

No. 751,849.

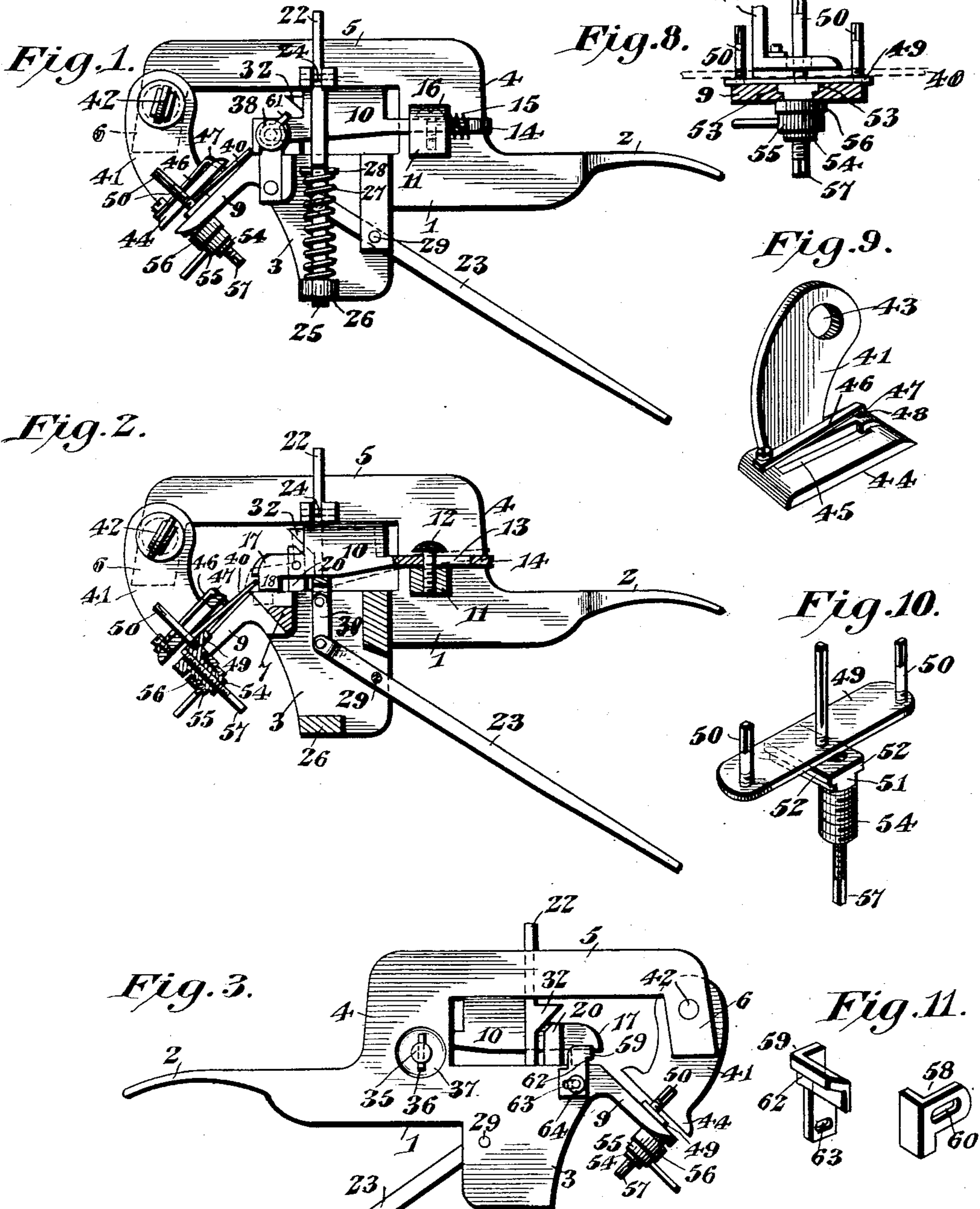
PATENTED FEB. 9, 1904.

S. HALTOM.
SAW SET.

APPLICATION FILED JUNE 30, 1902.

NO MODEL.

2 SHEETS—SHEET 1.



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By

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Witnesses
Jas. E. McLathran
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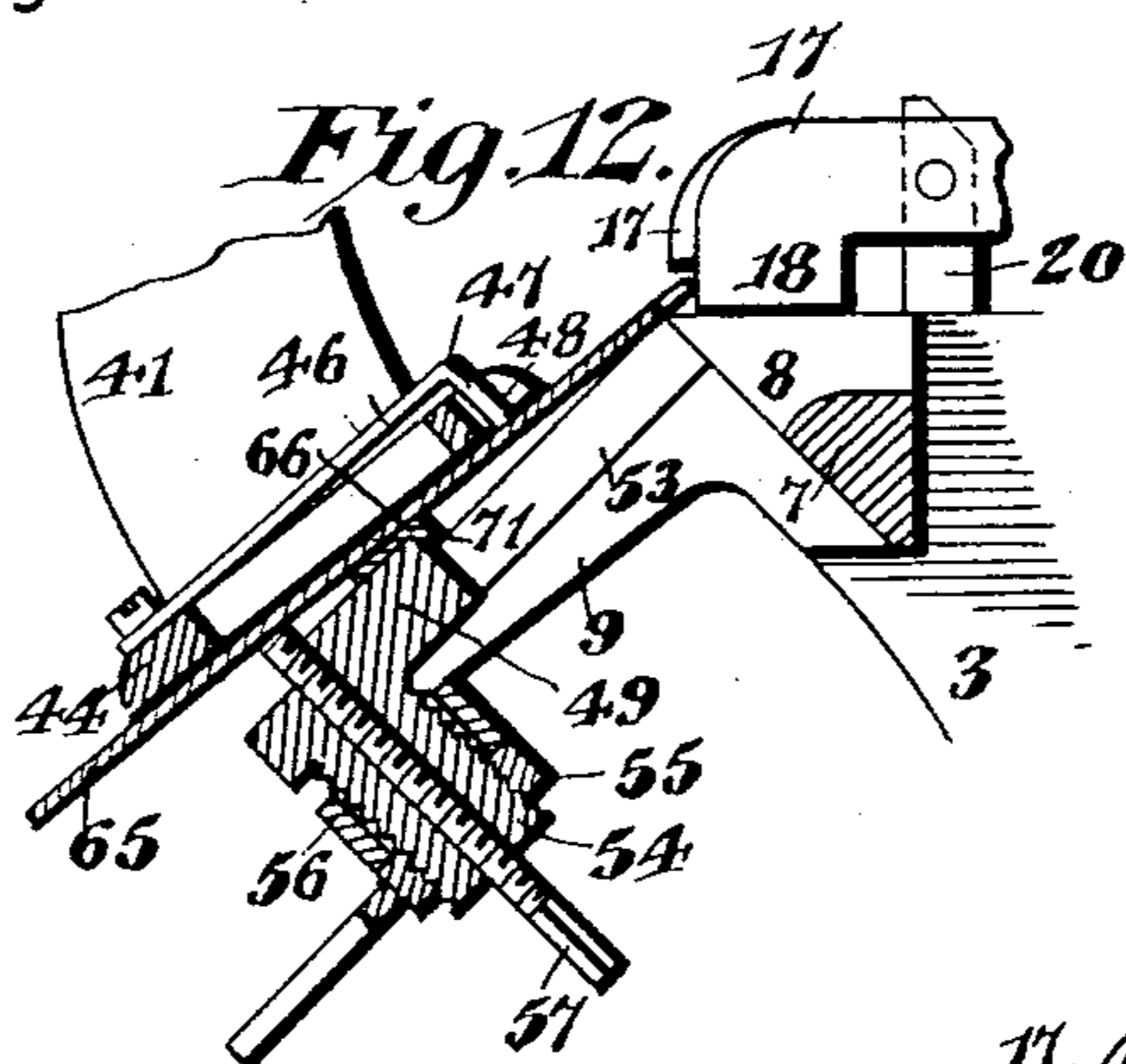
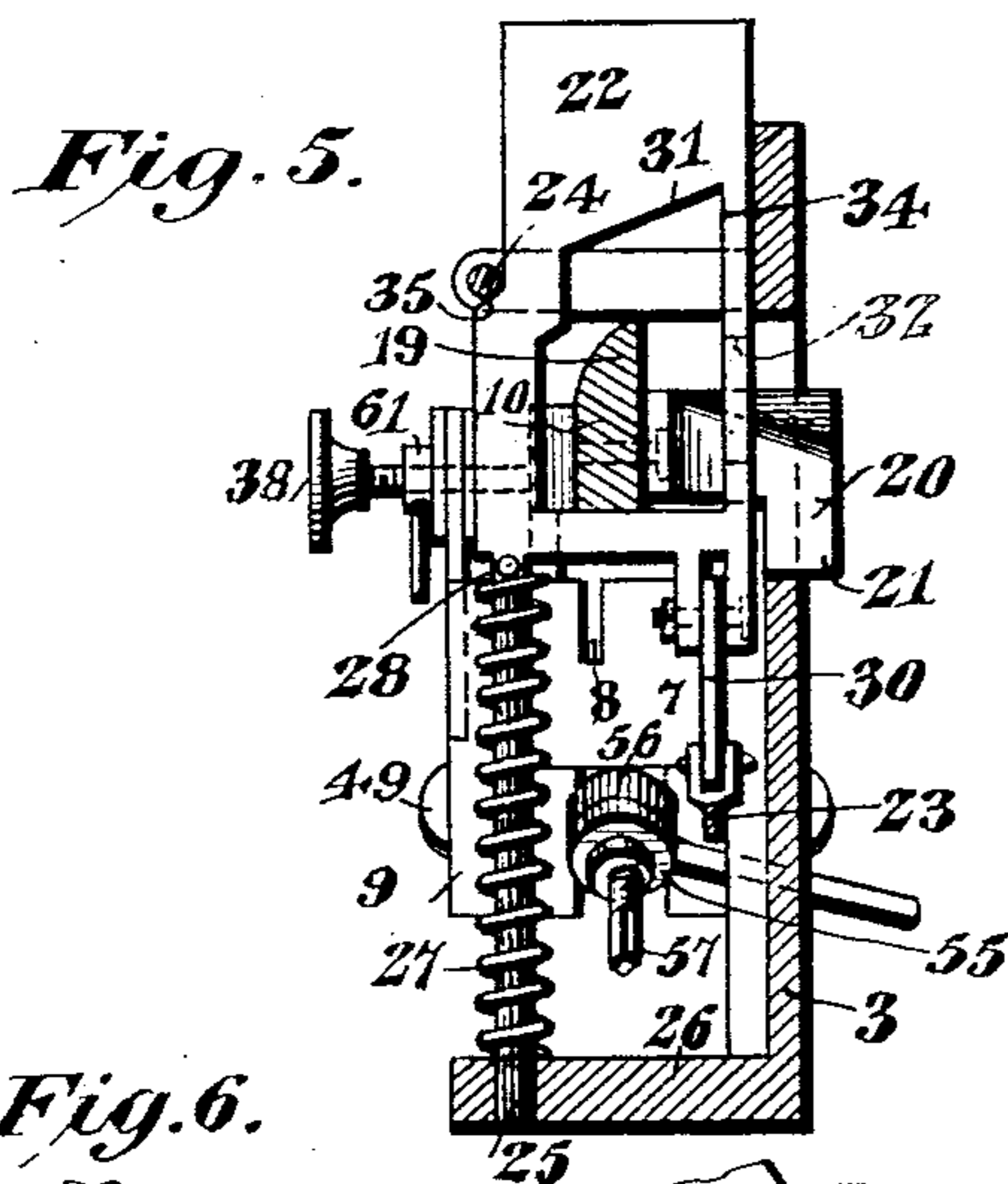
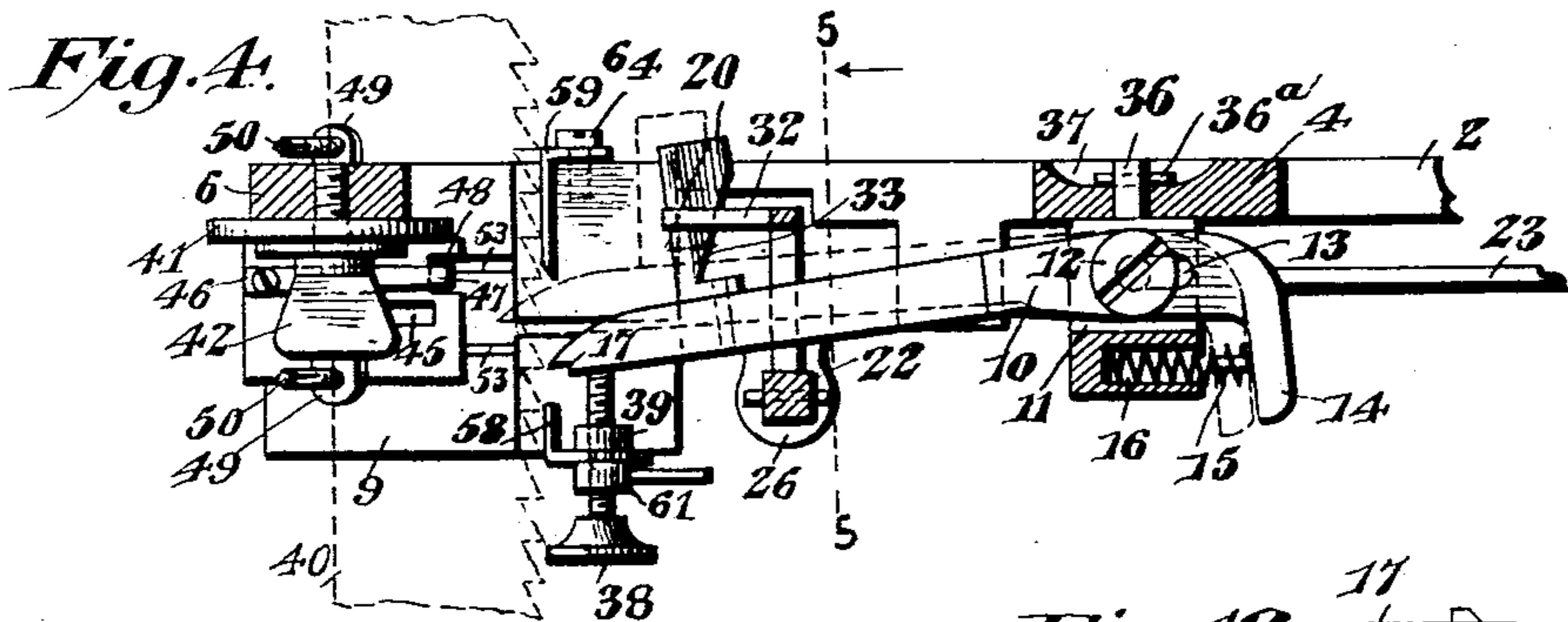


Fig. 6.

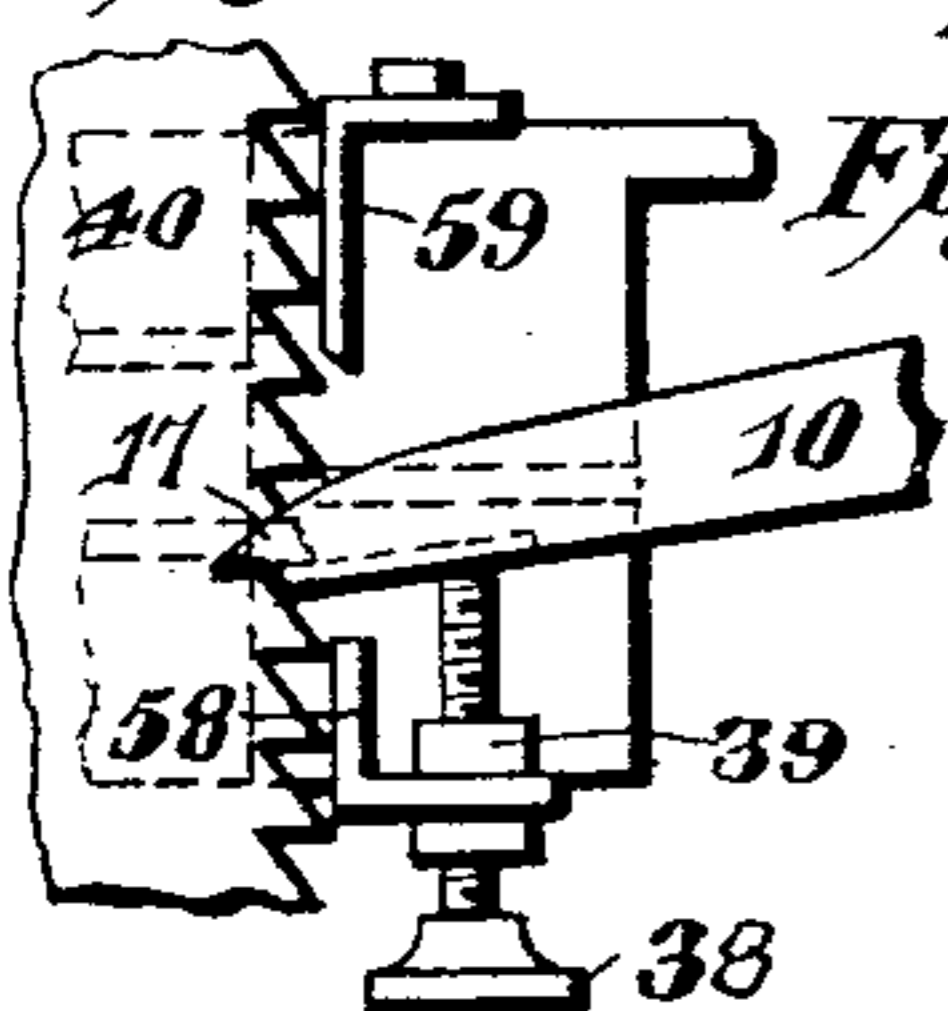


Fig. 7.

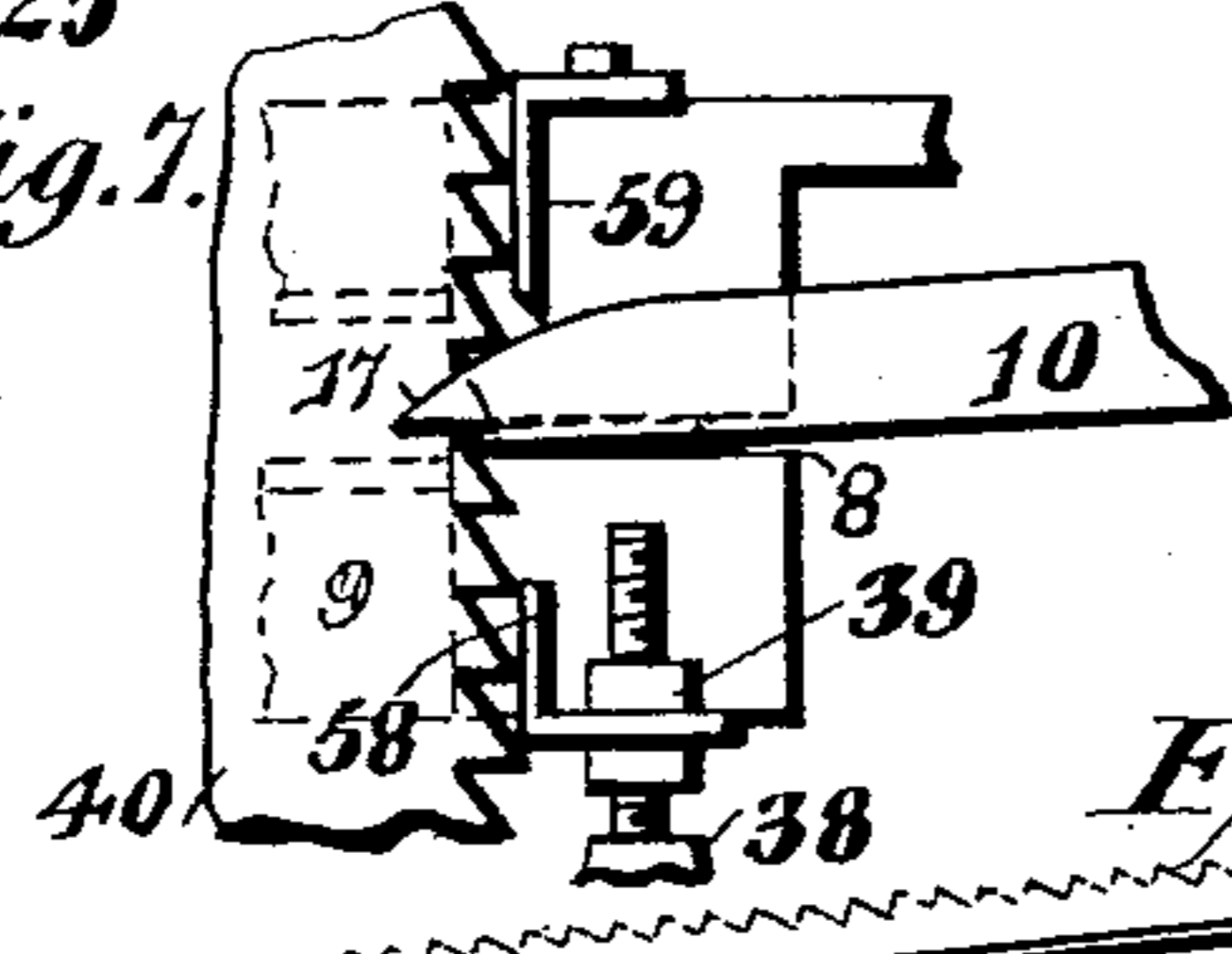


Fig. 13.

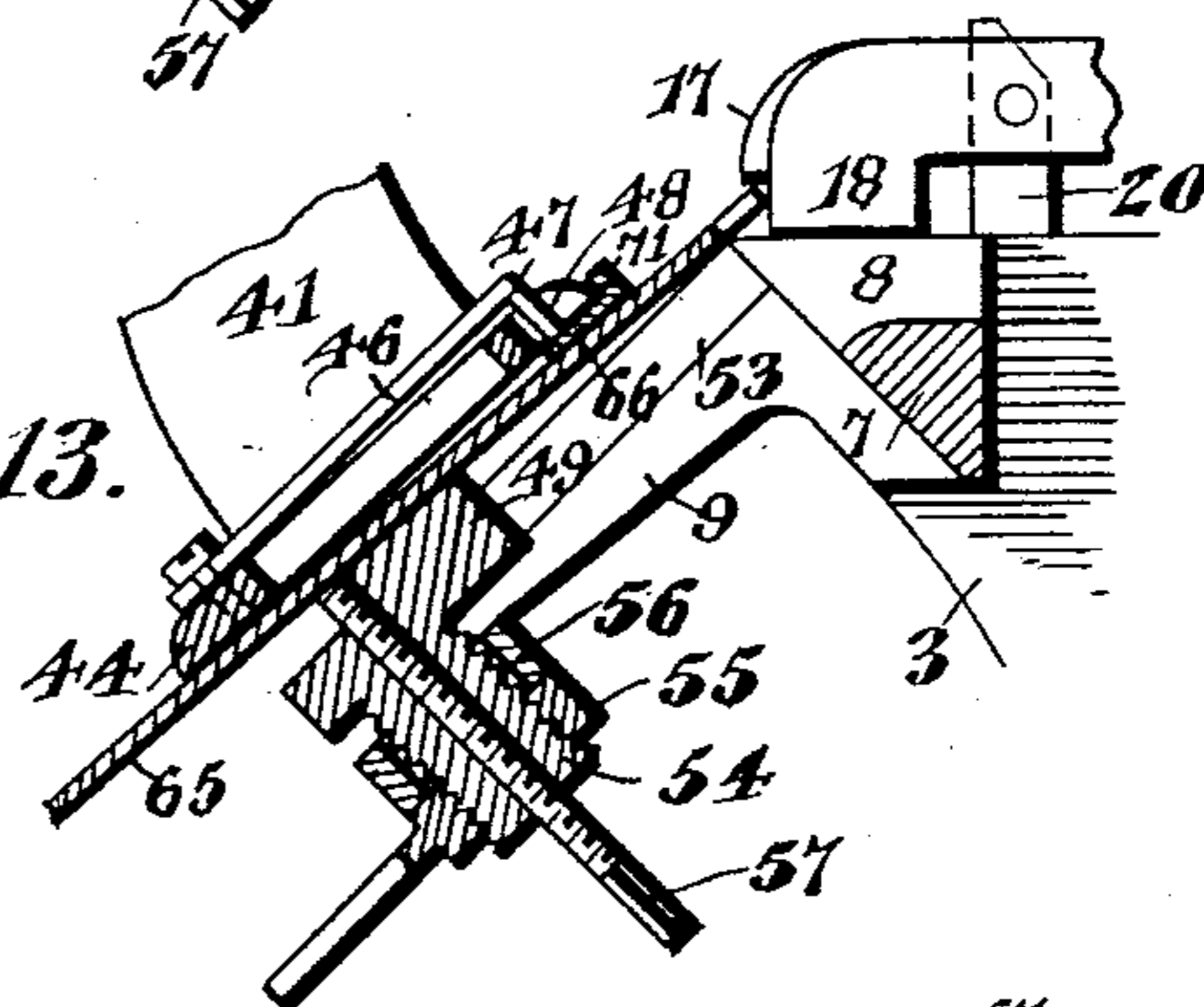


Fig. 14.

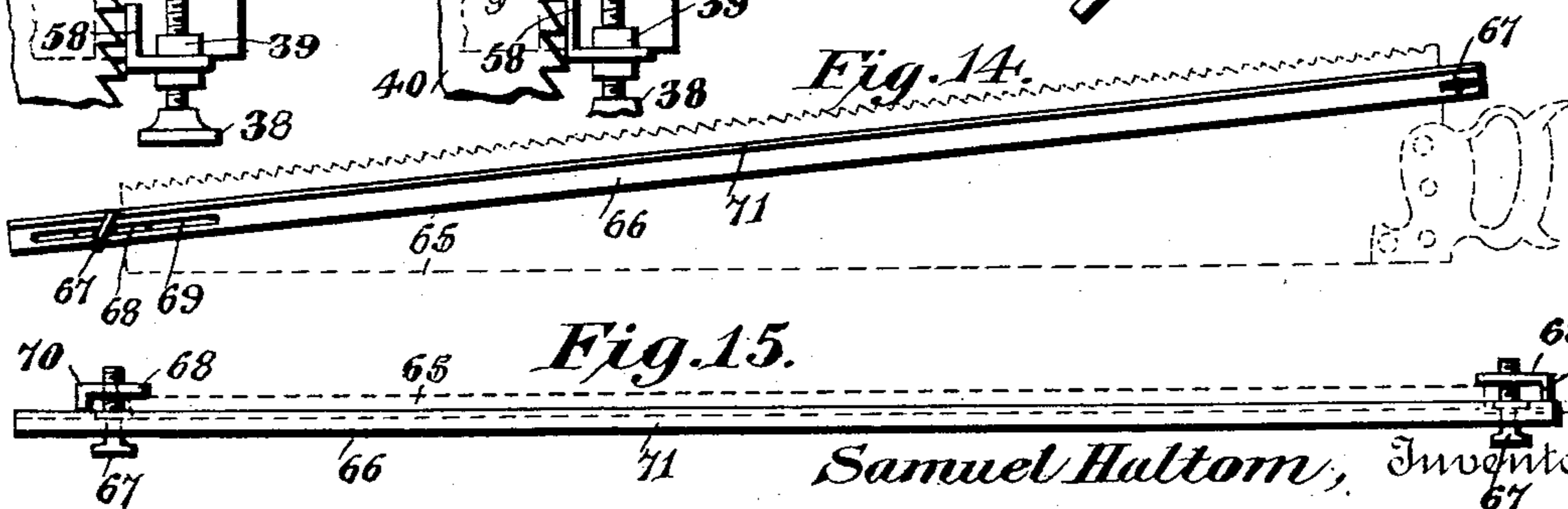


Fig. 15.

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UNITED STATES PATENT OFFICE.

SAMUEL HALTOM, OF HENDERSON, TEXAS.

SAW-SET.

SPECIFICATION forming part of Letters Patent No. 751,849, dated February 9, 1904.

Application filed June 30, 1902. Serial No. 113,787. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL HALTOM, a citizen of the United States, residing at Henderson, in the county of Rusk and State of Texas, have invented a new and useful Saw-Set, of which the following is a specification.

This invention relates to saw-sets, and is designed to automatically feed the saw-blade and set the teeth, regardless of the size thereof, in a simple and effective manner and to provide for a continuous uninterrupted operation of the device as fast as the controlling means can be manipulated. It is furthermore designed to have the setting-punch accomplish the feeding of the saw-blade, thereby to dispense with independent saw-feeding mechanism, and hence to materially simplify the construction and operation of the device, and also to provide for adjusting the movement of the punch so as to accommodate the same to saw-teeth of different sizes in order that the saw-blade may be properly fed the required distance to set the proper teeth and to avoid skipping of any of the teeth.

Another object is to provide an improved saw holder and guide to prevent looseness and yielding of the saw-blade under the action of the setting-punch and to have the guide adjustable, so as to accommodate saw-blades of different widths, and also to provide for adjustably tilting the saw-blades, so as to secure any desired degree of set or angular displacement of the teeth.

A final object is to have the device applicable to wide handsaws, as well as to the narrow blades of butchers' and band saws, and to provide a supplemental guide for application to wide saw-blades and for coöperation with the saw-guide carried by the frame of the device.

With these and other objects in view the present invention consists in the combination and arrangement of parts, as will be hereinafter more fully described, shown in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that changes in the form, proportion, size, and minor details may be made within the scope of the claims without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawings, Figure 1 is a side elevation of a saw-set embodying the features of the present invention. Fig. 2 is a longitudinal sectional view thereof. Fig. 3 is an elevation of the opposite side of the device. Fig. 4 is an enlarged detail plan section. Fig. 5 is a cross-sectional view taken on the line 5 5 of Fig. 4. Fig. 6 is a diagrammatic view showing the initial position of the punch when it starts to feed the saw-blade. Fig. 7 is a similar view showing the punch at the completion of its feed movement and in position to set or bend a tooth. Fig. 8 is a detail cross-sectional view taken through the saw-guide. Fig. 9 is a detail perspective view of the saw-holding element of the guide. Fig. 10 is a detail perspective of the adjustable member of the saw-guide. Fig. 11 is a detail perspective view of the saw-gages at opposite sides of the anvil. Fig. 12 is an enlarged detail sectional view taken longitudinally through the anvil and the saw-guide to illustrate the manner of guiding a wide handsaw-blade. Fig. 13 is a similar view showing the saw-blade reversed to set the teeth at the opposite side. Figs. 14 and 15 are detail views of the supplemental guide for application to a handsaw-blade.

Like characters of reference designate corresponding parts in all of the figures of the drawings.

In carrying out the present invention there is provided a frame consisting of a straight bar 1, terminating at its rear end in a handle 2 and having a pendent extension 3 near its front end and lying in the general plane of the frame. About the middle of the bar 1 there is an upstanding portion 4, which rises to a suitable distance above the body of the frame and has a forward extension 5, projected in advance of the body and having a pendent arm 6. At the front of the main bar 1 of the frame is an integral laterally-projected anvil portion 7, the top of which is flush with the top of the bar 1, and its front is beveled downwardly and rearwardly, as clearly indicated in Figs. 2, 12, and 13. The top of the anvil is provided with an open-ended groove or seat 8, which deepens toward its forward end for the accommodation of the setting-punch, as will be hereinafter explained. At the front of the anvil is an in-

tegral downwardly and forwardly inclined and longitudinally-bifurcated platform 9, the bifurcation of which communicates with the groove or seat 8.

5 The combined punch and feeder, which is constructed, as hereinafter explained, to feed the saw and set the teeth thereof and which is successively moved to accomplish these results, is designated by the numeral 10 and extends from the anvil to the rear of the arm 4, where it is supported in a seat 11, projected laterally from the arm 4 and held thereto by means of a headed fastening 12, passing through a longitudinal slot 13 in the punch and entering the seat, whereby the punch is capable of an endwise-reciprocatory movement. At the rear end of the punch there is a lateral outwardly-directed heel or shoulder 14, which bears against a helical spring 15, interposed between the part 14 and the rear end of the seat and received within a socket or recess 16, formed therein. The fastening 12 besides forming a guide for the punch in its endwise movement also forms a pivot therefor to permit lateral swinging of the punch, and the spring 15 is designed to return the punch to its normal position after each operation thereof—that is to say, the spring pushes the punch rearwardly in an endwise direction and also swings the forward end thereof laterally outward when the punch has been released at the completion of its operation. The forward end of the punch is laterally reduced to form a setting point or member 17, having a flat under face, as best indicated in Figs. 12 and 13, there being a feed projection 18 extending downwardly from the outer side of the punch and slightly in rear of the setting-point, the front edge of the feeding device being sharp or beveled, so as to readily enter the space between two adjacent teeth, as clearly indicated in Fig. 7 of the drawings, so that when the punch is shifted laterally the projection 18 will operate to feed the saw-blade in an endwise direction. At about the middle of the punch there is an upstanding cam-flange 19, (best illustrated in Fig. 5,) with its outer face beveled or inclined upwardly and inwardly and designed for shifting the punch laterally, as will be hereinafter described. In front of the cam-flange 19 and projected laterally from the opposite side of the punch is a cam-shoulder 20, which is carried by the punch and has its rear face inclined upwardly and forwardly and also laterally inward, this cam or flange projection being adapted to feed the punch forward. Moreover, the cam-flange 20 is provided at its outer end with a pendent lug or shoulder 21, which normally rests upon the anvil, so as to support the punch in an elevated position, and when the punch is shifted laterally the projection clears the anvil, so as to drop down at the outer side thereof when the punch is forced downwardly to bend or set a tooth.

The means for reciprocating and swinging the punch both horizontally and vertically consists of a vertically-reciprocating trip-slide 22 for coöperation with the cam portions of the punch and a manipulating-lever 23, fulcrumed upon the main frame and connected to the slide. The slide 22 has its upper end working through a slotted guide projection 24, carried by the upper portion of the frame, and is provided at its outer side with a pendent pin or stem 25, which works through a perforate guide projection 26, carried by the lower end of the frame extension 3. A helical spring 27 embraces the stem and bears in opposite directions against the projection 26 and a pin 28, set transversely through the upper end of the stem. The purpose of the spring 27 is to return the slide to its normally elevated position after being depressed by the lever. The lever is fulcrumed intermediate of its ends upon the pendent frame extension 3, as indicated at 29, and has its forward end pivotally connected to a link 30, which is pivotally hung from the inner side of the slide 22. The slide 22 is in the form of a flat metallic plate having an opening for the reception of the punch, the upper edge 31 of the opening, as best shown in Fig. 5, being inclined upwardly and inwardly to form a cam for coöperation with the cam 19 of the punch to shift the latter laterally inward when the cam 31 rides over and downwardly across the cam 19. It will be noted that the length of the opening in the slide is greater than the combined thickness of the punch and the cam 19, so that the slide may have a considerable initial movement before the cams 31 and 19 engage in order that the punch may be moved forwardly to its limit before it is shifted laterally.

For moving the punch forwardly before it is shifted laterally a cam projection 32, as best shown in Figs. 3 and 4, is provided upon the front side of the slide 22, near the inner edge thereof, the under side of the cam projection being inclined upwardly and forwardly, so as to coöperate with the laterally-projected cam 20, carried by the punch, whereby as the cam 32 rides downwardly across the cam 20 the punch will be moved forwardly in an endwise direction, so as to engage the feed projection 18 of the punch between a pair of teeth of the saw, the cam 32 being located below the lower end of the cam 31, so as to move the punch forwardly before it is shifted laterally. As best indicated in Fig. 4, it will be seen that the rear side 33 of the cam 20 is beveled or inclined from its outer end toward its inner end in order that there may be no binding between the cams 32 and 20 when the punch is shifted laterally.

By reference to Fig. 5 it will be observed that the lateral movement of the punch is limited by engagement with the wall 34 at the upper end of the cam 31, which forms a

stop-shoulder, and when this point has been reached the punch is moved downwardly by the further downward movement of the slide 22, it of course being understood that the connection between the punch and the fastening 12 is sufficiently loose to permit of these movements in three different directions. The downward movement of the punch is limited by reason of its engagement with the anvil, and when the lever 23 is released the slide will be automatically elevated by the spring 27, thereby elevating the punch, and the latter is also moved rearwardly and shifted laterally outward into its original normal position under the action of the spring 15, which has been compressed by the operation of the punch. The upward movement of the slide is limited by means of a stop-shoulder 34^a, provided upon the outer edge of the slide and disposed to strike against the under side of the outer end of the guide 24, so as to prevent the upward displacement of the slide and to stop the latter in proper position for engagement with the punch. From this description it is apparent that the punch can be operated as fast as the lever can be manipulated, and therefore the device may be operated as fast or slow as may be desired by manipulating the lever 23 accordingly.

In order that the punch may have a free up-and-down swinging movement, it is preferred to pivotally mount the seat 11, as best illustrated in Fig. 4, by providing the seat with a pivot-pin 36, which pierces the arm 4 and is held against endwise displacement by means of a key 36^a, which is passed transversely through the outer end of the pivot-pin and lies in a socket or depression 37 in the latter face of the arm 4, whereby the latter is free from projections.

The lateral inward movement of the punch is limited by having the projection 18 drop into the groove or seat 8 in the anvil 7, which stops the punch in the proper position for engaging the setting-point 17 with the tooth to be bent or set. To limit the lateral movement in the opposite direction, there is provided a stop in the form of a set-screw 38, which pierces a post 39, rising from the outer end of the anvil, the set-screw being adjustable through the post to vary the outward movement of the punch. This adjustable stop 38 is a very important feature of the present invention, as it provides for regulating the length of the lateral throw of the punch, so as to accommodate the latter to saw-teeth of different sizes, and therefore renders the present device capable of a wide range of usefulness upon saws of different sizes.

It will be understood that a saw-blade is adapted to be supported upon the inclined platform 9, as indicated at 40 in Figs. 1 and 2 of the drawings and by dotted lines in Fig. 4, with the teeth projected above and inclined across the front of the anvil, so as to be in po-

sition to be bent down thereagainst by the setting-point of the punch.

To hold the saw-blade against the platform or support, there is a holder consisting of a pendent arm 41, adjustably hung from the outer end of the upper part 5 of the frame by means of a thumb-screw 42, the opening 43 in the arm, as shown in Fig. 9, being considerably larger in diameter than the screw, so as to afford an adjustment of the arm, the latter having a laterally-projected holding or presser foot 44, carried by its lower end and lying over the platform or support 9. This foot is provided with a longitudinal slot 45, and at the inner side of the slot is a spring-finger 46, having its outer end connected to the upper side of the foot and its rear free end provided with a pendent projection 47, lying in a notch 48 in the rear edge of the foot and of a length to lie against the blade, so as to press the latter into engagement with the support or platform.

The saw-blade is guided in its endwise feeding movement and is held against outward edgewise displacement under the action of the setting operation of the punch by means of a guide consisting of a plate 49, disposed transversely across the top of the support or platform 9 and provided with a plurality of up-standing pins 50, which have polygonal shanks and have screw-threaded connections with the plate, so as to be detachable therefrom. The outer pins lie at the outer edges of the support or platform 9, while the center pin is accommodated in the bifurcation of the platform and the slot 45 of the presser-foot, whereby the plate may be adjusted without interference by the presser-foot. The under side of the plate is provided with a central head 51, which is projected in rear of the plate, and is provided at opposite sides with longitudinal flanges 52, that fit in longitudinal grooves or guideways 53 in the opposite edges of the bifurcated portion of the platform or support 9, so that the guide-plate may be adjusted toward and away from the setting-punch. The rear end of the head is provided with a pendent externally-screw-threaded tubular stem 54, which projects through the bifurcation of the platform or support 9 and carries a wrench-nut 55 to clamp against the under side of the platform and hold the guide-plate at any adjusted position, there being a washer 56 interposed between the wrench-nut and the platform. The interior or bore of the stem is screw-threaded and extends through the top of the head, and in this screw-threaded bore is fitted an adjustable set-screw 57, which is adapted to be projected upwardly beyond the face of the guide-plate, so as to engage the under side of a saw-blade to adjustably tilt the latter, as shown in Figs. 12 and 13, to vary the inclination of the set of the teeth.

It is of course desirable to accurately adjust the saw-blade, so that each tooth may project

across or overhang the anvil at a predetermined distance—that is to say, for exactly the length of the tooth—and to obtain this feature of adjustment I provide two gages 58 and 59, which have been shown in detail in Fig. 11. The gage 58 is in the form of a right-angle clip, having one member disposed transversely across the anvil and its other member lying against the outside of the post 39 and provided with a slot 60 to receive the set-screw 38, whereby the gage may be adjusted toward and away from the front edge of the anvil, there being a wrench-nut 61 applied to the set-screw 38, so as to lock the latter and also secure the gage when these parts have been adjusted. The other gage 59 is also in the form of a right-angled clip, one member of which projects across the upper face of the anvil and is cut away longitudinally upon its outer face and at its lower edge, as indicated at 62, to form a seat for the reception of the outer ends of the saw-teeth, the other pendent member of the clip being provided with a transverse slot 63 to receive a fastening 64, the latter being best shown in Fig. 3 and serving to adjustably connect the gage to the frame of the device.

In the operation of the device to set the teeth of a narrow saw-blade, as best illustrated in Figs. 4, 6, and 7, the saw-blade 40 is thrust endwise between the support or platform 9 and the presser-foot 44, with its back edge lying against the pins 50 of the guide, the latter then being adjusted forwardly until the base of the teeth are alined with the straight front edge of the anvil 7, and then the handled nut 55 is tightened, so as to hold the guide, and the thumb-screw 42 is tightened to hold the spring of the presser-foot in engagement with the upper side of the saw-blade, so as to prevent displacement thereof. The gages 58 and 59 are then adjusted so as to lie against the points of the teeth, but not so tight as to interfere with the endwise shifting or feeding of the blade. The blade thus being in position, the palm of the hand will be placed against the handle 2, and the fingers of the hand are pressed upwardly against the rear end of the lever, so as to draw the punch-controlling slide 22 downwardly to actuate the punch. The lever is at first moved very slowly, so as to impart only the initial endwise movement to the punch in order that the saw-blade may be adjusted by hand in an endwise direction to receive the feed projection 18 accurately between a pair of teeth and in rear of the first tooth to be set. After this adjustment has been accomplished the device is then ready for operation, the handle being regularly manipulated as fast as desired, and the teeth will be regularly bent or set and the saw-blade properly fed or shifted without further attention to either the saw or the machine. As hereinbefore explained, the initial forward movement of the punch places the feeding or shifting projection 18 in the space between a

pair of teeth at the outer side of the groove or seat 8 in the anvil, the lateral swinging movement of the punch feeds or shifts the saw-blade in an endwise direction, so as to move the tooth below the setting-point 17 to the opposite side of the seat 8, and then the downward movement of the punch brings the setting-point into engagement with the tooth, so as to bend the same down against the anvil. It will be noted that these three distinct movements or operations of the setting-punch are brought about by one manipulation of the lever, and when the latter is released the spring 27 automatically returns the lever to its original position, and through the medium of the slide 22 and the spring 15 the setting-punch is returned to its original position in readiness for another operation, whereby it is apparent that the teeth may be readily and conveniently set without any additional adjustment of the parts and merely by a continued manipulation of the operating-lever. It will of course be understood that the stop 38 is adjusted to limit the outward throw of the punch so as to travel backward from its final position the distance of one, two, or more teeth, according to the character of the saw or the desire of the operator, in order that the teeth may be set in regular order, and after the stop has once been adjusted the feed of the saw-blade will be absolutely perfect, and there will be no irregular setting of the teeth. After the saw-blade has been passed entirely through the machine it is inverted and passed through again, so as to set the alternate teeth at the opposite side of the saw-blade, this second operation being accomplished without further adjustment of any of the parts of the device.

It will here be noted that the saw-guide formed by the plate 49 and the pins 50 accurately guide the saw-blade in its movement across the device and also prevent edgewise displacement of the blade under the action of the forward movement of the punch and also under the setting action thereof. Moreover, the blade is held firmly against tilting under the bending or setting action of the punch by the presser-foot 44, and therefore all of the teeth are bent from the same point and also set at the same angle.

When it is desired to set the teeth of a saw-blade which is too wide to fit between the gages 58 and 59 and the pins 50 of the guide-plate—as, for instance, a handsaw—the pins 50 are removed from the guide-plate, and, as shown in Fig. 12, the saw-blade 65 is placed between the support or platform 9 and the presser-foot 44 and also over the guide-plate 49. To prevent the saw-blade from being displaced under the action of the punch, there is provided a supplemental guide-rod 66, which is angular or substantially L shape in cross-section. This guide-rod is applied to the under face of the saw-blade in rear of the teeth and is of a length to project at opposite ends of the saw-blade,

it being held thereon by means of terminal clamps, each of which consists of a set-screw 67, which pierces the rod and also pierces a clamp member 68 at the opposite side of the saw. Each set-screw pierces the guide-rod adjacent to but beyond the end of the saw-blade, the screw at the forward end of the rod being fitted in a longitudinal slot 69, so that the clamp may be adjusted longitudinally upon the rod to fit saws of different lengths. Moreover, the outer end of each clamp member 68 is provided with a transverse shoulder 70 to bear against the rod, while the opposite inner end of the clamp member lies against the saw-blade, whereby an effective clamping action is had between the member 68 and the blade. When the saw, with the guide thereon, is applied to the saw-set, the flange 71 of the rod bears against the inner edge of the guide-plate 49, whereby the saw is held against outward edgewise displacement and is effectively guided in its endwise movement. After one set of teeth has been bent or set the saw-blade is inverted, as in Fig. 13, so as to bring the guide-rod upon the upperside of the saw. The guide is then adjusted nearer the toothed edge of the saw, so that its flange 71 may engage the inner or rear edge of the presser-foot 44, which latter then forms a stationary guide for cooperation with the guide-flange 71. It will here be noted that the inclination of the saw-blade may be conveniently varied by means of the adjusting-screw 57, so as to vary the set of the saw-teeth.

The saw-set is adapted to be used either as a hand-tool or to be mounted upon a bench or table, and when arranged upon such a support any suitable means may be employed for actuating the operating-lever.

When the saw-set is used as a hand-tool, it will feed itself automatically along a saw-blade, as will be readily understood, and when the saw-set is used as a machine the saw-blade will be automatically fed forward.

What I claim is—

1. In a saw-setting apparatus, a combined tooth-setting and saw-feeding device, and means for moving the same to feed a saw and set the teeth thereof, substantially as described.

2. In a saw-setting apparatus, a combined tooth-setting and saw-feeding device, and means for moving said device longitudinally of a saw to feed the same and transversely thereof to set the teeth, substantially as described.

3. In a saw-setting apparatus, a combined tooth-setting and saw-feeding device, and means for moving said device inward and outward to engage and release a saw, and longitudinally of the cutting edge to feed the saw, and transversely of the same to set the teeth, substantially as described.

4. In a saw-setting apparatus, the combination with a saw holding and guiding means, of a saw-setting punch having a tooth-engaging

feed projection and a saw-setting point projecting laterally beyond the feed projection, and means for moving the punch to engage the feeding projection between a pair of saw-teeth, then moving the punch laterally to feed the saw and then moving the punch in direction substantially at right angles to the feeding movement thereof for engaging the setting-point with a tooth to set the same.

5. In a saw-setting apparatus, the combination with an anvil having a seat, of saw holding and guiding means in cooperative relation with the anvil, a combined tooth-setting and saw-feeding device normally at one side of the seat, and means for moving the device into engagement with the teeth of a saw, then moving the same laterally to the seat to feed the saw and finally moving a portion of the device into the seat to bend a tooth against the anvil.

6. In a saw-setting apparatus, the combination with a frame having saw holding and guiding means, of an endwise-reciprocatory and laterally-movable tooth-setting and saw-feeding device, an operating-lever fulcrumed upon the frame, and connecting means between the lever and the device to impart to the latter endwise movement to engage the same with a saw and also lateral movements at substantially right angles to each other to feed the saw and set the teeth.

7. In a saw-setting apparatus, the combination of a tooth-setting and saw-feeding device, and an operating-slide in cooperative relation with the device, the latter and the slide having mutually-engaging cams for moving the device to feed the saw and set the teeth thereof.

8. In a saw-setting apparatus, the combination with a frame, having saw holding and guiding means, of a tooth-setting and saw-feeding device, an operating-slide in cooperative relation with the device, the latter and the slide having mutually-engaging cams for moving the device forwardly and then laterally in two successive directions at substantially right angles to each other, operating means for the slide, and a spring to automatically return the slide to its original position.

9. In a saw-setting apparatus, the combination with saw holding and guiding means, of an endwise-reciprocatory and laterally-movable tooth-setting and saw-feeding device having a cam inclined transversely thereof, and another cam inclined longitudinally of the device, and an operating-slide having a cam in cooperative relation with the first-mentioned cam of the device, and another cam in cooperative relation with the other cam of the device.

10. In a saw-setting apparatus, the combination with saw holding and guiding means, of a slide, an endwise-reciprocatory and laterally-movable tooth-setting and saw-feeding device, the latter and the slide having mutually-cooperating cams for imparting endwise movement to the device, and other mutually-cooperative cams for moving the device laterally,

the first-mentioned cams being disposed for engagement prior to the engagement with the other cam.

11. In a saw-setting apparatus, the combination with saw holding and guiding means, of an endwise-reciprocatory and laterally-movable tooth-setting and saw-feeding device having a cam-surface which is inclined transversely thereof, and another cam projected laterally from the device and having its cam-face inclined longitudinally of the device, and a reciprocatory operating-slide having a longitudinal slot receiving the device, one end wall of the slot being inclined to form a cam-surface in coöperative relation with the first-mentioned cam of the device, the slide also being provided with a laterally-projected cam lying substantially parallel with the device and in coöperative relation with the laterally-projected cam thereof.

12. In a saw-setting apparatus, the combination with a frame having a saw holding and guiding device, of an endwise-reciprocatory and laterally-movable tooth-setting and saw-feeding device having a transversely-inclined cam and a lateral projection having a cam-face inclined longitudinally of the device, a reciprocatory slide working at substantially right angles to the device and having cams in coöperative relation with the respective cams of the device, a manipulating-lever connected to the slide, and a spring to automatically return the slide and the device to their original positions.

13. In a saw-setting apparatus, the combination with a frame, having a saw holding and guiding device, of a reciprocatory and laterally-movable tooth-setting and saw-feeding device provided with an intermediate transversely-inclined cam, and a laterally-projected cam having its inclined face disposed longitudinally of the device, a reciprocatory operating slide working at substantially right angles to the device and having a longitudinal slot receiving the same, one end wall of the slot being inclined to form a cam for coöperation with the first-mentioned cam of the device, another cam carried by the slide and in coöperative relation with the other cam of the device, a guide-stem projected from the slide, a guide carried by the frame and receiving the stem, a helical spring embracing the stem and bearing in opposite directions against the guide and the slide and a manipulating-lever fulcrumed upon the frame and connected to the slide.

14. In a saw-setting apparatus, the combination with a frame having saw holding and guiding means, of a laterally-projected pivotal seat carried by the frame, an endwise-reciprocatory tooth-setting and saw-feeding device having its rear end longitudinally slotted and slidably fitted in the seat, a pivot-pin extending through the slot and into the seat, and means

for imparting to the device endwise-reciprocating movements and swinging movements at substantially right angles to each other upon the pin and the seat as centers.

15. In a saw-setting apparatus, the combination with a frame having saw holding and guiding means, of a pivotal seat projected laterally from the frame, a tooth-setting and saw-feeding device having a longitudinally-slotted rear portion fitted in the seat and also provided with a transverse shoulder at its rear end, a spring interposed between the shoulder and the seat, a pivot-pin passed through the slot and entering the seat, means for imparting to the device endwise-reciprocatory movement and also laterally-swinging movements at substantially right angles to each other upon the pin and the seat as centers.

16. In a saw-setting apparatus, the combination with a frame, having saw holding and guiding means at one end and a handle at the opposite end, of a laterally-projected pivotal seat between the saw-holding means and the handle, a punch having its rear end longitudinally slotted and fitted in the seat, a pivot-pin extending through the slot and into the seat, a transverse shoulder at the rear end of the punch, a spring interposed between the shoulder and the seat, a pendent feed projection at the forward end of the punch, said forward end being formed into a tooth-swaging point, a longitudinally-disposed cam rising from the intermediate portion of the punch with its cam-surface inclined transversely toward the frame, a cam projected transversely from the inner side of the punch with its rear face inclined downwardly and rearwardly, a reciprocatory slide mounted in guides upon the frame and having an intermediate slot receiving the punch, the upper wall of the slot being inclined to correspond with and also for engagement with the transversely-inclined cam of the punch, a lever fulcrumed upon the frame and connected to the slide, and a spring to automatically return the slide to its original position.

17. In a saw-setting apparatus, the combination of a laterally-movable tooth-setting and saw-feeding device, and means for limiting the lateral movement thereof.

18. In a saw-setting apparatus, the combination of a laterally-movable tooth-setting and saw-feeding device, and an adjustable stop to limit the lateral movement of the device.

19. In a saw-setting apparatus, the combination of a laterally-movable tooth-setting and saw-feeding device, and a set-screw located in the path of the lateral movement of the device to adjustably limit the same.

20. In a saw-setting apparatus, the combination with a frame having an anvil, of a laterally-movable tooth-setting and saw-feeding device in coöperative relation with the anvil, a post rising above the anvil, and a set-screw

carried by the post and disposed in the path of the device to adjustably limit the movement of the device.

21. In a saw-setting apparatus, the combination of an anvil, a combined tooth-setting and saw-feeding device mounted for lateral movement to feed a saw-blade, gages located at opposite sides of the device, and an adjustable stop extending inward from one of the gages and arranged in the path of the device to limit the movement of the same, substantially as described.

22. In a saw-setting apparatus, the combination with an anvil, and a laterally-movable tooth-setting and saw-feeding device, a stop to limit the lateral movement of the device, and a gage carried by the stop.

23. In a saw-setting apparatus, the combination with an anvil, and a laterally-movable tooth-setting and saw-feeding device, of a post rising from one side of the anvil, a set-screw piercing the post and disposed in the path of the device to limit the movement thereof, a saw-gage having a slot receiving the set-screw, and a nut carried by the set-screw to adjustably bend the gage against the post.

24. In a saw-setting apparatus, the combination with a frame, of a saw-holder and guide at one end of the frame, a handle at the opposite end of the frame, an endwise-reciprocatory and laterally-movable combined tooth-setting and saw-feeding device mounted upon the frame between the saw-guide and the handle, and a lever fulcrumed upon the frame and in operative relation with the device with its free end portion in coöperative relation with the handle of the frame.

25. In a saw-setting apparatus, the combination with a frame embodying upper and lower members, a handle at one end thereof, a saw support and guide carried by the opposite end of the lower member, a saw-holder hung from the upper member in coöperative relation with the guide, an endwise-reciprocatory and laterally-movable combined tooth-setting and saw-feeding device mounted upon the frame between the guide and the handle, and a lever fulcrumed upon the frame in coöperative relation with the device, with its outer end in coöperative relation with the handle.

26. In a saw-setting apparatus, the combination with a frame, of a handle at one end, an anvil at the opposite end, a saw-holder inclined downwardly and forwardly from the anvil, a combined punching and feeding device in coöperative relation with the anvil, and a lever fulcrumed upon the frame in coöperative relation with the combined punching and feeding device and having its rear free end in coöperative relation with the handle.

27. In a saw-setting apparatus, the combination with a frame, of an anvil, a saw-support inclined downwardly and forwardly from the anvil, a saw-holder pivotally hung from the

upper portion of the frame in coöperative relation with the support, and a tooth-setting punch mounted upon the frame in coöperative relation with the anvil.

28. In a saw-setting apparatus, the combination with a frame, of an anvil, a saw-support inclined downwardly and forwardly from the anvil, a saw-holder pivotally hung from the frame and in coöperative relation and adjustable with respect to the saw-support, and a tooth-setting punch in coöperative relation with the anvil.

29. In a saw-setting apparatus, the combination with a frame, of an anvil, a tooth-setting punch, a saw-support, and a saw-holder having a spring to hold the saw in engagement with the support.

30. In a saw-setting apparatus, the combination with a frame, of an anvil, a tooth-setting punch, a saw-support, and a saw-holder having a leaf-spring provided with a lateral finger to bear against a saw and hold it in engagement with the support.

31. In a saw-setting apparatus, the combination with a frame having a handle at one end, of an anvil at the opposite end, a tooth-setting punch, an operating-lever fulcrumed upon the frame in coöperative relation with the punch and having its free rear end in coöperative relation with the handle, a saw-support inclined downwardly and forwardly from the anvil, and a saw-holder in coöperative relation with the support and having an adjustable pivotal connection with the frame, and a spring to hold a saw in engagement with the support.

32. In a saw-setting apparatus, the combination with a frame, of an anvil, a punch in coöperative relation therewith, a saw-support, and a saw-guide carried by the support and located beyond and spaced from the anvil and adjustable toward and away from the same.

33. In a saw-setting apparatus, the combination with a frame, of an anvil, a punch in coöperative relation therewith, a saw-support, and a saw-guide carried by the support in front of the anvil and spaced from the latter and adjustable toward and away from the same.

34. In a saw-setting apparatus, the combination with a frame, of an anvil, a tooth-setting punch, a slotted saw-support, and a saw-guide carried by the support at a point beyond the anvil and having a stem adjustably slidable in the slot of the support.

35. In a saw-setting apparatus, the combination with a frame, of an anvil thereon, a tooth-setting punch, a longitudinally-slotted saw-support, the opposite edges of the slot having guideways thereon, a saw-guide mounted upon the support and having a head slidably mounted in the guideways of the slot, a threaded stem projected from the head, and a binding-nut carried by the same.

36. In a saw-setting apparatus, the combination with a frame, of an anvil, a tooth-setting punch, a slotted saw-support, a saw-guide adjustably mounted upon the support and movable toward and from the anvil, and means carried by the guide for adjustably tilting a saw-blade.

37. In a saw-setting apparatus, the combination with a frame, of an anvil, a tooth-setting punch, a slotted saw-support, a saw-guide adjustably carried by the support and movable toward and from the anvil, and a saw-tilting set-screw piercing the saw-guide and projected through the slot of the support.

38. In a saw-setting apparatus, the combination with a frame, of an anvil, a tooth-setting punch, a slotted saw-support, a saw-guide adjustably mounted upon the support and having a threaded stem projected through the slot thereof, said saw-guide being movable toward and from the anvil, an adjusting-nut carried by the stem, and a saw-tilting set-screw piercing the stem and the saw-guide.

39. In a saw-setting apparatus, the combination with a frame, of an anvil, a tooth-setting punch, a saw-support, an adjustable saw-guide carried by the support, and a saw-holder pivotally mounted on and carried by the frame in cooperative relation with the support.

40. In a saw-setting apparatus, the combination with a frame, of an anvil, a tooth-setting punch, a slotted saw-support, an adjustable saw-guide having a head mounted in the slot of the support and provided with a screw-threaded stem, an adjusting-nut mounted upon the stem, and a pivotal saw-holder hung from the frame in cooperative relation with the saw-support.

41. In a saw-setting apparatus, the combination with a frame having a handle at one end, of an anvil at the opposite end, a tooth-setting punch in cooperative relation with the anvil, a lever fulcrumed upon the frame in operative relation with the punch and having its rear free end in cooperative relation with the handle, a longitudinally-slotted saw-support inclined downwardly and forwardly from the anvil, an adjustable saw-guide disposed transversely across the support and having a head working in the slot thereof, a screw-threaded stem projected from the head and extending through the slot, an adjusting-nut carried by the stem to bind against the support, a pivotal saw-holder hung from the frame and having a lateral presser-foot in cooperative relation with the support, and a spring carried by the presser-foot to hold a saw-blade in engagement with the support.

42. In a saw-setting apparatus, the combi-

nation with an anvil, a saw-support, and a saw-guide, of supplemental guide means for application to a saw-blade and for cooperation with the main guide.

43. In a saw-setting apparatus, the combination with an anvil, a saw-support, and a saw-guide, of a supplemental guide-rail having means for connection with the saw-blade and for cooperation with the main saw-guide.

44. In a saw-setting apparatus, the combination with an anvil, a saw-support, and a saw-guide, of supplemental guide means for application to a saw-blade and cooperation with the main guide, consisting of a bar having a longitudinal flange and a longitudinal slot at one end, a clamp-screw adjustable in the slot, another clamp-screw piercing the opposite end of the bar, and clamp members carried by the screws.

45. In a saw-setting apparatus, the combination with a frame, of an anvil, a saw-support inclined downwardly and forwardly from the anvil, a combined tooth-setting and saw-feeding device in cooperative relation with the anvil, means for moving the device forwardly, then laterally and finally downward into cooperative relation with the anvil, a spring to return the device to its original position, an adjustable stop carried by the anvil to limit the return movement of the device, a saw-guide carried by the support and adjustable toward and away from the anvil, and a saw-holder carried by the frame and adjustable with respect to the support.

46. In a saw-setting apparatus, the combination with a frame, of an anvil at one end thereof, a handle at the opposite end of the frame; a saw-support inclined downwardly and forwardly from the anvil, a combined tooth-setting and saw-feeding device mounted between the anvil and the handle, operating means for moving the device forwardly, then laterally and finally downward in cooperative relation with the anvil, a lever fulcrumed upon the frame in cooperative relation with the handle and also connected to the operating means, a saw-guide disposed transversely across the support and adjustable toward and away from the anvil, and a saw-holder carried by the frame and adjustable with respect to the saw-support.

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

SAMUEL HALTOM.

Witnesses:

W. T. RAY,
TOM NORVELL.