocation. A gib, A^7, is, or may be, fitted at one edge of the carriage, which, in connection with screws A^8, mounted in said edge of the carriage may be employed for the purpose of rendering the fit of the carriage within the ways accurate and for the purpose of taking up the wear of these parts. In this instance my frame-work is formed as a single casting, and for that reason the provision of the gage and means for attaching the same are preferably separate pieces and require simply fitting the parts to each other.

The carriage F is provided near its front end with two upwardly-projecting lugs, F′, from one to the other of which there extends a rod or shaft, F^2, on which there is pivotally mounted a connecting-rod, G, which terminates, as at G′, in the form of an eccentric-strap, or, in other words, a ring, adapted to embrace an eccentric.

It is apparent, or it will hereinafter appear, that the form of the connecting-rod in this latter respect may be varied to adapt it to be operated by a crank-arm instead of an eccentric. If desired however, to secure accuracy and smoothness of movement as well as for the purpose of obtaining a powerful reciprocation of the carriage and of the parts connected therewith the eccentric form is preferable. The eccentric H, with which the rod G is connected, is mounted upon the main shaft H′, which is provided with a hand-wheel, H^2, and which has its bearings formed as a part of the frame-work, A.

At the rear end of the carriage there are formed two transversely-opposite slotted standards, F^3. Within these slotted standards are arranged the rearward extensions, I′ I^2, of the tool-carrier I, so that while the tool-carrier is reciprocated by and with the carriage F it shall also be capable of vertical movement at its free end.

The front end of the tool-carrier is provided with two projecting lugs, I^3, Fig. 1, on the faces of which is supported a clamping-bar, I^4, by means of screws I^5, seated in the lugs. Between the lugs is arranged the cutter J, hereinafter described. The tool-carrier I has at each side depending flanges I^6. (See Figs. 2 and 5.) Each of these lateral flanges is perforated and threaded for the reception of a screw, I^7, which projects into a washer-plate, I^8, arranged between the flange and the standard F′ of the carriage F. A set-nut, I^9, serves to maintain the screw in any desired adjustment.

There being a wearing-plate, I^8, and its accessories at each side of the tool-carrier, it can be seen that the standards F′ serve to steadily maintain the tool-carrier against any lateral vibration during the cutting operation.

Apertures I^{10} are formed in the top of the

tool-carrier to give access to the screws or pins F^4, which are or may be employed for retaining the shaft or rod F^2 against longitudinal movement in the standards F'. The ends of this shaft may terminate flush with the outer surfaces of the standards or inside thereof, but may not project therefrom, as such projection would interfere with the operation of the wearing-plates I^8.

A screw, J', is seated in the upper end of each of the cutters J and near the rear side thereof, so that the head of said screw shall project over the tool-carrier, which in this instance is provided with a semicircular flat-bottomed recess, I^{11}, within which the screw-head projects. The object of this screw is to facilitate a fine adjustment of the cutter vertically in the tool-carrier, which may be accomplished by relieving in a slight degree the pressure of the clamping-bar, I^4, and turning the screw J' in one direction to raise the tool, and in an opposite direction to determine the limit of a downward adjustment thereof.

Each of the cutters consists of a rectangular bar of steel having a semicircular or other shaped groove, J^2, formed across its face, and having its end beveled at each side at one of the several angles necessary to produce in a rule cut thereby such a disposition of the end as is required in printing-rules giving impressions of borders having a different number of sides. Fig. 7 shows cutters having different shapes or beveled sides for the purpose stated. These tools are capable of use, as will hereinafter appear, in mitering rules by the contact of one or both of the beveled faces of the cutter, so that the adjacent faces of a miter-joint in a rule may be produced either by a single cutting operation of the machine through a single rule or by separate cutting operations upon separate rules, as desired.

The tool-carrier is perforated for the passage of a depressing-bolt, K, which in this instance is retained in connection with the carrier by a pin, K', passing through the bolt K and bearing upon the upper surface of the carrier. The lower end of the bolt K is provided with a laterally-projecting lug, K^2, which takes bearing upon or against the under surface of a cam, L, pivoted on a stud, L', screw-threaded into the bottom of the carriage F, as clearly shown in Fig. 2.

K^3 is a spring encircling the bolt K and bearing at one end against the under side of the tool-carrier and at the other upon the carriage through which the rod passes, an aperture, $F^\times$, therefor being formed in the carriage, as shown in Fig. 4.

The cam L is provided at its periphery with a continuous series of ratchet-teeth, L^2, and a pawl, L^3, is pivotally mounted on the arm M' of a bell-crank lever, M, which is mounted on the stud L'.

A spring, N, encircles the stud and is fixed at one end of a pin, L^4, projecting therefrom, while its opposite end takes bearing on the longer arm of the bell-crank lever, as clearly shown in Fig. 3. A spring, N', serves to keep the free end of the pawl in contact with the ratchet-teeth, while the spring N serves to give a backward movement to the pawl over said ratchet-teeth. The lever M projects beneath and outside of the frame-work A, so that it may be, when desired, operated by hand; otherwise it comes into contact during a backward movement of the carriage F against the side wall of the frame, as at A^{10}. Now, if it be desired to produce a shorter oscillation of the lever M, I have provided a latch, O, pivoted, as at O', to the frame A, so as to permit of its upper end being thrown forward, as shown by dotted lines O^2, into the path of the lever. A projection, O^3, on the latch, abuts against the lower edge of the depending flange A^{10}, and thus maintains the latch in a horizontal position when thrown either to the front or to the rear, as shown in dotted and in full lines, respectively, in Fig. 3. Apertures A^{11} are formed in the bottom of the frame-work for the reception of bolts or screws, serving to secure the machine upon a bench or table.

A strip, P, of brass or other material, (see Figs. 1 and 2,) is inserted in the bed and at the cutting-line thereof, so that in case that portion of the bed becomes marred or injured by the cutter a new strip may be inserted.

This being the construction, the operation of the machine is as follows: I deem it proper to state here that in producing the miter-joints of printers' rules it is essential that the faces of the joints should be perfectly free from any protuberances and the edges of the joints free from any fins or projections. In order to produce a smooth surface there must not be the slightest jar or vibration of the cutting-tool, and, on the other hand, the rule being cut must be held firmly against vibration or trembling during the cutting operation. It is also apparent that the cutting-line must be at a true right angle to the edges of the rule and must not vary during the cutting operation. All of these requisites are necessitated from the fact that the slightest variation therefrom produces at the joints of the rules an opening or other irregularity which will appear in each impression taken therefrom. A rule having been placed on the bed and against, preferably, its front flange, and the clamp having been secured, as hereinbefore described, the length of the rule having also been determined by the hereinbefore described gage-rod, with or without the supplementary plate D, motion is imparted to hand-wheel H^2 and is conveyed to the carriage F by the connecting-rod G, so that said carriage, the tool and the tool-carrier, and the lowering-cam connected therewith are all reciprocated for a distance somewhat greater than the width of the bed. At each backward movement of the carrier the lever M abuts against the frame-work, and thus is made to move the cam L the distance of, for example, a single tooth of the ratchet thereon, or the distance may be increased, as hereinbefore described. As the

cam is rotated, the stud K^2 is gradually depressed and carries with it the bolt K, which in turn depresses the tool-carrier and the tool, and thus the cutter is lowered for a fresh cut across the rule. When the rule is very nearly or completely severed, the cam has made a complete revolution and the lug K^2 is by spring K^3 moved from the highest point $L^\times$ of the cam to its lowest point, and now the cutter is in position to begin a second operation at another point upon the rule. Now, it will be observed that where the cut is made intermediate the ends of a rule the adjacent faces will be adapted to form the joint of a 4, 6, 8, or other number of sides in a border, in accordance with the angle of the beveled sides of the tool or cutter. So, also, it is apparent that the end of a rule may be arranged in proximity to the cutting-line of the machine, so that but one of the beveled sides of the tool shall be brought into operation.

By reason of the transverse groove J^2 in the tool the face below said tool may be ground in the act of sharpening the same, so as to maintain the tool in good condition without grinding either of the beveled sides thereof.

I have hereinbefore spoken of the construction and operation of my machine in connection with printers' rules. It is to be understood that the same is adapted for and capable of cutting printers' leads, and I therefore use these terms synonymously.

Having described my invention and its operation, what I claim is—

1. In a machine for cutting printers' rules, a fixed bed provided with means for retaining the rule thereon, in combination with a reciprocating tool-carriage, a pivoted carrier mounted thereon, and means for gradually depressing the latter during the operation of cutting, substantially as specified.

2. In a machine for cutting printers' rules, a fixed bed, in combination with a reciprocating carriage, a pivoted tool-carrier, and tool-holder depressing-cam mounted on the carriage and connected to the carrier, and means for rotating the cam, substantially as specified.

3. In a machine for cutting printers' rules, a fixed bed, in combination with a reciprocating tool-carrier pivotally mounted upon the reciprocating carriage, a cam rotatably mounted on said carriage and connected with the tool-carrier, and means for rotating the cam, substantially as specified.

4. In a machine for cutting printers' rules, a reciprocating carriage, a rod connected to the carriage and operated by an eccentric, means for rotating the eccentric, a tool-carrier pivoted at one end to the carriage, and means for depressing the tool-carrier arranged in front of its pivot and connected with the carriage, substantially as specified.

5. In a machine for cutting printers' leads, a reciprocating pivotally-mounted tool-carrier, a rod depending therefrom, a cam having connection with the rod, and mechanism for rotating the cam, substantially as specified.

6. In a machine for cutting printers' rules, a tool-carrier pivoted to a reciprocating carriage and having between its pivoted and free ends a supporting-spring, and a rod having contact with a cam connected with the carriage and provided with a ratchet, and a ratchet-operating lever projecting outside of the carriage, and a stop or projection arranged in the path of the lever, substantially as specified.

7. In a machine for cutting printers' rules, a reciprocating carriage having lugs at one end and standards at the opposite end thereof, in combination with a tool-carrier having rearward bifurcations pivoted to the standards, a connecting-rod arranged between the bifurcations pivoted to the lugs, and means for reciprocating the connecting-rod, substantially as specified.

8. In a machine for cutting printers' rules, a carriage and a rotatable cam, in combination with a bifurcated pivoted tool-carrier, a connecting-rod, a carrier-supporting spring, and a rod extending from the carrier to the cam, substantially as specified.

9. The combination of a gage-bar provided with a scale and with apertures, a gage-bar support, and a gage-plate provided with apertures and means for connecting an aperture of the gage-plate with an aperture of the gage-bar, substantially as specified.

10. In combination with the bed and cutter of a machine for cutting printers' rules, and with the gage-rod thereof, a supplementary pivoted gage-plate, substantially as specified.

11. A clamp for a machine for cutting printers' rules, comprising a curved flat-faced recessed bifurcated fixed jaw, a movable jaw mounted in the bifurcations of the fixed jaw and provided with a binding-screw, substantially as specified.

12. The combination of a reciprocating carriage having lugs thereon, as described, and a pivoted tool-carrier having lateral flanges adapted to embrace said lugs, substantially as specified.

13. The combination, with a reciprocating carriage having lugs and standards, of a pivoted tool-carrier mounted in the standards and having depending lateral flanges, and adjustable wearing-plates arranged between the flanges and the lugs, substantially as specified.

14. In combination with the gage-rod, a supplementary gage-plate mounted upon threaded pivots, whereby the same may be adjusted longitudinally with relation to the gage-rod used in connection therewith, substantially as shown and described.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM H. GOLDING.

Witnesses:
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