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MACHINE FOR TRIMMING THE FINGER PLATE ON A PIANO KEY

Filed April 2, 1948

3 Sheets-Sheet 1

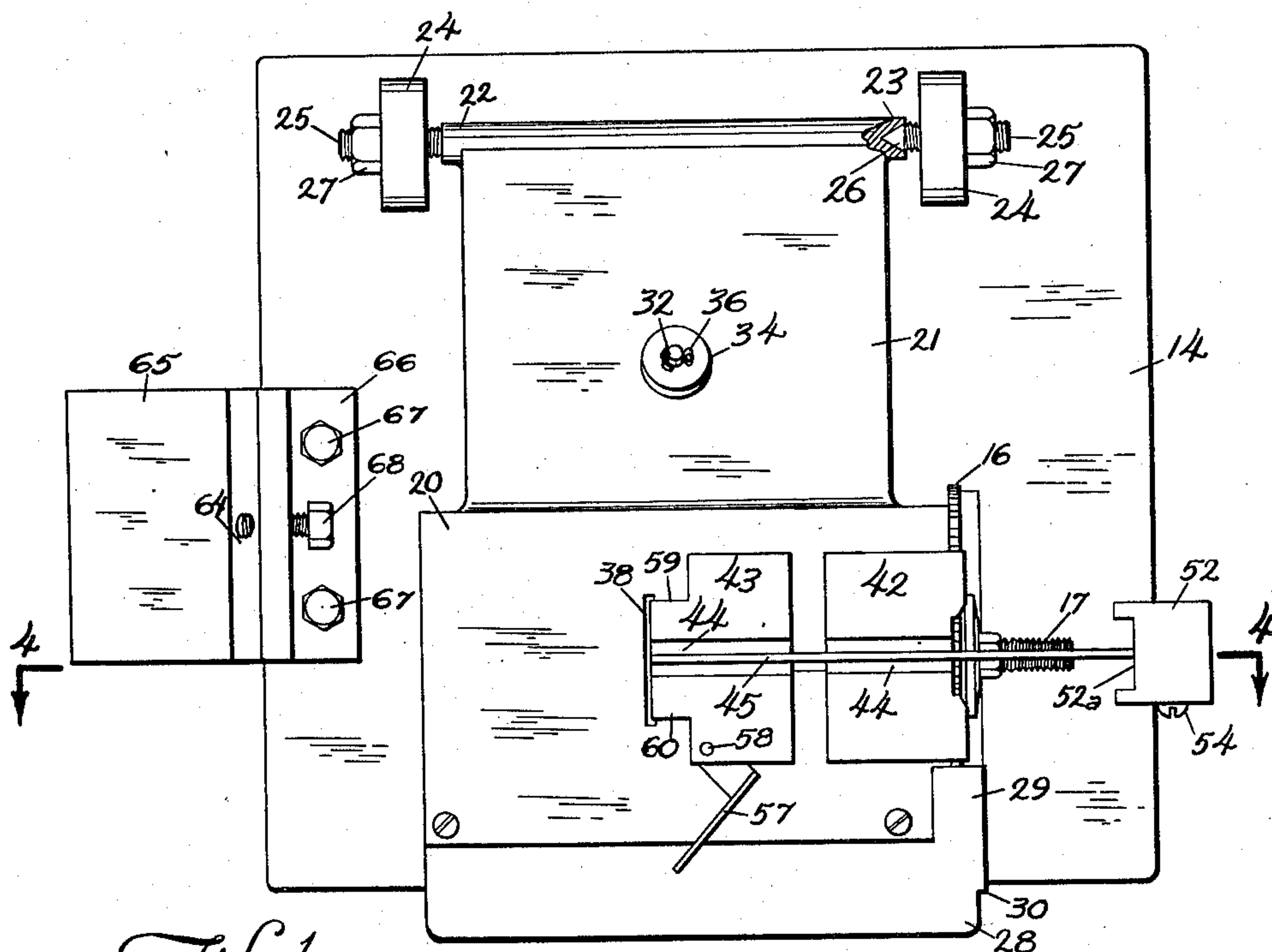


Fig. 1

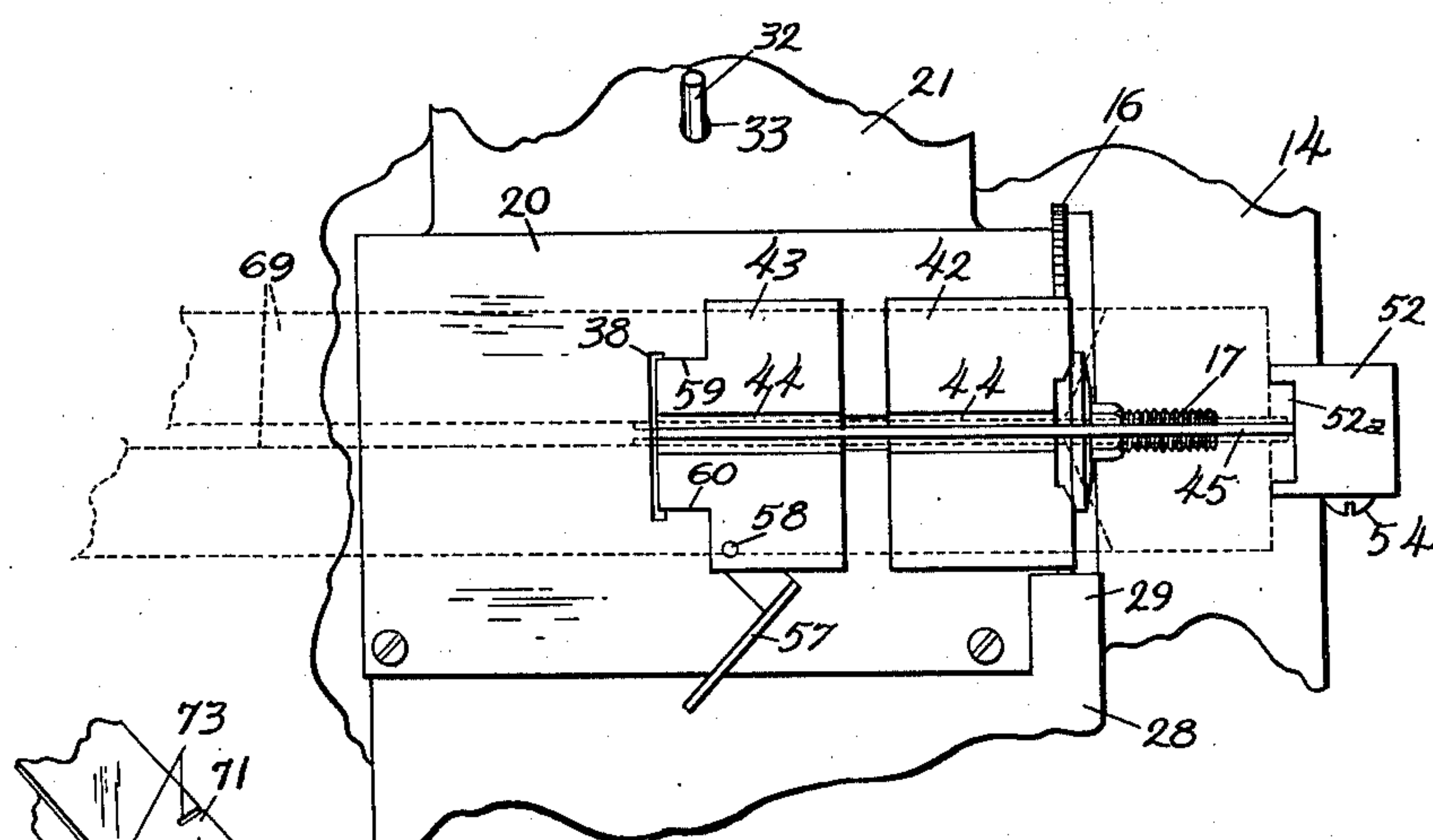


Fig. 2

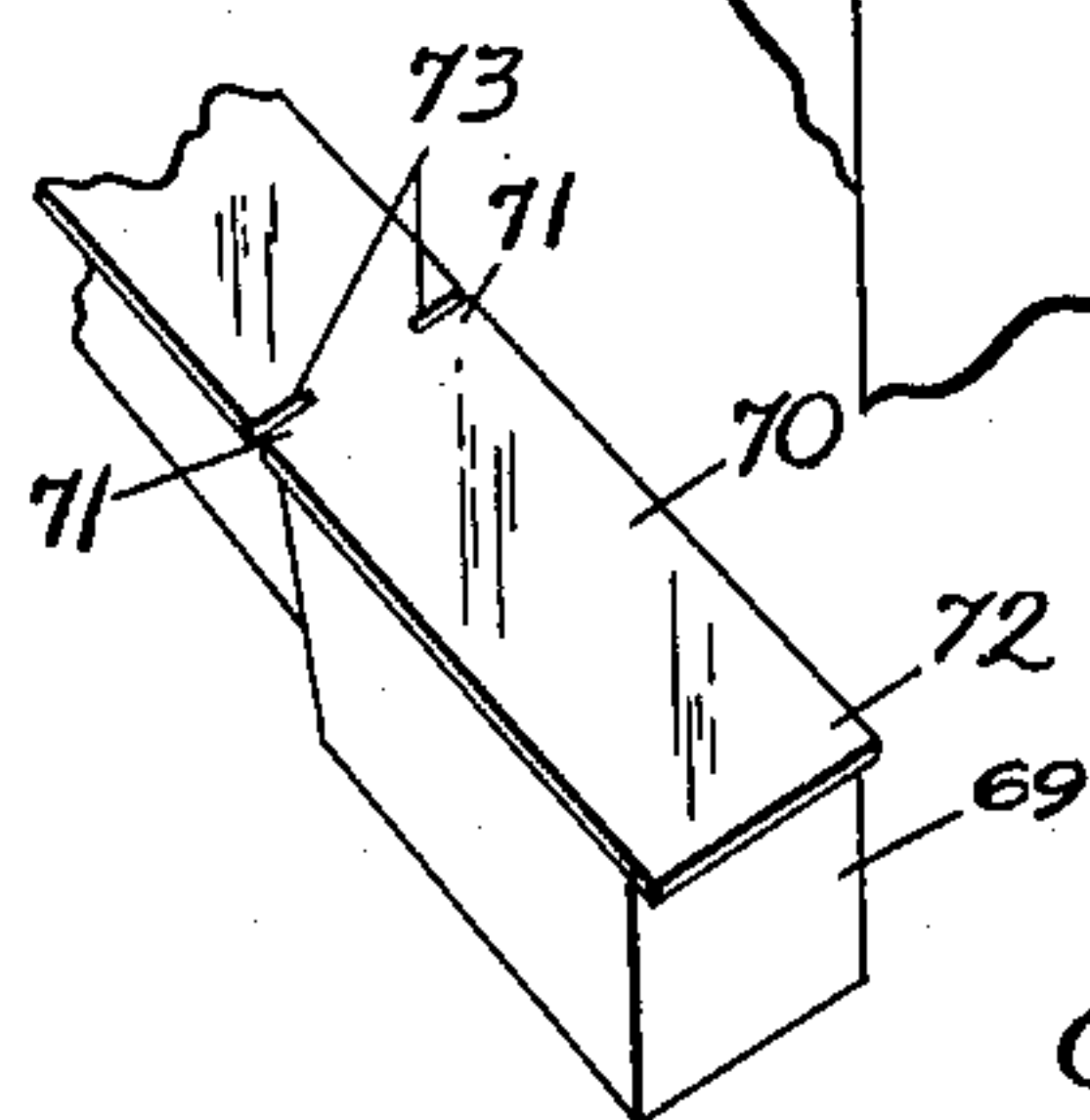


Fig. 3

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3 Sheets-Sheet 3

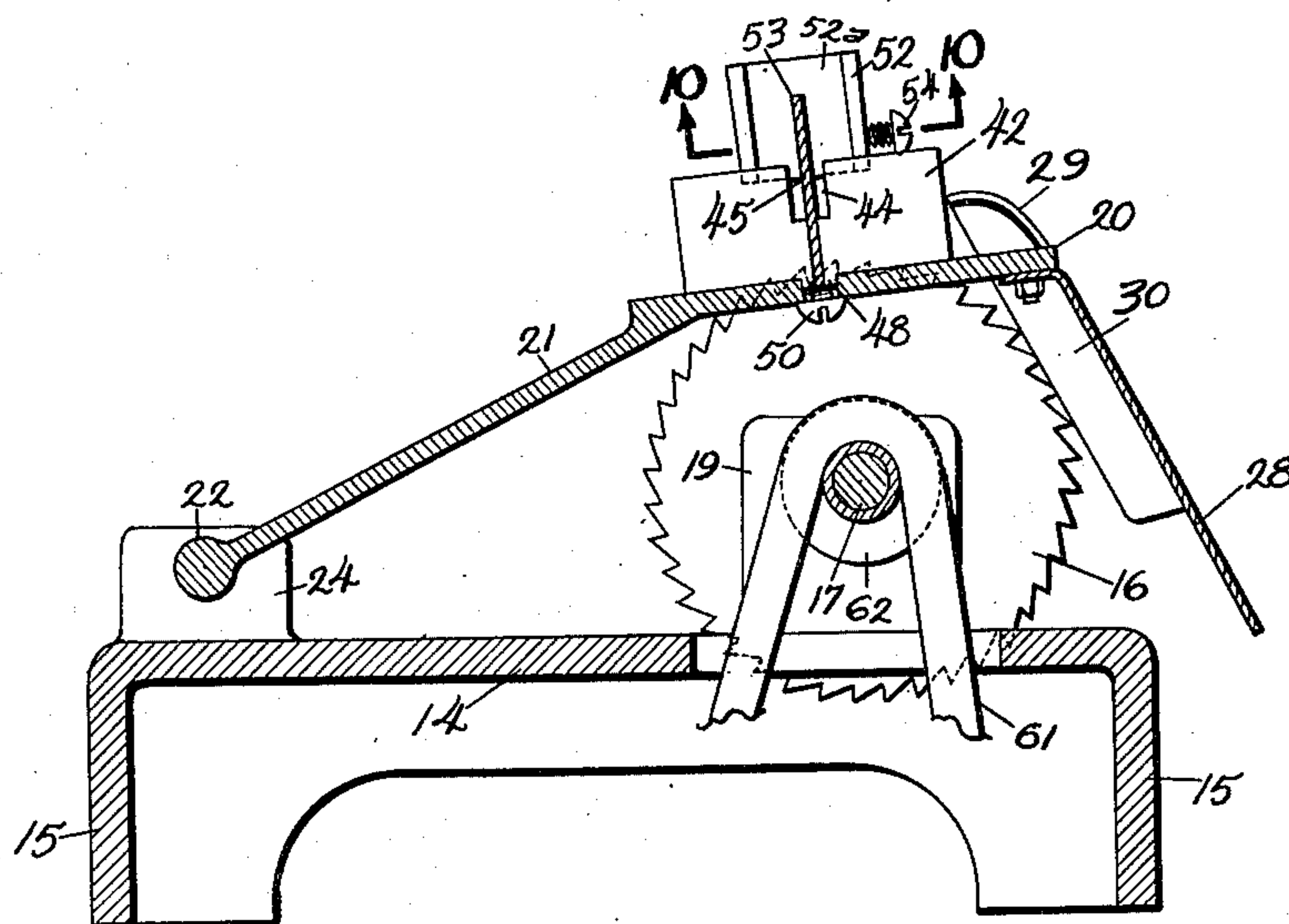


Fig. 9

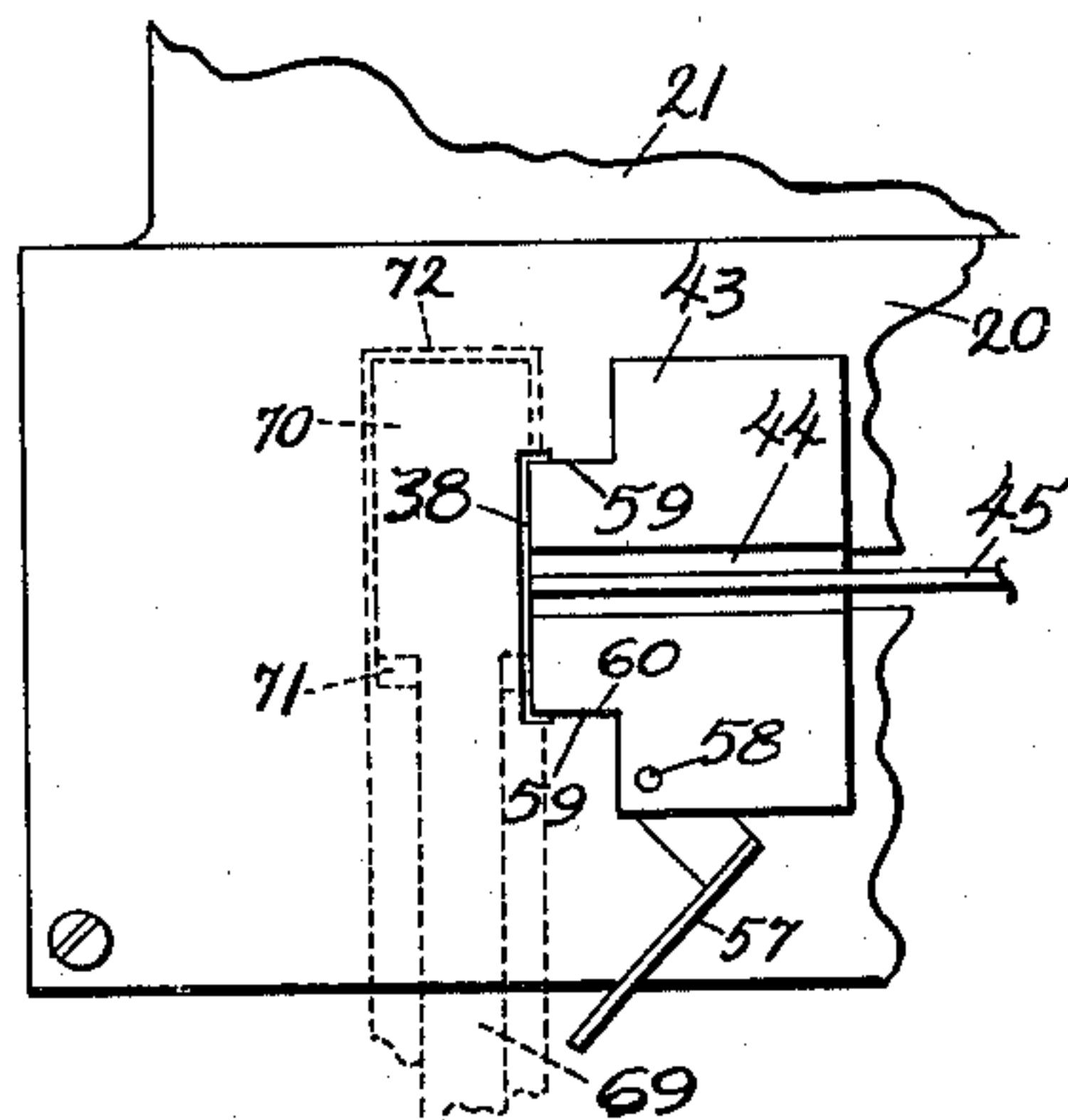


Fig. 11

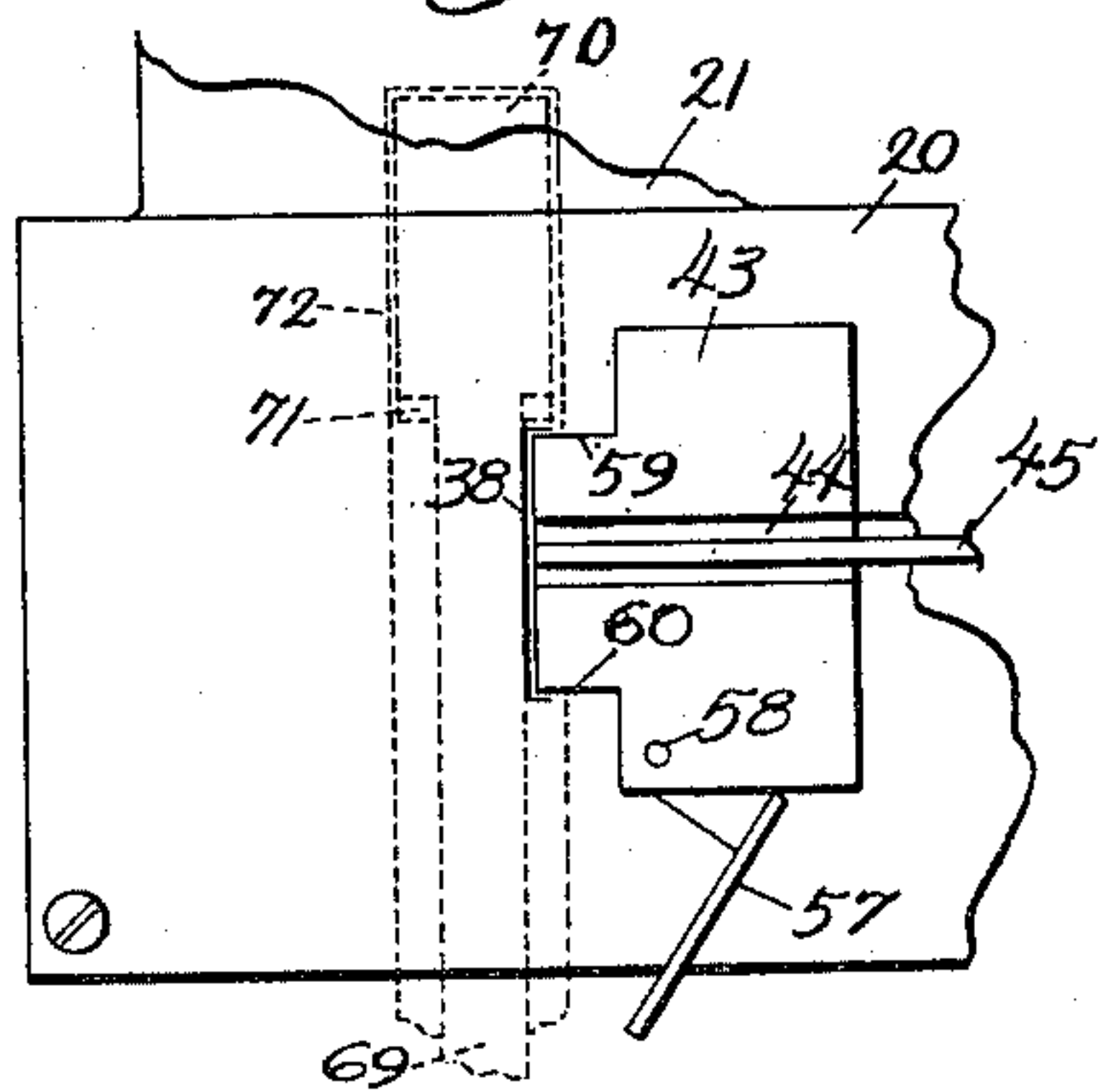


Fig. 13

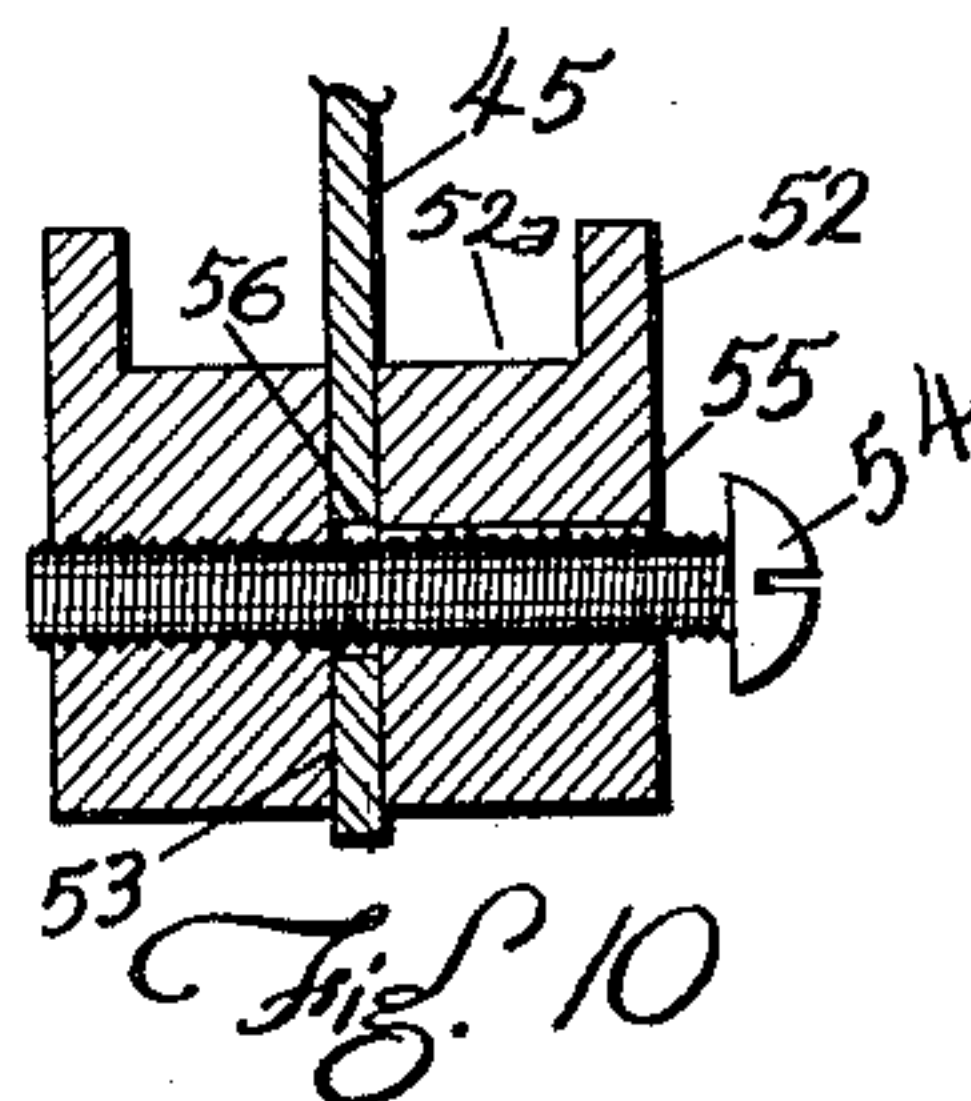


Fig. 10

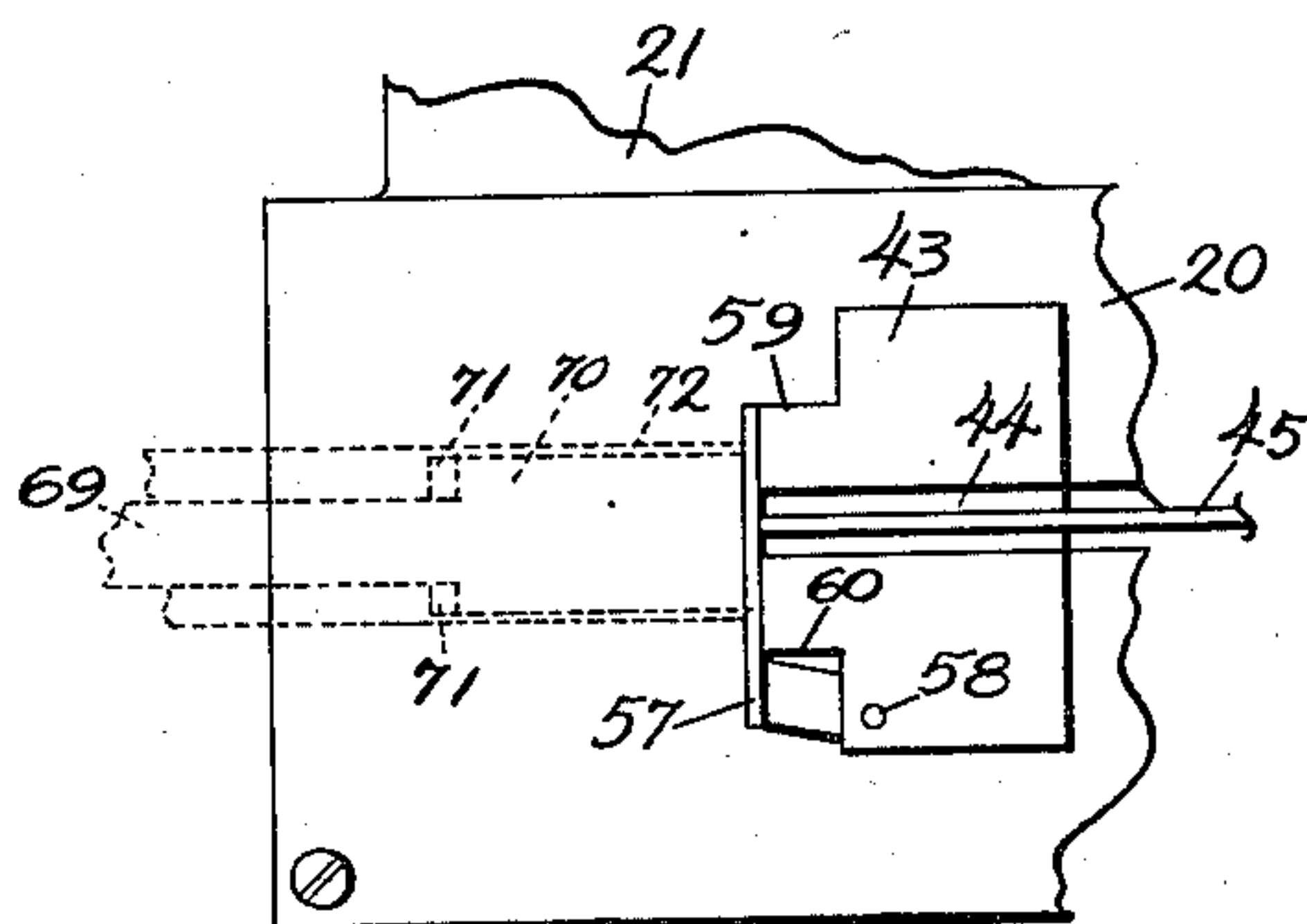


Fig. 12

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MACHINE FOR TRIMMING THE FINGER
PLATE ON A PIANO KEY

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11 Claims. (Cl. 144-2)

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My present invention relates to improvements in machines for trimming finger plates on piano keys.

It is well known that finger plates to be applied to piano keys, as replacements, are usually made of a composition representing ivory and are of a size somewhat larger than the finished product, and hence must be trimmed to the desired size after being applied to piano keys.

At present, the method of trimming finger plates on piano keys is a crude, slow and tedious process in which the greater portion of the surplus stock is removed in a manner that leaves the edge portions of the finger plates in a very rough state and which are finally brought to a finished state by means of a rasp while the piano key is held in a vise.

The principal object of this invention is to provide a novel machine by the use of which the finger plates on a full set of piano keys may be speedily and accurately cut to an exact size.

A further object of this invention is to provide a machine for trimming finger plates on piano keys, by the use of which an operator does not have to change his position, hence saving considerable time in the trimming process.

Other objects of this invention will be apparent from the following description and the accompanying drawings.

To the above end, generally stated, the invention consists of the novel devices and combination of devices hereinafter described and defined in the claims.

In the accompanying drawings, which illustrate the invention, like characters indicate like parts throughout the several views.

Referring to the drawings:

Fig. 1 is a plan view of the improved machine;

Fig. 2 is a fragmentary view corresponding to Fig. 1 and further showing, by means of broken lines, two positions of a piano key in which cuts are made in the longitudinal edge portions of the finger plate on said piano key;

Fig. 3 is a fragmentary perspective view of a piano key in which cuts are made in the longitudinal edge portions of its finger plate when said piano key is positioned in the machine as shown in Fig. 2;

Fig. 4 is a view partly in elevation and partly in section taken on the line 4-4 of Fig. 1, and also showing by means of broken lines a piano key in which the outer end portion of its finger plate is to be trimmed;

Fig. 5 is a fragmentary perspective view of a piano key in which the outer end portion of its

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finger plate has been trimmed by positioning said piano key in the machine, as shown in Fig. 4;

Fig. 6 is a view principally in transverse vertical section taken on the line 6-6 of Fig. 4;

Fig. 7 is a fragmentary bottom plan view of a piano key and also showing, by means of broken lines, the portions of the finger plate removed by trimming;

Fig. 8 is a perspective view of the inner supporting block;

Fig. 9 is a view principally in transverse section taken on the line 9-9 of Fig. 4;

Fig. 10 is a view principally in section taken on the line 10-10 of Fig. 9;

Fig. 11 is a fragmentary plan view of the table and also showing, by means of broken lines, a fragment of a piano key in a position in which one of the longitudinal edge portions of its finger plate is to be trimmed;

Fig. 12 is a view corresponding to Fig. 11, with the exception that the spacer is closed and the piano key removed to a position in which the front end portion of the finger plate is to be trimmed; and

Fig. 13 is a view corresponding to Fig. 11, but showing the piano key positioned for the second cut to complete the trimming of the respective longitudinal edge portion of the finger plate.

The numeral 14 indicates a square base having at its corners short supporting legs 15. A relatively large circular toothed cutter 16 is mounted on the right-hand end portion of an arbor 17, see Fig. 4, and a relatively small circular toothed cutter 18 is mounted on the other end portion of said arbor. The arbor 17 is mounted in a pair of upstanding bearings 19, between the cutters 16 and 18 and integral with the base 14.

A table 20 overlies the small cutter 18 and is closely positioned to the large cutter 16. Integral with the table 20 is a wide downwardly and outwardly inclined hinge member 21, the lower edge portion of which terminates in a round member 22. The end portions of the member 22 extend outwardly of said hinge member and have formed therein conical seats 23. This member 22 extends between a pair of upstanding bearings 24 on the base 14 and a pair of axially aligned hinge pins 25 having screw-threaded engagement with the bearings 24 through which they extend. These hinge pins 25 have conical ends 26 that extend into the seats 23 in the ends of the member 22. Lock nuts 27 on the outer end portions of the hinge pins 25 impinge the bearings 24 and hold said hinge pins where adjusted. Obviously, by adjusting the hinge pins 25 in the bearings 24,

the table 20 may be adjusted toward or from the plane of the cutter 16.

The hinge member 21 affords a guard for the cutters 16 and 18 and a second guard 28 for said cutters is a sheet metal plate attached to the opposite edge portion of the table 20 from the hinge member 21 and extends outwardly and downwardly from said table. This guard 28 has a narrow upwardly projecting curved extension 29 that overlies the cutter 16 and a long depending flange 30 that overlaps said cutter outwardly thereof.

The table 20 is yieldingly held in a raised position as shown in Fig. 9, by a coiled spring 31 encircling a post 32 secured to the base 14 and extending through a hole 33, Fig. 2, in the hinge member 21. Applied to the post 32, outwardly of the hinge member 21, is a felt washer 34 and a cotter pin 36. When the table 21 is manually depressed, to bring the work into engagement with either of the cutters 16—18, it engages an adjustable stop 37 that positions the table 20 relative to the cutters 16 and 18. The small cutter 16, when the table 20 is held depressed, works through a slot 38 in the table 20. The adjustable stop 37, as shown, is a long upright machine screw having threaded engagement with an extension 39 on one of the bearings 19. A lock nut 40 on the stop 37 impinges the bearing extension 39 and holds said stop where adjusted.

On the table 20 are two endwise spaced supporting blocks 42 and 43. These blocks 42 and 43 are perpendicular to the plane of the large cutter 16 and formed therein is a channel 44. Extending longitudinally through the channel 44, at the transverse center thereof, is a flat guide plate 45 that projects materially outwardly of the large cutter 16. It is important to note that the guide plate 45, Fig. 4, extends above the blocks 42 and 43. The guide plate 45 has in its lower longitudinal edge portion a wide notch 46 into which the block 42 extends. Said guide plate 45, at the notch 46, extends into grooves 47, see Fig. 8, in the end portions of the block 42 with a pressed fit that rigidly connects the block 42 and the guide plate 45. The guide plate 45 is reduced in width at its rear lower edge portion and loosely rests on the bottom of the channel 44.

On the bottoms of blocks 42 and 43 are flat two-part rib 48 that extends into a channel 49 in the table 20 and holds the blocks 42 and 43 for straight-line sliding movement on the table 20 toward or from the plane of the large cutter 16. Each block 42—43 is secured to the table 20, where adjusted, by a set screw 50 that extends through the channel 49, has threaded engagement with the respective blocks 42—43 and with its head impinging the under side of the table 20.

The large cutter 16 works in a deep notch 51 in the under longitudinal edge portion of the guide plate 45. The block 42, at its outer end, is recessed at 42^a for the cutter 16 and said block, above this recess, is notched at 42^b to afford clearance for the cutter 16 when the table 20 is held depressed.

Mounted on the outer end portion of the guide plate 45 is an adjustable stop block 52 having in its under side a deep groove 53 into which the guide plate 45 extends with a close working fit. The stop block 52 rests on the guide plate 45 for sliding adjustment toward or from the large cutter 16. A screw 54 extends loosely through a bore 55 in the stop block 52 on one side of the guide plate 45, through a longitudinal slot 56 in said guide plate and has threaded engagement with

the stop block 52 on the other side of said guide plate. The head of the screw 54 impinges the stop block 52 and said screw 54, when tightened, draws the prongs of said stop block 52 into frictional engagement with the guide plate 45 and holds said stop block where adjusted. In the face of the stop block 52 is a recess 52^a.

A spacer 57, in the form of a flat plate, is hinged at 58 to the block 43 for swinging movement into a position in which it bears against the outer end of said block, see Fig. 12. The two corner portions of the outer block 43 are notched to afford stop shoulders 59 and 60. It is important to note that the block 43, at its rear end portion, is spaced above the table 20 as indicated at 43^a for the passage of the finger plate of a piano key thereunder.

The arbor 17 is driven by a V belt 61 that runs over a V pulley 62 on said arbor and a like pulley on the armature shaft of an electric motor, not shown.

The upper edges of a trimmed finger piece on a piano key are slightly beveled by a file 63, shown by broken lines in Fig. 4. This file 63 is releasably held in a laterally inclined position in a laterally oblique channel 64 in a rectangular member 65 that affords a support on which the finger plate on a piano key rests, face down, while having its sharp trimmed edge removed by the file 63. The member 65 has at one side a horizontal flange 66 spaced below the top of said member, resting on the base 14 and secured thereto by a pair of machine screws 67. A set screw 68 above the flange 66 has threaded engagement with the member 65, impinges the file 63 and holds the same pressed against the opposite side of the channel 64.

In the drawings is shown, by means of full and broken lines, a fragment of a conventional piano key 69 having at its outer end the customary head 70 that is considerably wider than the key proper, projects outwardly on opposite sides thereof and the rear corner portions thereof afford oblique shoulders 71. A finger plate 72 that replaces an old finger plate is glued or otherwise secured to the top of the head 70 and extends rearwardly onto the adjacent portion of the body of the piano key 69. It will be noted that the front end portion of the finger plate 72 and the longitudinal edge portions thereof project outwardly of the head 70 and body of the piano key 69.

Operation

When the machine is being operated, the operator stands in front of the guard 18, Fig. 1.

Normally, the table 20 is yieldingly held in a raised position above the cutters 16 and 18 so that there is no cutting action thereby, as shown in Fig. 4. The table 20 in the other views is shown depressed.

The first operation in trimming the finger plate 72 is to transversely cut said plate at its longitudinal edge portions at the shoulders 71 on the head 70, as indicated at 73, in Fig. 3. To make these cuts, the piano key 69 is laid flatwise on the blocks 42 and 43 with the finger plate 72 extending edgewise into the channel 44 with its face pressed against the adjacent side of the guide plate 45 and with the outer end portion of the finger plate 72 extending into the notch 52^a, Figs. 1 and 2, and with the outer end of the head 70 of the piano key 69 in contact with the stop block 52. The adjustment of the stop block 52 on the guide plate 45 endwise positions the piano key 69 with its shoulders 71 in the plane of the outer

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side of the cutter 16, whereby the cuts 73 will be made at said shoulders. While the piano key 69 is held by the operator in the position above described, he depresses the table 20 to bring the lower edge portion of the finger plate 72 into contact with the cutter 16 to make one of the cuts 73.

Next, the operator releases the depressed table 20, lifts the piano key 69 from the blocks 42 and 43, turns the same about its longitudinal axis to edgewise reverse the finger plate 72 and again lays said key on the blocks 42 and 43 with the finger plate 72 extending into the channel 44 with its face against the opposite side of the guide 45 from the first position of the piano key 69 and with the end of the key head 70 against the stop block 52. The table 20 is again depressed to bring the lower edge portion of the finger plate 72 into contact with the cutter 16 to make the second cut 73 in said finger plate.

The next operation of the machine is to trim the outer end portion of the finger plate 72. The first step in this operation is to close the spacer 57 against the rear end of the block 43 and place the piano key 69 with its finger plate 72 extending under the rear end portion 43' of the block 43 and with spacer 57 the outer end of the head 70 in contact with spacer 57 the rear end of said block. While the operator holds the piano key 69 in this position, he depresses the table 20 which projects the cutter 18 through the slot 38 and cuts the surplus stock from the finger plate 72. The purpose of the spacer 57 is to position the piano key 69 so as to leave the outer end of the finger plate 72 projecting slightly outwardly of the outer end of the piano key head 70 a distance the equivalent of the thickness of the spacer 57.

The last and final operation of the machine is to trim the longitudinal edge portions of the finger plate 72 at the sides of the body of the piano key 69 and its head 70. The first step in this operation is to pivotally move the spacer 57 away from the end of the block 43, turn the piano key 69 parallel to the cutter 18 and away from the operator with the face of the finger plate 72 resting on the table 20 and with the piano key head 70 in contact with the rear end of the block 43. Next, the operator depresses the table 20 to project the cutter 18 through the slot 38 and moves the piano key 69 away from himself to feed the finger plate 72 to said cutter. This cut extends from the outer end of the finger plate 72 to the respective cut 73 and at the completion thereof positions the head 70 beyond the block 43 and releases the depressed table 20.

Next, the operator moves the piano key laterally to position the body thereof against the block 43 and with the respective shoulders 71 on the head 70 in contact with the stop shoulder 59. The operator now depresses the table 20 to again project the cutter 18 through the slot 38 to make the initial cut in the finger plate 72 at the adjacent transverse cut 73. The piano key 69 is now moved endwise away from the operator to cut the surplus stock at the respective side of the piano key body from the finger plate 72. At the completion of the cut, the operator releases the depressed table 20.

The operator now endwise reverses the piano key 69 and the other side of the finger plate 72 is trimmed by first placing the body of the piano key 69 against the block 43. He then depresses the table 20 and moves the piano key 69 away from himself until the respective shoulders 71

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engage the stop shoulder 60 and the cut is stopped at the adjacent transverse cut 73. Next, the piano key 69 is moved laterally away from the block section 43 and the respective side of the head 70 is placed against said block section. Finally, the operator further moves the piano key 69 away from himself to feed the finger plate 72 to the cutter 18 and cut the same at the side of said head.

From what has been said, it will be understood that the machine described is capable of modifications as to details of construction and arrangement within the scope of the invention herein disclosed and claimed.

What I claim is:

1. In a device of the class described, a base, a rotary cutter on the base, a table overlying the base, means yieldingly holding the table in a raised position, means on the table for supporting a piano key having a finger plate to be trimmed, and a two sided guiding means fixed on the table perpendicular thereto and on a radial line extending from the axis of the cutter for positioning the finger plate edgewise transversely over the cutter said supporting means being on each side of the guiding means and spaced outwardly therefrom.

2. The structure defined in claim 1, further including an adjustable stop for endwise positioning the piano key relative to the cutter.

3. In a device of the class described, a base, a rotary cutter on the base, a table overlying the base, means yieldingly holding the table in a raised position, a two-sided guide on the table perpendicular to the plane thereof and on a radial line extending from the axis of the cutter, and means on the table for supporting a piano key having a finger plate to be trimmed with the face of the finger plate in contact with one side of the guide and held thereby edgewise transversely over the cutter.

4. The structure defined in claim 3, further including an adjustable stop for endwise positioning the piano key relative to the cutter.

5. In a device of the class described, a base, a rotary cutter on the base, a table overlying the base, means yieldingly holding the table in a raised position, a fixed supporting block on the table for a piano key having a finger plate to be trimmed, said block having therein a channel extending perpendicular to the plane of the cutter, and a fixed two sided guide plate extending longitudinally through its channel at the transverse center and spaced from the sides thereof.

6. The structure defined in claim 5, further including an adjustable stop block slidably mounted on the guide plate for endwise positioning the piano key relative to the cutter.

7. In a device of the class described, a base, a rotary cutter on the base, a table overlying the base, yielding means holding the table in a raised position, a pair of endwise spaced inner and outer blocks slidably mounted on the table for independent adjustments relative to the plane of the cutter, means for independently holding the blocks where adjusted, a channel in the blocks perpendicular to the plane of the cutter, a long vertically disposed guide plate extending longitudinally through the channel at the transverse center thereof, said guide plate having in its lower edge portion a deep notch into which the inner block extends, said inner block having grooves into which the edge portions of the guide plate at the notch extend and connect the inner block and the guide plate for common adjust-

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ment relative to the plane of the cutter, said guide plate extending loosely into the channel in the outer block, and an adjustable stop block on the guide plate.

8. The structure defined in claim 7 in which the stop block has in its face a recess for receiving the end portion of the finger plate on a piano key endwise engaging the stop block.

9. The structure defined in claim 7 in which the stop block has in its under side a groove into which the guide plate extends and further including means for frictionally clamping the stop block onto the guide plate.

10. In a device of the class described, a base, a rotary cutter on the base, a table overlying the base and having an integral, lateral and offset extension pivoted to the base to turn about a horizontal axis, fixed guiding means on the table perpendicular to the plane thereof and on a radial line extending from the axis of the cutter for positioning the finger plate on a piano key edgewise transversely over the cutter, and yielding means holding the table in a raised position.

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11. The structure defined in claim 10, further including means for adjusting the hinge member to adjust the table transversely of the plane of the cutter.

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