

A. SAUMELL.

MUSIC RECORDER.

APPLICATION FILED SEPT. 28, 1907.

931,494.

Patented Aug. 17, 1909.

3 SHEETS—SHEET 1.

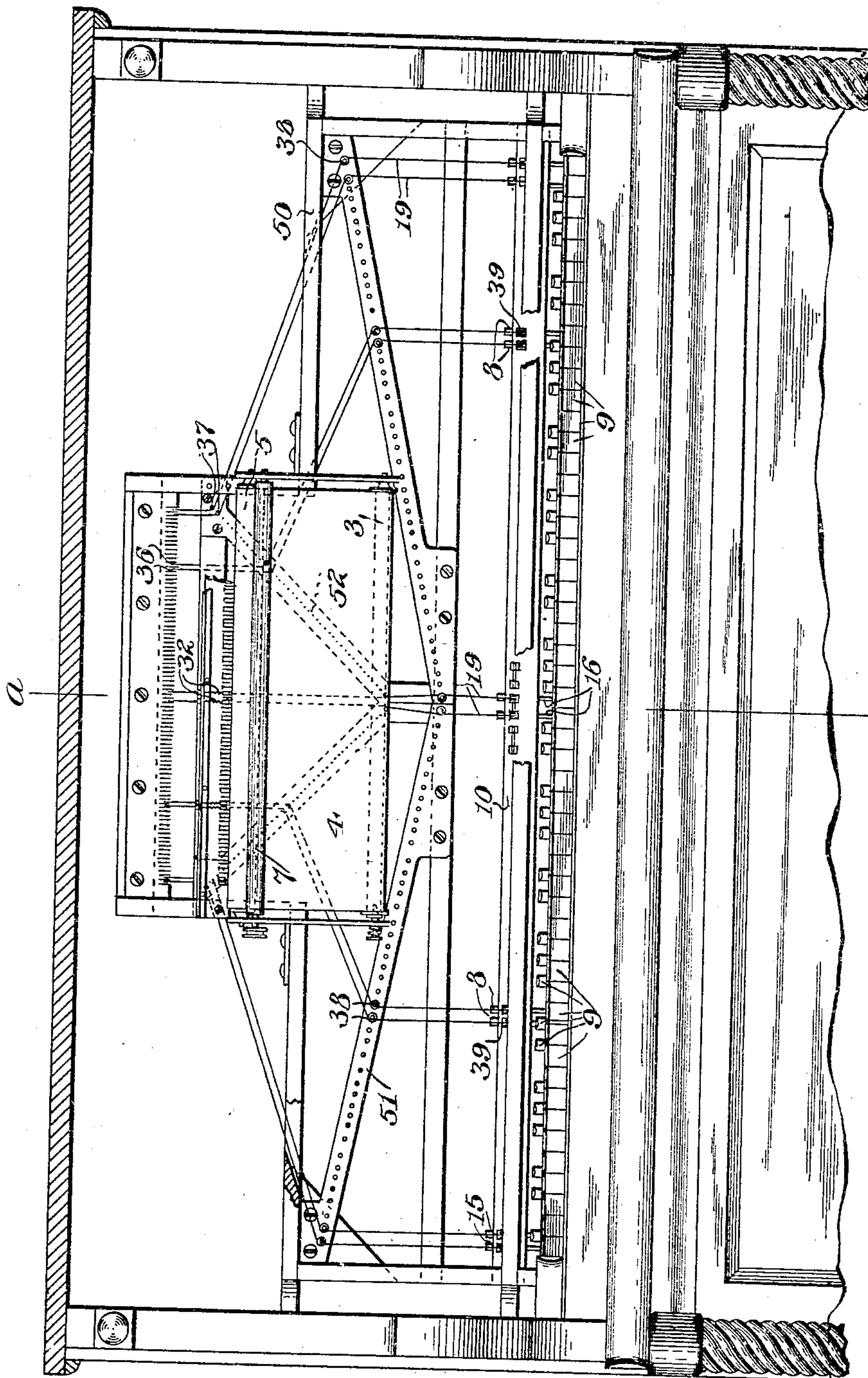


FIG. 1.

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Inventor:

*August Saumell*

By his Attorney,

*F. H. Richards*

A. SAUMELL.

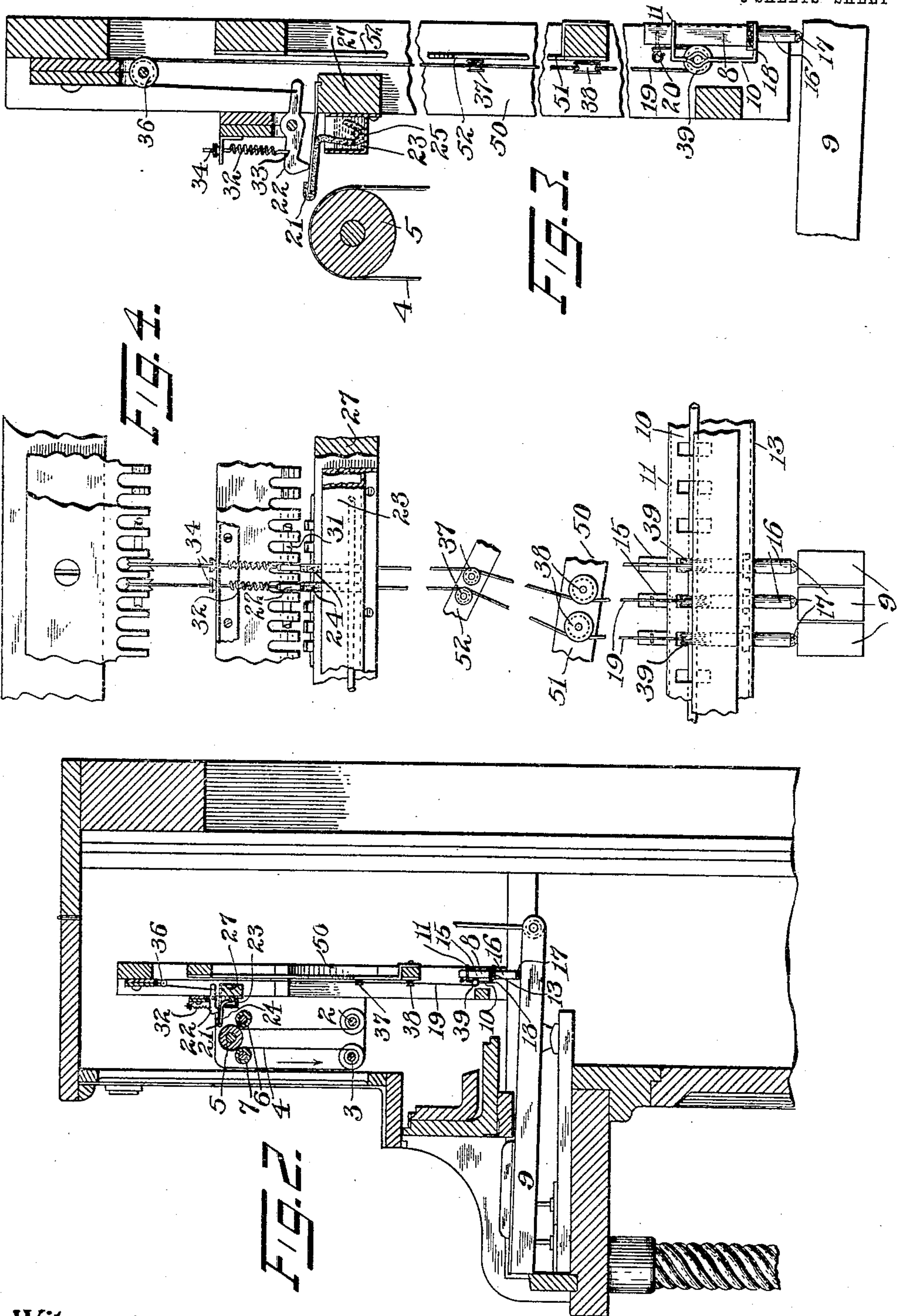
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3 SHEETS—SHEET 2.



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3 SHEETS—SHEET 3.

FIG. 11.

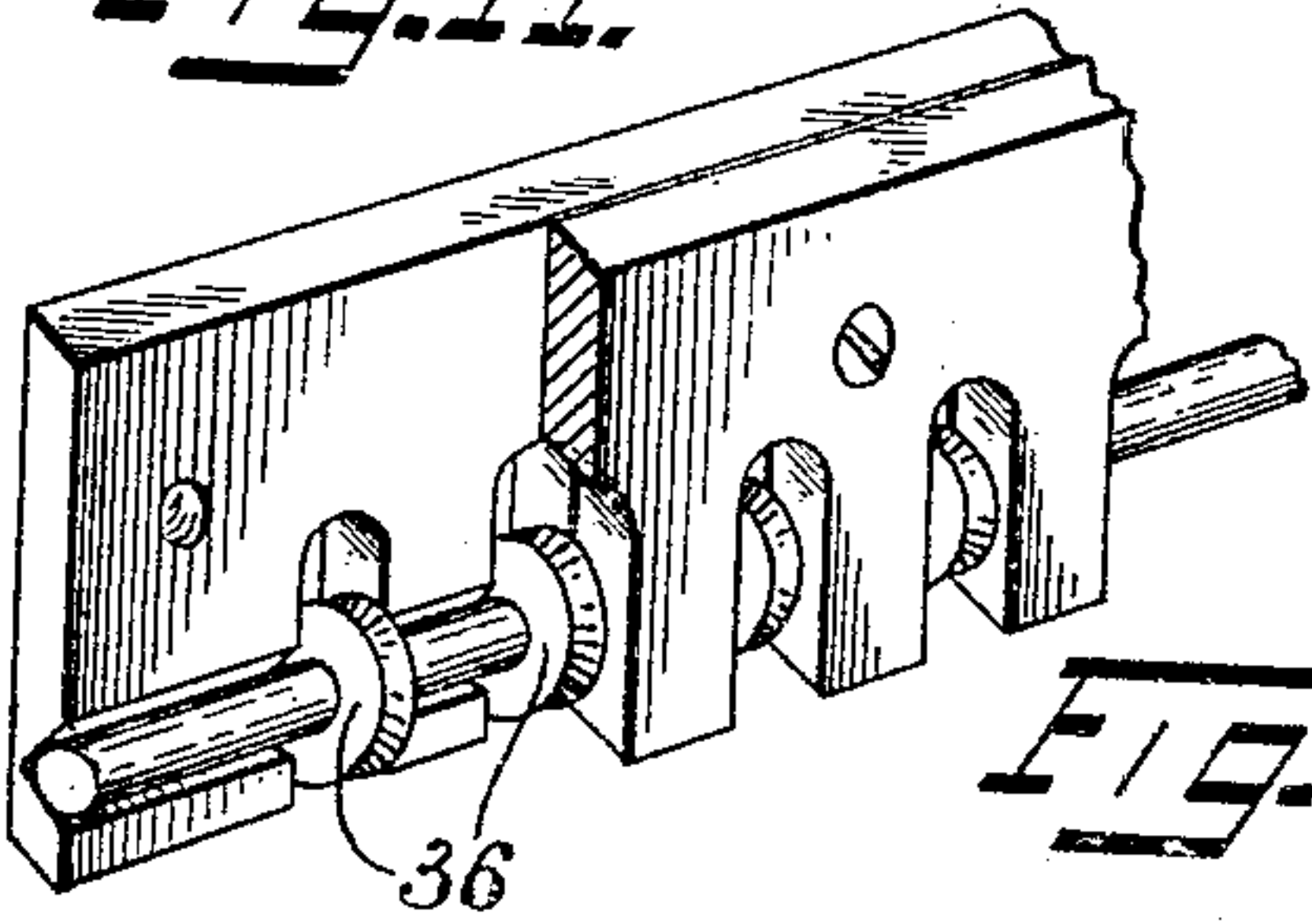


FIG. 9.

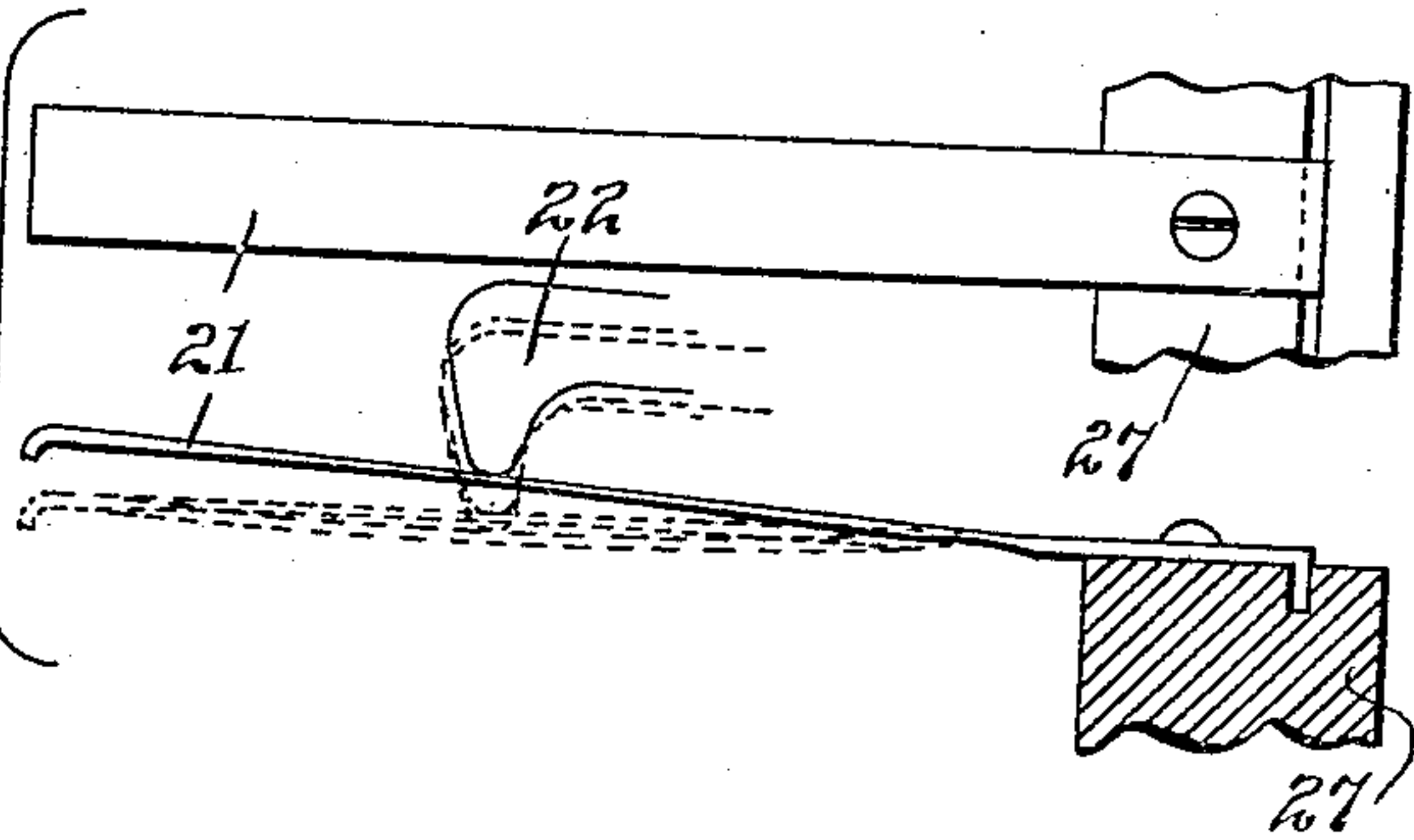


FIG. 6.

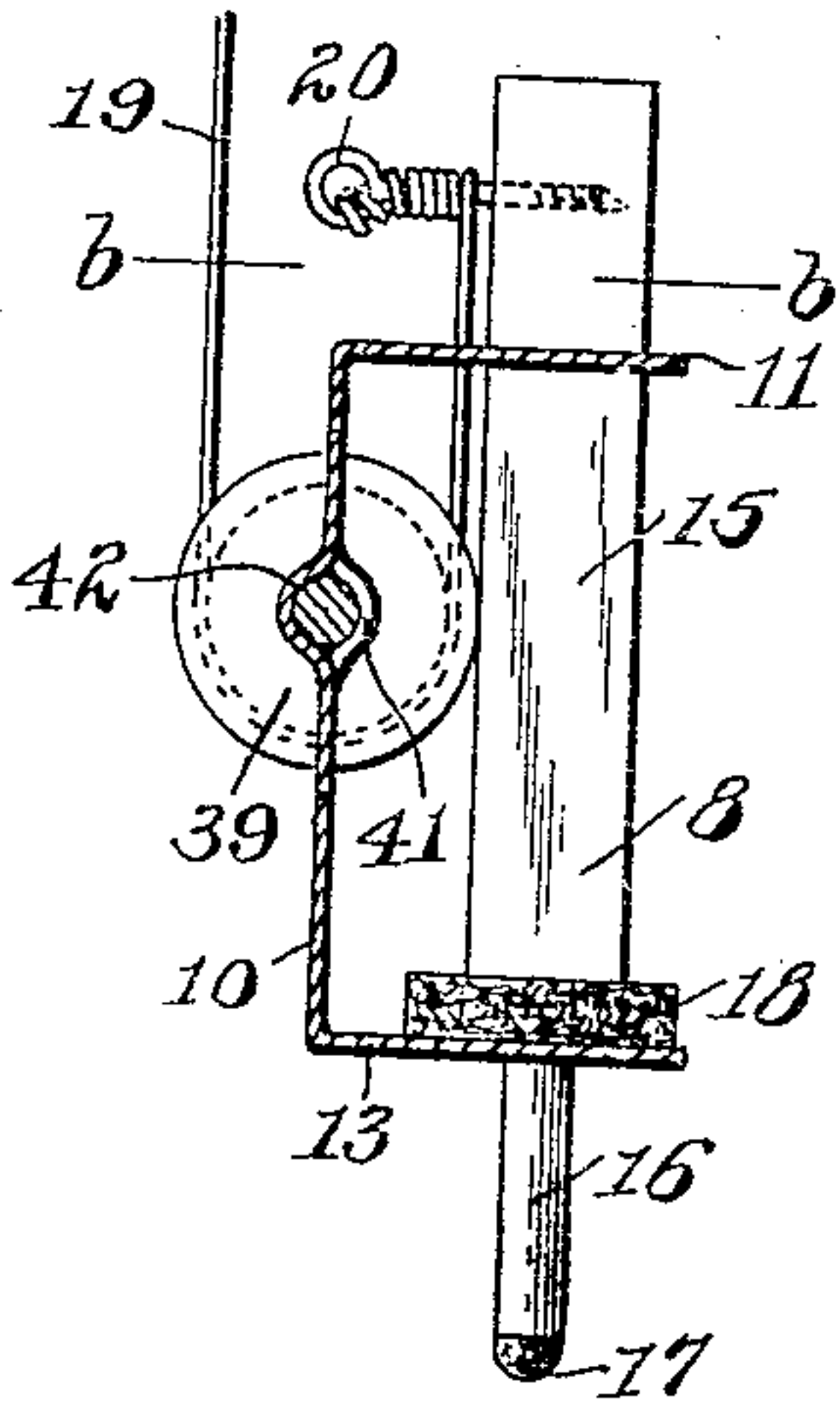


FIG. 10.

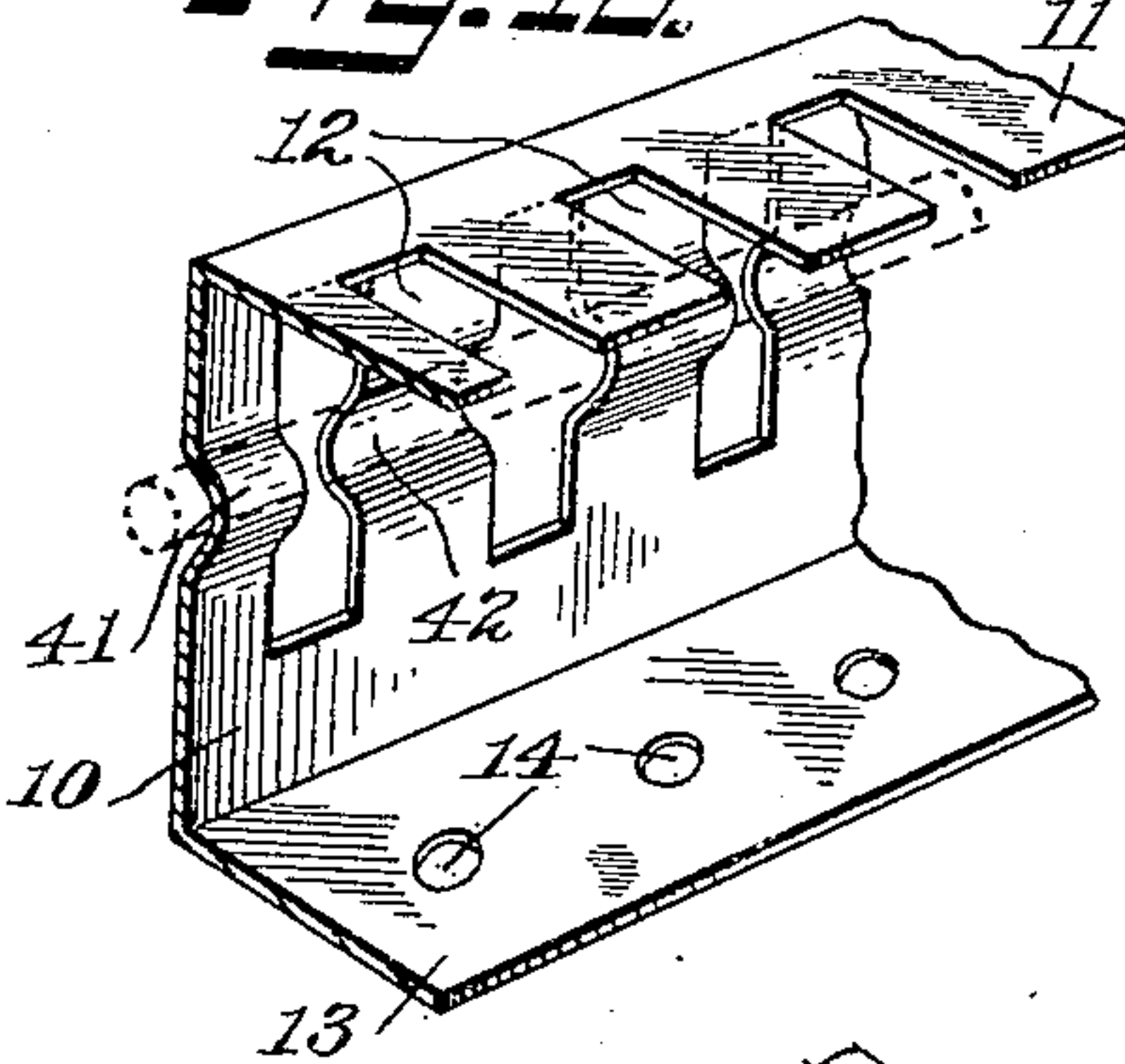


FIG. 8.

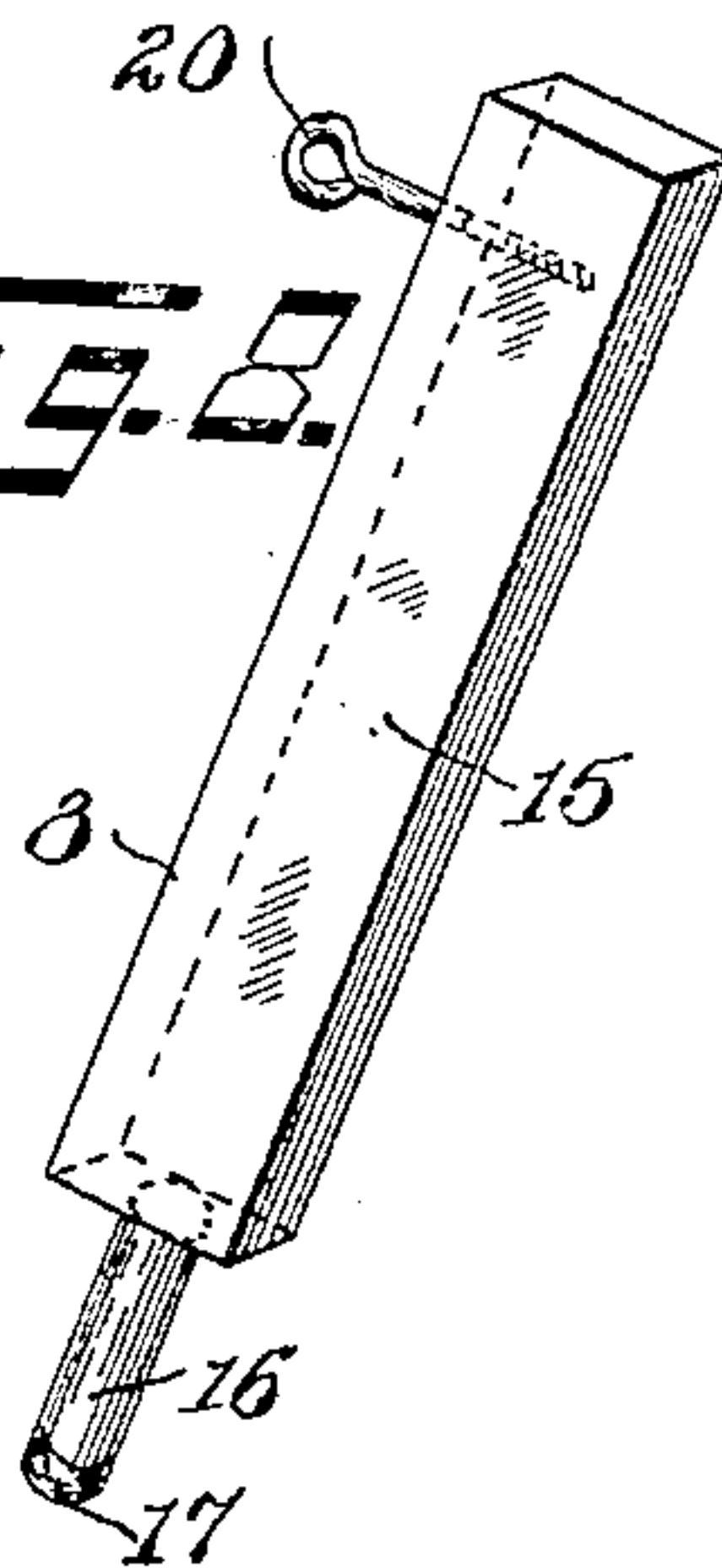


FIG. 7.

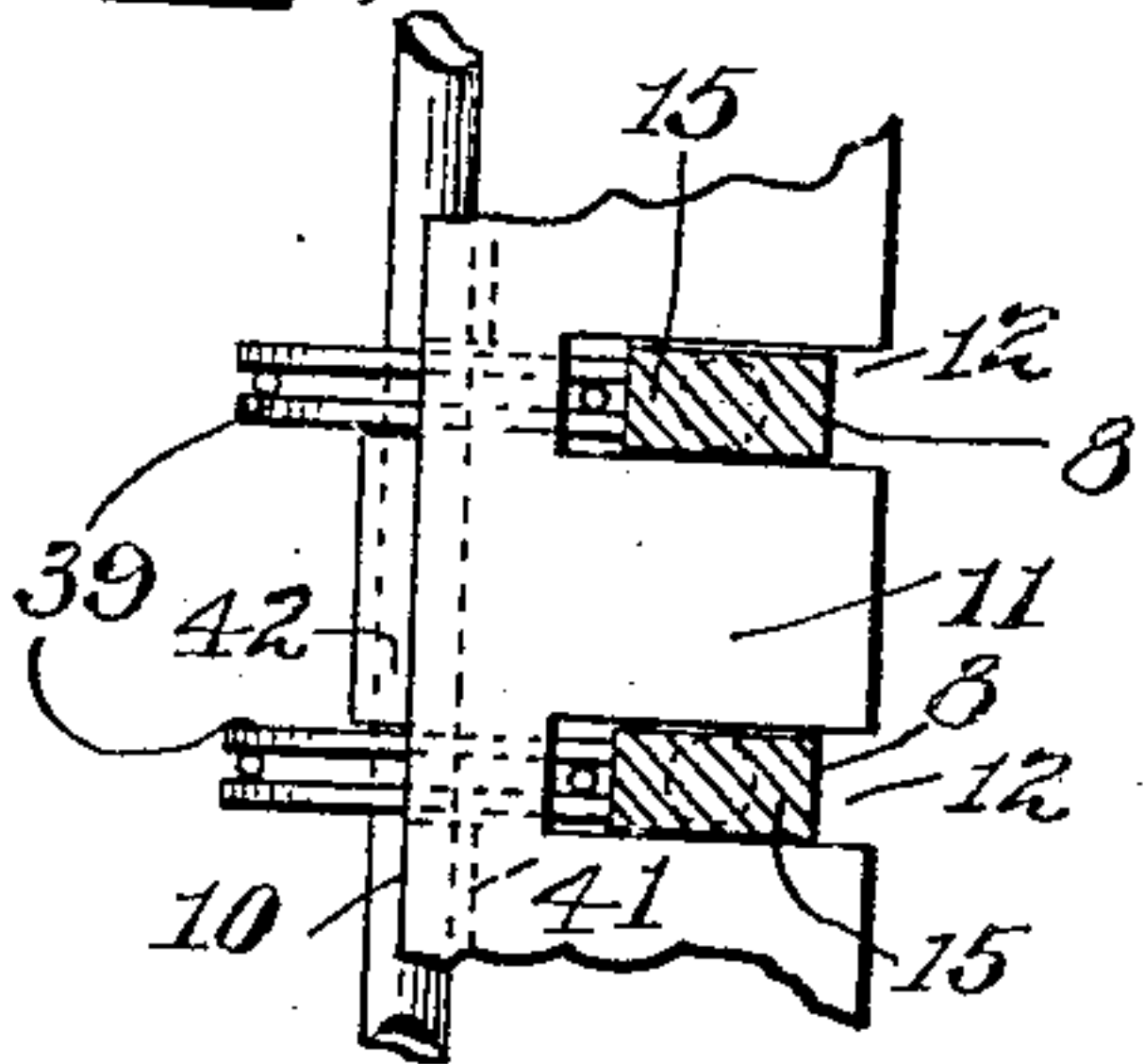
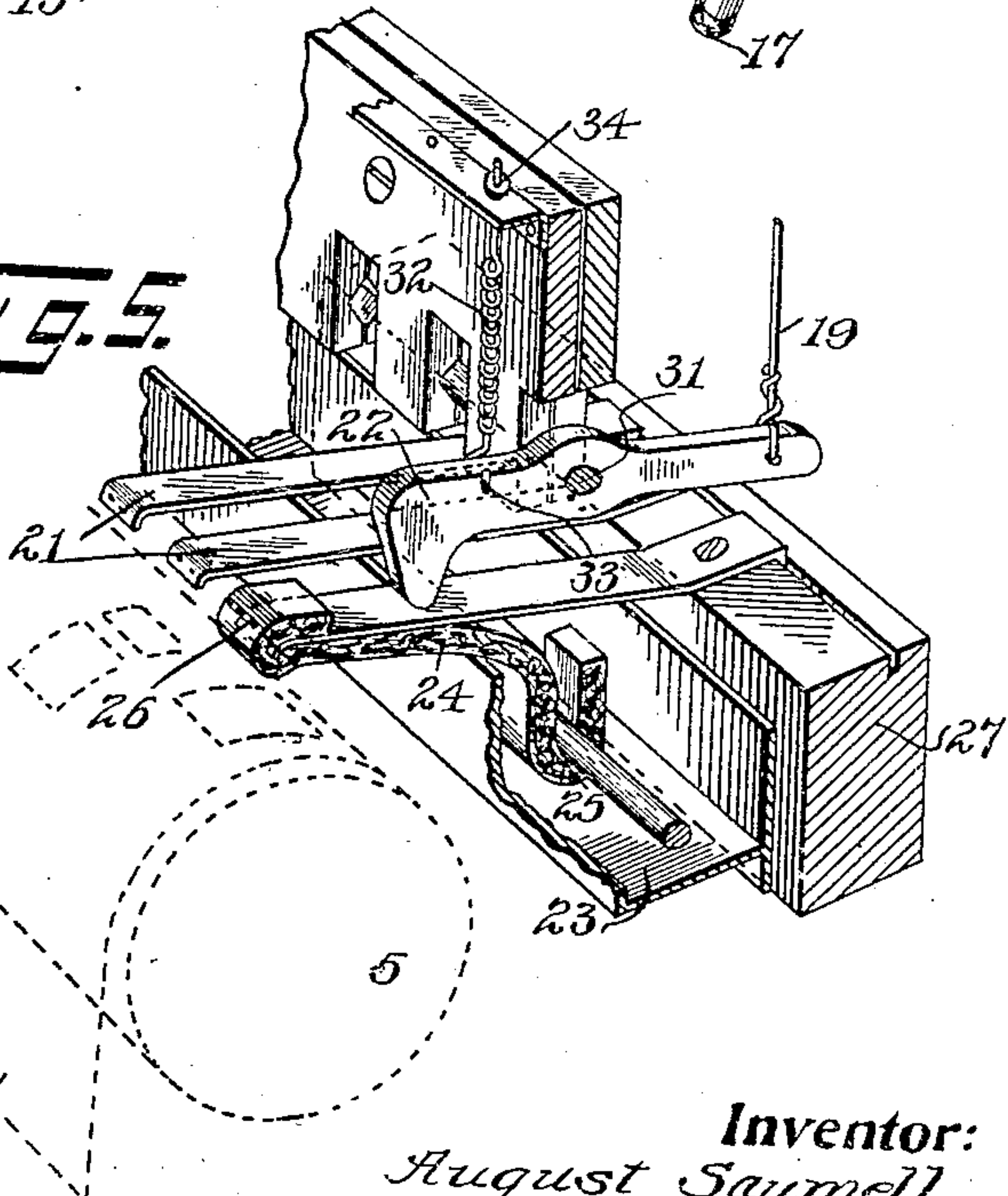


FIG. 5.



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# UNITED STATES PATENT OFFICE.

AUGUST SAUMELL, OF NEW YORK, N. Y.

## MUSIC-RECORDER.

No. 931,494.

Specification of Letters Patent.

Patented Aug. 17, 1909.

Application filed September 28, 1907. Serial No. 395,045.

*To all whom it may concern:*

Be it known that I, AUGUST SAUMELL, a citizen of Venezuela, residing in New York, borough of the Bronx, and State of New York, have invented certain new and useful Improvements in Music-Recorders, of which the following is a specification.

The present improvement relates to an improved mechanism for graphically recording the improvisations or productions of a pianist for the purpose of making an accurate record thereof, which, when properly perforated, can be used on mechanical musical instruments to accurately reproduce the work of such player, although it could be used equally well with other forms of musical instruments having keys.

One of the objects of the present improvement is to provide an improved mechanism of this character which will produce a more accurate and uniform record than heretofore obtained of music played upon a piano or other keyed instrument, and to produce such a record in such a shape that the sheet on which it is made may be perforated for a musical instrument to thereby accurately reproduce the same music as that originally played, and to do this in accurate time and modulation corresponding with such original playing.

A further object of the invention is the provision of a mechanism of the character specified, organized without the use of a lever system as a part of the transmitting means between the keys of the musical instrument and the marking mechanism, whereby the organization will be very much simplified and the movements of the keys directly imparted to a resilient marking mechanism through the medium of light, flexible strings having no appreciable weight, thereby avoiding the necessity of overcoming the momentum of levers or other relatively heavy members.

In the drawings accompanying and forming part of this specification, Figure 1 is a front view of a piano with the front and fall board removed to illustrate this improved mechanism in position, some only of the transmitting strings, however, being shown, Fig. 2 is a cross-sectional view thereof, taken in line *a—*a**, Fig. 1, Fig. 3 is a detail sectional view of a portion of this improved mechanism removed from the piano, one of the keys of such piano being, however, shown, Fig. 4

Fig. 3, Fig. 5 is an enlarged perspective view of a portion of the marking mechanism, Fig. 6 is an enlarged side view of a part of the plunger mechanism, showing one of the plungers with its string attached thereto, the guiding means for such plunger being shown in section, Fig. 7 is a cross-sectional view taken in line *b—b*, Fig. 6, Fig. 8 is a perspective view of one of such plungers, Fig. 9 is a view of one portion of the marking mechanism, Fig. 10 is a detail view of a part of the guiding means for the plungers, and Fig. 11 is a detail view of a part of the guiding means for the strings.

Similar characters of reference indicate corresponding parts throughout the different figures of the drawings.

The present mechanism, which is adapted for attachment to any suitable keyed musical instrument, but is more particularly adapted for use with an ordinary piano without change thereof, comprises in a general way a suitable frame-work, sheet feeding means, recording mechanism, and actuator mechanism adapted to be actuated by the keys of the instrument and to impart movement of such keys directly through the medium of flexible strings to the recording mechanism.

The sheet feeding mechanism in the form shown comprises a suitable system of rolls supported in the framework of the pianograph for carrying a traveling web of paper 4, and operated in any suitable manner, as for instance by clock-work mechanism or a motor, as may be found most desirable, neither of which, however, it is deemed necessary to show in the present instance. The preferred arrangement for this sheet feeding mechanism comprises a main roll 5 forming a platen for the marking mechanism; and a supply roll 2 and receiving roll 3, one carrying the paper to be marked and the other to receive it after it is marked. In the present instance the marker will engage the paper between the horizontal and perpendicular planes intersecting the axes of the rolls at about forty-five degrees to the radial line of the roll at the point where engaged. These rolls are located in proper position relatively to such main roll and connected with some suitable mechanism by which movement is imparted thereto to draw the paper over the platen. Suitable rolls 6, 7 are used, and located in proper position to engage the sheet between them and the main roll as it passes



around the latter to insure proper tautness of the sheet as it passes from the supply to the receiving roll.

The actuating mechanism, in the particular embodiment thereof herein illustrated, comprises a series of plungers 8, which, when the instrument is applied to an upright grand piano, are vertically located, that is, located in a plane transverse to the plane of the keys of the instrument, each in position to be engaged by the upper rear edge of one of said keys 9. Such plungers usually correspond in number with the number of the keys of the instrument, although, of course, a less number of plungers might be used according to the number of octaves more generally used.

For guiding the plungers a suitable guide-frame 10 is attached to the framework and has an upper and a lower projecting portion or shelf, the upper portion 11 having rectangular recesses 12, one for each plunger, and the lower portion 13 having a series of circular openings 14, one in alignment with each of said rectangular recesses. Each of the plungers 8 preferably comprises a rectangular portion 15 fitting each of the rectangular recesses 12, and a rod or stem 16 projecting into one of the circular openings of the guide-frame. Each of these plungers is provided at the end of its stem where it is engaged by the key of the instrument with a suitable piece of felt 17, and also at the point where it is in contact with the guide-frame with a similar piece of felt 18, thereby to muffle any sound which the operation of the plungers might cause. Each of these plungers is provided with means for attaching its connecting string or cord 19 thereto. This means in the present instance is shown as an adjusting screw 20, whereby the proper tautness or tension can be given to the string. The plungers 8 are so located that the lower ends thereof are directly engaged by the rear upper ends of the keys 9 of the instrument.

The marking mechanism, in the preferred form thereof, comprises a series of markers or marking devices 21 corresponding in number with the number of plungers, and a series of depressors 22, preferably of hard wood, corresponding in number with the number of markers and cooperating with such marking devices. Each of these markers is of spring or resilient formation. Below the markers a suitable ink reservoir 23 is attached to the framework, ink being fed therefrom to the markers by means of suitable feeding means, such as wicks or strips of felt 24, one end 25 of each of which is secured within the reservoir and the other end 26 to the markers, in the present instance by being bent around the free end of each marker. These markers are made up of very flexible strips of metal, which may be attached individually to a suitable bar 27

of the framework, or the markers may be made up in the form of a comb, or in a series of combs, as found most desirable in practice.

For pressing the ends of each of the markers on to the traveling web of paper as the same is continuously fed at a certain speed around the main roll, thereby to record a long or short line or dot according to the touch on the key, a series of depressors 22, one for each marker, as hereinbefore stated, is provided. Each of these depressors comprises an oscillatory finger suitably pivoted approximately midway of its length and so located as to preferably engage each resilient marker approximately midway of the length of its resilient portion, to insure not only the proper movement of the marker, but that each marker may accurately record the movement of the fingers of the player upon the keys. These markers are carried on a rod 31, carried by a part of the framework, and each is provided with suitable means for returning it to its normal position, which may be in the form of some elastic means and may be variously located. For instance, it could be located at the under outer end of each of the markers, although in the preferred form shown it is in the form of a spiral spring 32 having one end 33 secured to the marker forward of the pivotal point thereof, and the other end 34 attached to a suitable projection of the framework.

For imparting movement from the actuator plungers to the markers suitable flexible means, such as cords or strings 19, are used, these being directly attached to the ends of the depressors forming part of the marking mechanism, at the rear thereof, and to the plungers through the medium of the adjusting screws, thereby doing away with the use of all levers or other heavy intermediate transmitting instrumentalities and permitting the touch of the player to be substantially instantaneously transmitted, without the use of a system of levers or other heavy transmitting media, to the marking mechanism.

For guiding the strings suitable means is provided, carried by the framework 50, which latter is so organized that the marking mechanism may be materially condensed as compared with the keyboard of the piano or other musical instrument, it being made up of what may be termed a pair of V's 51 and 52 for properly receiving and guiding the cords from the plungers to the marking mechanism. The guiding means in the present instance comprises a set of guide rolls for each string, and in the present instance this set is made up of four rolls 36, 37, 38, 39, two, as 37 and 38, being carried by the V-shaped portions 51 and 52 of the framework, one, as 39, carried adjacent to the plunger while the other, as 36, is above



the marking mechanism, so that the string passing upward and thence downward will give its depressor the desired downward movement. Each string passes over its guide roll 36 and then over rolls 37 and 38 on the V-shaped frames, and thence to and around the guide roll 39 carried by the plunger guide-frame, this roll being preferably so located that it will have frictional contact with the adjacent plunger, so that as the plunger is moved upwardly it will move with less friction, while at the same time the movement of the plunger will assist in turning the roll and thereby reduce the friction on the cord. These guide rolls 39 are preferably all mounted on a rod carried by oppositely bent portions 41 and 42 of the wall of the guide frame.

The capacity of the recording mechanism to make the required character of record is due not only to the peculiar organization or assemblage of the parts thereof, but also in part to the means which permits of the proper adjusting of the several instrumentalities, whereby the operator may bring all of the separate devices into the required precise relations to each other.

By reason of the peculiar arrangement and mode of connection of the actuators or plungers and record marker, the former of which are directly operated from the upper rear sides of the piano keys, any tendency to overthrow in the upward movement of the plunger or primary actuator is restrained through the resistance of the marker on the record sheet.

By employing small firm strings or cords of proper character and flexibility I have found that these may be of such very small weight as to afford no substantial difference in the amount of resistance whether located at the middle portion of the keyboard or at end portions thereof.

The operation of the present improvement will be readily understood from the foregoing description. As each key of the instrument is depressed the plunger in engagement therewith will be operated, through the medium of its string, to oscillate its depressor, which will depress the marker engaged thereby on to the record sheet as it passes over the roll. The return of the marker to its normal disengaged position is assisted by the resilient form thereof, and the return of the depressor to its normal position is obtained through the medium of a spiral spring. Thus, by the use of resilient marking means, and by means of the peculiar organization herein described, in which the marking means is connected to the actuating means through the medium of strings, without the use of intermediate levers or parts, the inertia of which must be overcome, and which strings may be properly regulated or adjusted to the required tautness, I am able

to produce an instrument which will accurately reproduce on paper the improvisations or other productions of a player on the keys of that instrument, and to so produce it, as I have demonstrated by actual practice, that when the sheet is perforated in accordance with those marks and placed upon a mechanical player it is difficult, if not impossible, to determine whether the piece is being played by the original composer on the keys of the instrument or by the mechanical player.

I claim as my invention:

1. The combination with a musical instrument having keys, of a series of plungers each directly engaged by a key of said instrument, a series of spring-formed marking devices, one for each plunger, a rocking depressor for actuating each of said marking devices, and strings connecting the rocking depressors directly to said plungers.

2. The combination with a musical instrument having keys, of a series of plungers each directly engaged by a key of said instrument, a series of spring-formed marking devices, one for each plunger, a rocking depressor located above each of said marking devices for actuating it, strings connecting said rocking depressors directly with said plungers, and means carried by each of said plungers for regulating the tension of said strings.

3. The combination with a musical instrument having keys of a series of movable spring-formed marking devices, an ink reservoir, means for feeding ink from said reservoir to said marking devices, a series of depressors, one for each of said marking devices, a series of plungers corresponding in number with the number of marking devices and directly engaged each by one of the keys of said instrument and movable in a direction opposite to the movement of the markers to their marking position, and connecting strings attached to the depressors and plungers.

4. The combination with a keyed musical instrument, of recording mechanism comprising a series of resilient marking devices, a series of spring controlled depressors, one for each marking device, a series of plungers corresponding in number with said marking devices and each directly engaged by one of the keys of said instrument, and strings directly connecting said plungers and depressors.

5. The combination with a keyed musical instrument, of recording mechanism comprising a series of resilient marking devices, a series of spring controlled depressors, one for each marking device, a series of plungers corresponding in number with said marking devices and each directly engaged by one of the keys of said instrument, strings directly connecting said plungers and depressors, and guide rolls each in engagement with a plunger to guide said strings.



6. The combination with a keyed musical instrument, of recording mechanism comprising a series of resilient marking devices, an ink reservoir adjacent to said marking devices, wicks for feeding ink to said marking devices, an oscillatory spring controlled depressor in engagement with each of said marking devices, a series of plungers corresponding in number with the number of said marking devices and each directly engaged by a key of said instrument, and strings connecting one end of said depressors directly with said plungers.

7. The combination with a keyed musical instrument, of recording mechanism comprising a series of resilient marking devices, an ink reservoir adjacent to said marking devices, wicks for feeding ink to said marking devices, an oscillatory spring controlled depressor in engagement with each of said marking devices, a series of plungers corresponding in number with the number of said marking devices and each directly engaged by a key of said instrument, strings connecting one end of said depressors directly with said plungers, and means carried by each of said plungers for adjusting the tension of said strings.

8. The combination with a keyed musical instrument, of recording mechanism comprising a series of resilient marking devices, an ink reservoir adjacent to said marking devices, wicks for feeding ink to said marking devices, an oscillatory spring controlled depressor in engagement with each of said marking devices, a series of plungers corresponding in number with the number of said marking devices and each directly engaged by a key of said instrument, strings connecting one end of said depressors directly with said plungers, and means for guiding said plungers and carrying a series of guide rolls one for each of said strings.

9. The combination with a keyed musical instrument, of recording mechanism comprising a series of resilient marking devices, an ink reservoir adjacent to said marking devices, wicks for feeding ink to said marking devices, an oscillatory spring controlled depressor in engagement with each of said marking devices, a series of plungers corresponding in number with the number of said marking devices and each directly engaged by a key of said instrument, strings connecting one end of said depressors directly with said plungers, and means for guiding said plungers and carrying a series of guide-rolls one for each of said strings, each of said guide-rolls having engagement with a plunger.

10. The combination with a keyed musical instrument, of recording mechanism comprising a series of resilient marking instrumentalities, a series of oscillatory fingers one for actuating each of said marking instru-

mentalities, a series of reciprocatory plungers each directly engaged by a key of said instrument, and strings directly connecting said oscillatory fingers with said reciprocatory plungers.

11. The combination with a keyed musical instrument, of recording mechanism comprising a series of resilient marking instrumentalities, a series of oscillatory fingers one for actuating each of said marking instrumentalities, a series of reciprocatory plungers each directly engaged by a key of said instrument, strings directly connecting said oscillatory fingers with said reciprocatory plungers, and guiding means for said strings a part of such guiding means having engagement with and operated by said plungers thereby to reduce the friction on said strings.

12. The combination with a keyed musical instrument, of recording mechanism comprising a series of resilient marking instrumentalities, a series of fingers one in engagement with each of said resilient marking instrumentalities at a point substantially midway of the resilient portion thereof, a series of plungers corresponding in number with said marking instrumentalities and each directly engaged by one of the keys of said instrument, an ink reservoir located below said marking instrumentalities, means for feeding ink from said reservoir to said marking instrumentalities, and strings each directly connecting one of said fingers with one of said plungers.

13. The combination with a keyed musical instrument, of a series of resilient marking devices corresponding in number with the number of keys of said instrument, an ink reservoir below said resilient marking devices, means for feeding ink therefrom to said marking devices, a series of oscillatory fingers corresponding in number with said marking devices and each in engagement with one of said marking devices at a point substantially midway between the resilient portions thereof, means for regulating the position of each of said fingers, a series of reciprocatory plungers corresponding in number with and each directly engaged by the keys of said instrument at the rear upper edges thereof, strings directly connecting the ends of said oscillatory fingers with said plungers, guiding means for the plungers, guiding rolls for the strings some of such guiding rolls carried by the plunger-guiding means and in position to engage said plungers.

14. The combination with a keyed instrument, of a platen for supporting material for receiving markings, a plurality of resilient markers normally tending to move away from the platen, a depressor for each marker movable toward and from the side of the marker farthest from the platen, a spring



for retracting each depressor from the marker, and means of connection between each depressor and a key of the instrument.

5 15. The combination with a musical instrument having keys, of a series of plungers each directly engaged by a key of said instrument, a series of spring-formed marking devices one for each plunger, means for sup-

plying marking material to said devices including a wick attached to each of said devices, and means connected with said plungers for operating said marking devices. 10

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