2 Sheets - Sheet 1.

E. Weissenborn,

Making Lead Pencils.

No. 68,819. Patented Sep. 10, 1867.

Fig. 1

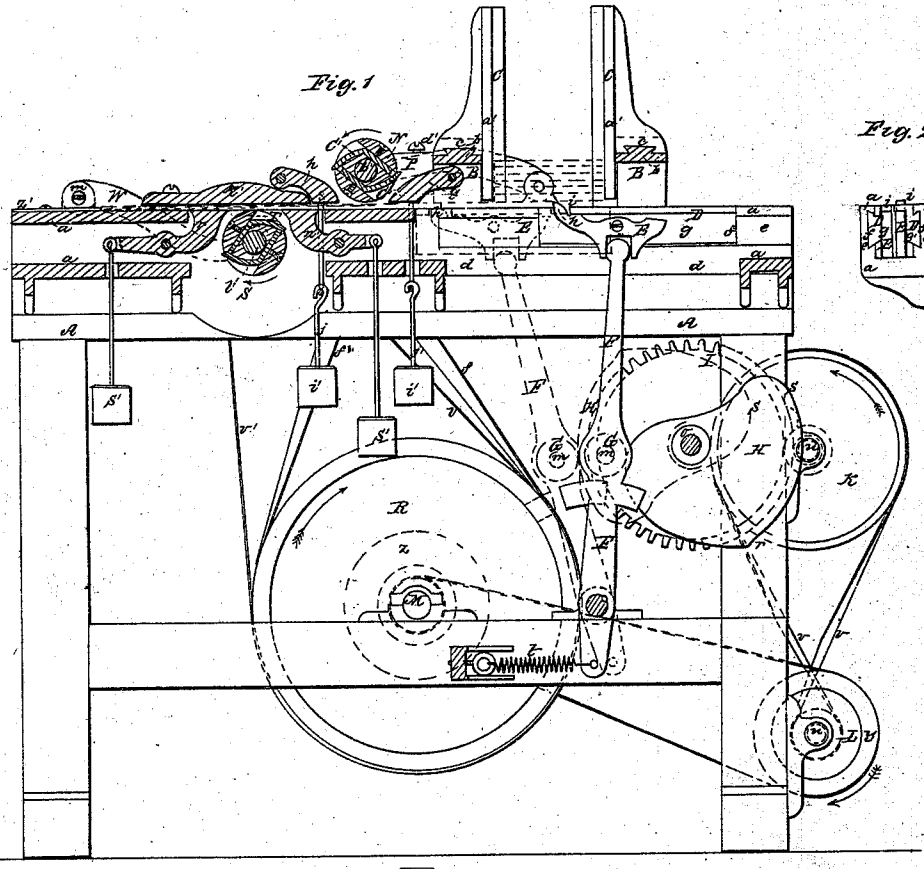
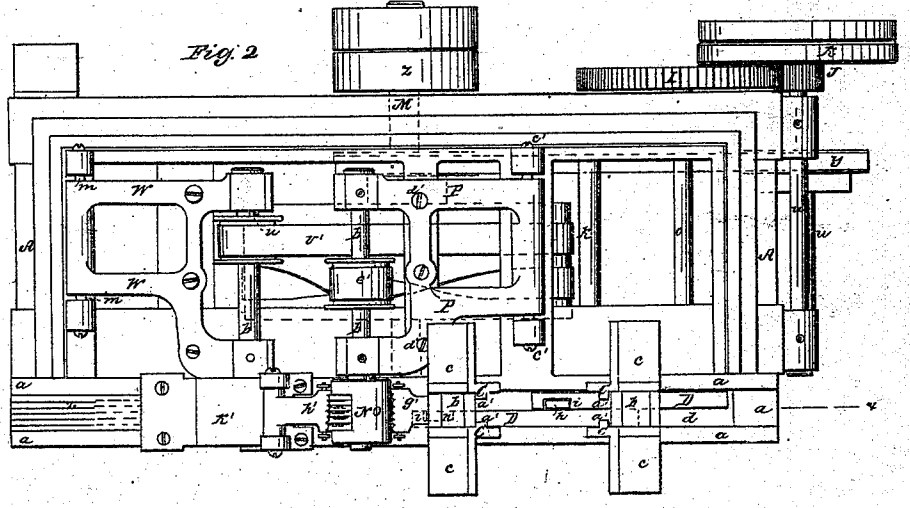


Fig. 2½

Fig. 2



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2 Sheets- Sheet 2.

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Fig. 3

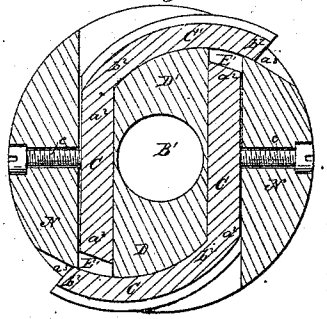


Fig. 4

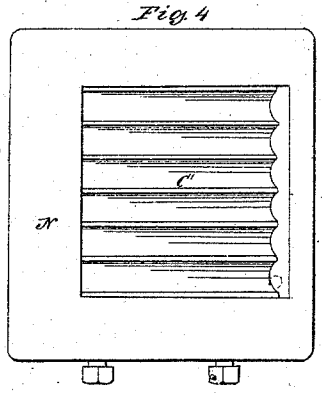


Fig. 5

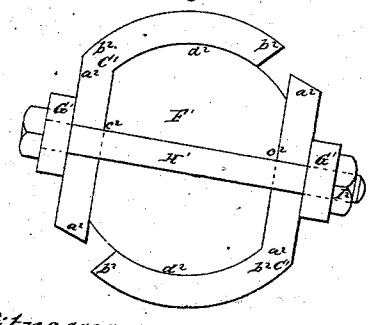


Fig. 6

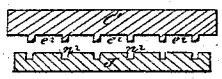


Fig. 8

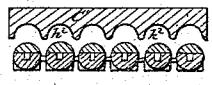


Fig. 7

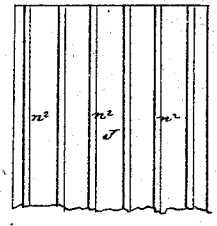


Fig. 10

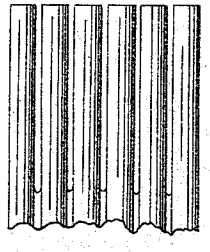
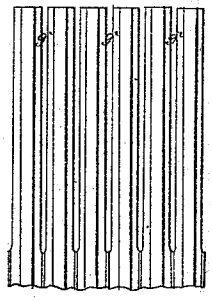


Fig. 9



Fig. 11



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EDWARD WEISSENBORN, OF HUDSON CITY, NEW JERSEY, ASSIGNOR TO AMERICAN LEAD-PENCIL COMPANY, OF NEW YORK, N. Y.

Letters Patent No. 68,819, *dated September* 10, 1867.

IMPROVEMENT IN MACHINES FOR MAKING LEAD PENCILS.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, EDWARD WEISSENBORN, of Hudson City, in the county of Hudson, and State of New Jersey, have invented certain new and useful Improvements in Machines for Making Lead Pencils; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1 is a longitudinal vertical section taken in the line *x x* of fig. 2.

Figure 2 is a top or plan view.

Figure 2½ is an end view of a portion of the invention.

Figure 3 is a transverse section of the cutter-head of the machine with cutters attached.

Figure 4 is a side view of the same.

Figure 5 is a transverse section, showing the manner of securing the cutters to a mandrel, in order that they may be turned into proper shape.

Figure 6 is a detached transverse section, showing the manner in which longitudinal grooves are made in the wooden "blank" from which the pencils are formed for the reception of the "lead."

Figure 7 is a plan view of one of the wooden blanks with the grooves formed in it for the reception of the lead.

Figure 8 is a detached transverse section, indicating the manner in which the wooden "blanks" are divided into cylindrical pencils by means of longitudinal grooves cut in their opposite sides.

Figure 9 is a similar view, showing the manner of forming hexagonal pencils by the same means.

Figure 10 is a plan view, showing the formation of the grooves by means of which cylindrical pencils are divided from each other or cut from the blank.

Figure 11 is a similar view, showing hexagonal instead of cylindrical pencils.

Similar letters of reference indicate corresponding parts in all the figures.

This invention consists in a novel means of feeding lead-pencil blanks to the cutters of a lead-pencil machine, whereby the use of feed-rollers is dispensed with, thus avoiding the injurious pressure exerted upon the wooden blanks, and upon the leads when such rollers are employed. The invention also consists in a novel arrangement of cutters acting upon both sides of the blank to divide it longitudinally into pencils of proper form at a single operation, instead of cutting or grooving only one side at one operation, as in the machines heretofore constructed for this purpose. The invention further consists in a novel construction of the cutters of the machine, whereby they may be easily turned into the required shape on a mandrel in a lathe, and by which they may be more easily secured to the cutter-head than those heretofore in use, and by which they are also rendered much less liable to warp in hardening.

To enable others to understand the construction and operation of my invention, I will proceed to describe it with reference to the drawings.

A is a main frame, which supports the other portions of the machine, and is made of any suitable material. Fixed longitudinally upon one side of this main frame, at the top thereof, is a small frame, *a*, which extends the whole length of the main frame A, and along and upon which the wooden strips or blanks from which the pencils are made are passed during the operations of grooving the blanks for the reception of the lead and the shaping and separating the pencils, as will be hereinafter fully set forth.

B represents two arched or hollow brackets which project upward from the frame *a*, near one end thereof, and at a distance apart somewhat greater than the length of the blanks to be operated upon, in order to accommodate the guides between which the said blanks are passed, as will be hereafter explained.

Rigidly fixed in a longitudinal position upon the top of each of these brackets B is a flat bar, *b*. These bars *b* are made broader at their upper than at their lower sides, or, in other words, are of dove-tail form, as shown more clearly in fig. 1.

C represents vertical guides, of which there are two to each bracket, B, and which are situated at the inner sides of the said brackets. Fixed to the outer edge of each of these vertical guides, C, is a horizontal plate, *c*, each plate, *c*, having a dove-tail groove formed longitudinally in its under side, the said grooves being slipped

upon the dove-tailed bars *b*, and thus securing the guides C to the brackets B in an upright position. The two guides C upon each bracket are situated at a distance apart equal to the width of the blank, and may be adjusted to suit any width of blank by moving them upon the bars *b*, and securing them at the desired points thereon by means of pins or screws passing through the plates *c* into the bars *b*, or by any other suitable means. Each of these guides, C, is furnished with a vertical shoulder at *a'*, the said shoulders acting upon the ends of the blanks to keep them in position, and do not extend quite down to the upper surface of the frame *a*, so that a space is left through which the blank passes to the cutters, and which also allows the proper working of the blank-feeding apparatus, as will be hereinafter shown.

The blanks are simply flat slabs or strips of suitable wood, of the same length as the pencils to be made, and of any desired and uniform width and thickness. These blanks are placed one above the other in a horizontal position between the guides C, as shown in red lines in fig. 1, being fed into the same from the top. When desired, these guides C may extend up to that floor or story of the building above the one occupied by the machine, so that the blanks may be placed between the guides from such upper story. The blanks are fed to the cutters one at a time from the bottom of the pile, as will be hereinafter set forth. The bottom of the frame *a*, at that end thereof at which the guides are situated, is open, as shown at *d*, and in each side of the said end of the frame *a* is formed a dove-tail groove, *e*. At each of the said sides is situated a sliding bar, D, which has upon its outermost surface a longitudinal bar, *f*, which is made of dove-tail form in its cross-section, and is fitted into one of the dove-tail grooves, *e*, in the sides of the frame *a*, (as more clearly shown in fig. 3,) in such manner that the sliding bars D are held in proper position in contact with the said sides of the frame, the bars *f* attached thereto moving longitudinally in the grooves *e*. Formed in the inner and lower side of each sliding bar, D, is a longitudinal rebate or recess, *g*, in which is placed a pivoted catch, E. The long arm of the catch terminates in an upwardly projecting spur, *h*, which works through a slot or notch, *i*, in the upper side or top of the said bar D. The short arm of the said catch rests against the top of the rebate *g*, when the long arm is depressed, so that the spur *h* is prevented from falling too far below the slot or notch *i*. In the under side of each catch, E, is a deep transverse notch, *j*, of rectangular form.

F represents two upright levers, one of which is shown in red lines in fig. 1, and which are pivoted near their lower ends on a transverse shaft, *k*. The upper end of each of these levers, F, projects and fits into the notch *j* of one of the catches, E, in such manner that when the said upper ends of these levers F are moved inward toward the centre of the frame *a*, they will first act upon the catches E to raise the spurs *h*, so that they project up through the slots or notches *i* in the upper sides of the sliding bars D, and then slide the said bars inward toward the said centre of the frame.

Attached to the lower and short arm of each lever, F, is a spiral spring, *l*, which tends to draw the said lower ends inward, and consequently to move the long upper arms thereof, and consequently the sliding bars D, back towards the end of the frame *a*. When this backward movement of the long arms of the levers takes place, the ends of the said arms acting upon the opposite or rearmost sides of the notches *j* depress the long arms of the catches E, and bring the spurs *h* thereof below the upper surfaces of the sliding bars D. Fixed upon each lever, F, at a suitable point between its upper extremity and the shaft *k*, is a laterally projecting pin, *m*, which forms the pivot or axle of a friction-roller, G.

H indicates two cams, (one of which is shown in red lines,) which are placed in line with the friction-rollers G, and are fixed upon the end of a transverse rotary shaft, *o*. These cams H are placed upon opposite sides of the said shaft *o*, and act upon the friction-rollers G to move the long arms of the levers F, and consequently the sliding-bars D, alternately inward toward the centre of the frame *a*, while a portion of the circumference of each cam, H, being formed on the arc of a circle, as from *s* to *r*. The said levers and sliding-bars are held stationary in such forward position for a short space of time, as will be hereinafter further explained, the levers when released from the action of the cams being brought back to their first position by the spiral springs *l* acting upon their lower or short arms.

Fixed upon that end of the shaft *o*, opposite the cams H, is a spur-wheel, I, which gears into a pinion, J, on another transverse shaft, *u*, which is also furnished with a pulley, K. A belt, *v*, passes from this pulley, K, to a pulley, L, on another transverse shaft, *w*, while a second belt passes from another pulley, *y*, on the said shaft *w* to a pulley, *z*, shown in dotted lines on the driving-shaft M, so that the rotation of the driving-shaft M communicates a rotary motion to the shaft *o*, and consequently to the cams H, in order to operate the sliding-bars D, as just set forth.

N is a rotating cutter-head, which is situated over the frame *a*, near the centre thereof, and which is fixed upon the end of a transverse shaft, *b'*, which works in suitable bearings in the inner end of a hinged frame, P, the opposite end of which is hinged or pivoted to the top or upper side of the main frame A by a transverse shaft or bolt, *c'*. The distance of the cutter-head N from the upper surface of the frame *a* is determined and adjusted by means of two set-screws *d'*, which extend through the outer end of the hinged frame P downward into the top of the main frame A. Fixed upon the shaft *b'* is a pulley, *e'*, which is connected by means of a belt, *f'*, with a large wheel or pulley, R, upon the driving-shaft M, by which means the rotation of the cutter-head N is obtained.

g' and *h'* are two pivoted pressers, the free ends of which press tightly upon the upper surface of the blanks as they pass underneath the cutter-head N, being kept in contact therewith by suitable weights, *i'*, suspended from them by links, *j'*, as shown in fig. 1. The frame *a* is divided vertically by a large opening, S, which extends entirely through the same, and has fixed over it a cover, *k'*, which is made concave on its under side. Situated in this opening S is a second rotating cutter-head, T, which is so placed as to act upon the under side of the blank as the said blank is moved along the upper side of the frame *a*, and is fixed upon the end of a transverse rotating shaft, *l'*, which works in bearings formed in the inner end of a hinge-frame, W, the outer

end of which is hinged or pivoted to the top of the main frame by a transverse bolt, m^1, the inner end, which carries the rotating shaft, being made adjustable by means of set-screws in the same manner as the other hinged frame P.

n' and r' are pivoted pressers, the flat or inner ends of which press tightly upward against the under side of the blank as it passes over the cutter-head T, being kept in contact therewith by weights s' suspended from the outer ends of the said pressers. Secured upon the shaft l' is a pulley, u', which is connected by a belt, v', with the large pulley R, by which means the proper rotation of the said cutter-head T is secured.

It now remains to explain the form and construction of the cutters, and the manner of attaching them to the cutter-heads, which is more clearly illustrated in figs. 3, 4, and 5. The cutter-head is marked N in the said figures, but the cutter-head T is of the same construction, and the cutters are attached thereto in the same manner.

B′ is the central hole of the said cutter-head, by means of which it is secured upon its shaft. C′ represents two cutters secured in the said head N. One portion of each of these cutters is made straight and flat, as shown at a^2, while the other portion or end thereof is made curved in the arc of a circle, as shown at b^2.

E′ are straight slots formed in the cutter-head N, one upon each side of the hole B′, and parallel with each other. The straight flat portion a^2 of each cutter C′ is placed in one of these slots, E, with the curved portions b^2 situated upon opposite sides of the head N, and pointing in opposite directions, the central part D′ of the said head having its ends rounded to fit the concave inner sides of the said curved portions of the cutters, and thus more firmly supporting the same, as more clearly shown in fig. 3, the curved outer surfaces of the cutters being eccentric with the axis of the cutter-head, as represented in the said figure. The outer extremity of each of the said curved ends of the cutters C′ constitutes the cutting edge thereof, and is formed in the manner to be presently described. The cutters are rigidly secured in their places by means of set-screws, c^2, passing through opposite sides of the cutter-head, with their heads countersunk therein to prevent them from interfering with the operation of the cutter-head. The extremities of the curved parts of the cutters C′ may be made to project somewhat past the slots E′, the corners of the cutter-head in front of them being cut away for the purpose, as shown at a^3. The manner of forming or turning the outer surface of the curved portions b^2 of the cutters, is shown in fig. 5.

The cutting edges of the cutters C′ being formed by the outer extremities of the curved portions b^2, as hereinbefore mentioned, the shape of the said cutting edges, and the nature of the work done by them, may be determined by longitudinal grooves formed upon the outer surface of the curved portions aforesaid, or, in other words, by the shape of the ribs situated between such grooves. Thus the grooves in the cutter designed for grooving the blanks for the reception of the "lead" are made shallow and quadrangular in form, as shown at e^2, in fig. 6, the sharp ends of the narrow ribs f^2 between them cutting the grooves n^2 in the blank J′, while the grooves in the cutters designed for dividing the blank into round pencils are semicircular in their cross-section, as shown at h^2, in fig. 8, and in those for cutting the blank into hexagonal pencils are made sloping at the sides, as shown at m^2, in fig. 9, so as to cut a triangular groove, indicated by g^2 in the said figure, the pencils being formed from the blank (after the lead has been put therein) by cutting grooves between the "leads" upon opposite sides of the blank, so as to cut half way through the same from each side, thus entirely separating the pencils from each other, as will be hereinafter more fully set forth.

The operation of the invention is as follows: A cutter-head furnished with the grooving cutters shown in fig. 6, and hereinbefore fully described, is fixed upon the shaft b^1, and a cutter-head provided with similar cutters, designed to cut one or more grooves in the under side of the blanks, may be fixed upon the shaft l^1. The "blanks," consisting of wooden strips or slabs of suitable length, breadth, and thickness, are placed one above the other between the guides C, as shown in red lines in fig. 1, and hereinbefore fully explained; and a rotary motion being given to the driving-shaft M by means of a belt-wheel, x', on one end thereof, the cutter-heads aforesaid, and also the shaft o, which carries the cams H, are caused to rotate at the proper speed. The position of the sliding-bars D, with reference to the blanks within the aforesaid guides is such that when the said bars are drawn back or outward, the spurs h are situated beyond the outer ends of the lowermost blanks, and the cams H being situated upon opposite sides of the shaft o, act alternately upon the friction-roller G to move the upper or long arms of the levers F, and consequently the sliding-bars D inward, and allow them to be brought back or outward alternately by the agency of the spiral springs l acting upon the lower or short arms of the said levers.

The operation of each lever F and slide D may be more particularly described as follows: The slide D being moved outward, so that the spur h is situated somewhat beyond the outer ends of the blanks, as just mentioned, the cam H, rotating in the direction shown by the red arrow in fig. 1, forces the upper and long arm of the lever F inward. The extremity of the said long arm ofthe lever acting upon the innermost side of the notch j of the pivoted catch E, tilts the said catch E so that the spur h projects upward through the hole or slot i, and immediately behind the outer end of the lowermost blank. The continued motion of the cam H forcing the long arm of the lever inward, causes the said spur j to push the blank inward toward the cutter-head N, the said blank pushing before it the blank which had previously been at the bottom of the pile, and been pushed inward by the spur j of the other sliding-bar D, in the same manner as the one just described. The blank being thus pushed inward beyond the inner end of the pile of blanks between the guides C, the movement of the cam being continued, a small recess or depression, r, formed in the circumference of the said cam, immediately behind its most salient part, is brought behind the friction-roller G, so that the spring l is enabled to bring the long arm of the lever back far enough to act upon the outer side of the notch j of the pivoted catch E, and thus tilt the said catch so that the spur h is brought downward below the upper surface thereof, so as not to interfere with the passage of the succeeding blank. The semicircular portion from r to s of the cam H then acts upon the

friction-roller G to hold the lever F, and consequently the sliding-bar D, stationary in its forward position, the said bar D sustaining the weight of the pile of blanks between the guides C, while the other cam H, acting upon the other lever F, operates the other sliding-bar to push the succeeding lowermost blank of the said pile inward against the outer or rearmost end of the blank just mentioned, and thus feeding it underneath the grooving cutters of the cutter-head N, which being done, the lever F first mentioned is released by its cam H, and brought back to its first position by the spring l acting upon its lower end. By these means the pile of blanks between the guides C is sustained alternately by the sliding-bars D, and the lowermost blanks of the said pile are fed successively inward by the alternate action of the said sliding-bars, and the blanks are fed to the cutters of the cutter-head N by the pushing action behind them of the succeeding blank, and in like manner are fed to and over the cutter-head T, to be grooved upon their under sides by the pushing of those behind them as they issue from underneath the cutter-head N, by which means the blanks are not subjected to severe or injurious pressure, which would be likely to occur if rollers were employed to produce the feeding movement of the same; the pressers h^1 g^1 and r^1 n^1, holding the blanks in proper position while undergoing the grooving operation, as hereinbefore explained.

When the cutters attached to the cutter-head N are of the kind shown in fig. 6, as hereinbefore set forth, the longitudinal grooves formed in the said blank are rectangular in their cross-section, as shown at n^2, in the said figure, and also in fig. 7, and are designed to receive the leads which may be placed therein in the usual manner. The rectangular groove or grooves formed in the under side of the blank when such cutters are employed upon the cutter-head T, serve, in connection with a suitable stationary guiding-spur, to assist in properly guiding the movement of the blank during the subsequent operation of dividing the blank into separate pencils, or, in other words, of separating the pencils from each other. The blanks being thus provided with longitudinal rectangular grooves n^2, and the said grooves being filled with the material constituting the "leads" of the pencils, a thin strip of any suitable wood is glued or cemented upon the surface of the blank over the leads, thus enclosing the said leads within the wood, whereupon it remains only to properly divide the blanks thus constituted in a longitudinal direction between the leads therein in order to complete the pencil. This separation of the pencils is effected by cutting through the blank from opposite sides thereof by means of suitably shaped cutters attached to the cutter-heads N and T, the said cutter-heads being adjusted to accommodate the increased thickness of the blank by means of the set-screws d^1, the blanks being fed to the said cutter-heads in the same manner as in forming the rectangular grooves n^2, and as hereinbefore fully set forth. When the pencils are designed to be cylindrical in shape the cutters are of the form shown in cross-section in fig. 8, while if a hexagonal pencil is desired, the cutters are made in the manner shown in cross-section in fig. 9. The blanks being passed underneath the cutter-head N, the cutters on the said head cut longitudinal grooves in the upper side thereof between the leads enclosed therein, the said grooves extending rather more than half way through the blank, the blank then passing over the cutter-head T. The cutters on the said head T cut through the remaining thickness of the blank and divide it into pencils, the said pencils being forced out from above the cutter-head T by the pushing action of the pencils formed from the succeeding blank, and being guided in thus passing out from the cutters by passing into suitably shaped longitudinal grooves formed on the upper surface of the frame a, as shown at x' in fig. 2. In thus separating the pencils a stationary stud may be made to project upward from the upper surface of the frame a, and to work in a rectangular longitudinal groove formed in the under side of the blank, (as just hereinbefore fully explained,) in such manner as to prevent any lateral movement of the blank, and secure the proper division of the blank in the spaces between the leads enclosed therein, as hereinbefore fully explained.

What I claim as new, and desire to secure by Letters Patent, is—

1. The sliding-bars D carrying the pivoted catches E, and arranged in relation with the frame a, guides C, and cutters, substantially as herein set forth for the purpose specified.

2. The sliding-bars D, pivoted catches E, and levers F, combined with suitable cams H, and spring retractors l, operating substantially as herein set forth for the purpose specified.

3. The arrangement of the two cutter-heads N and T, and their blank-supporting beds, with reference to each other and to the feeding devices, so that the one cutter shall first groove the whole length of one side of the blank, and then the other the whole length of the other side, to separate it into pencils as described.

4. The cutters C' constructed with a flat portion, a^2, and curved or semicircular portion, b^2, and applied to the cutter-head substantially as herein set forth for the purpose specified.

EDW. WEISSENBORN.

Witnesses:

HENRY T. BROWN,

W. MORRIS SMITH.