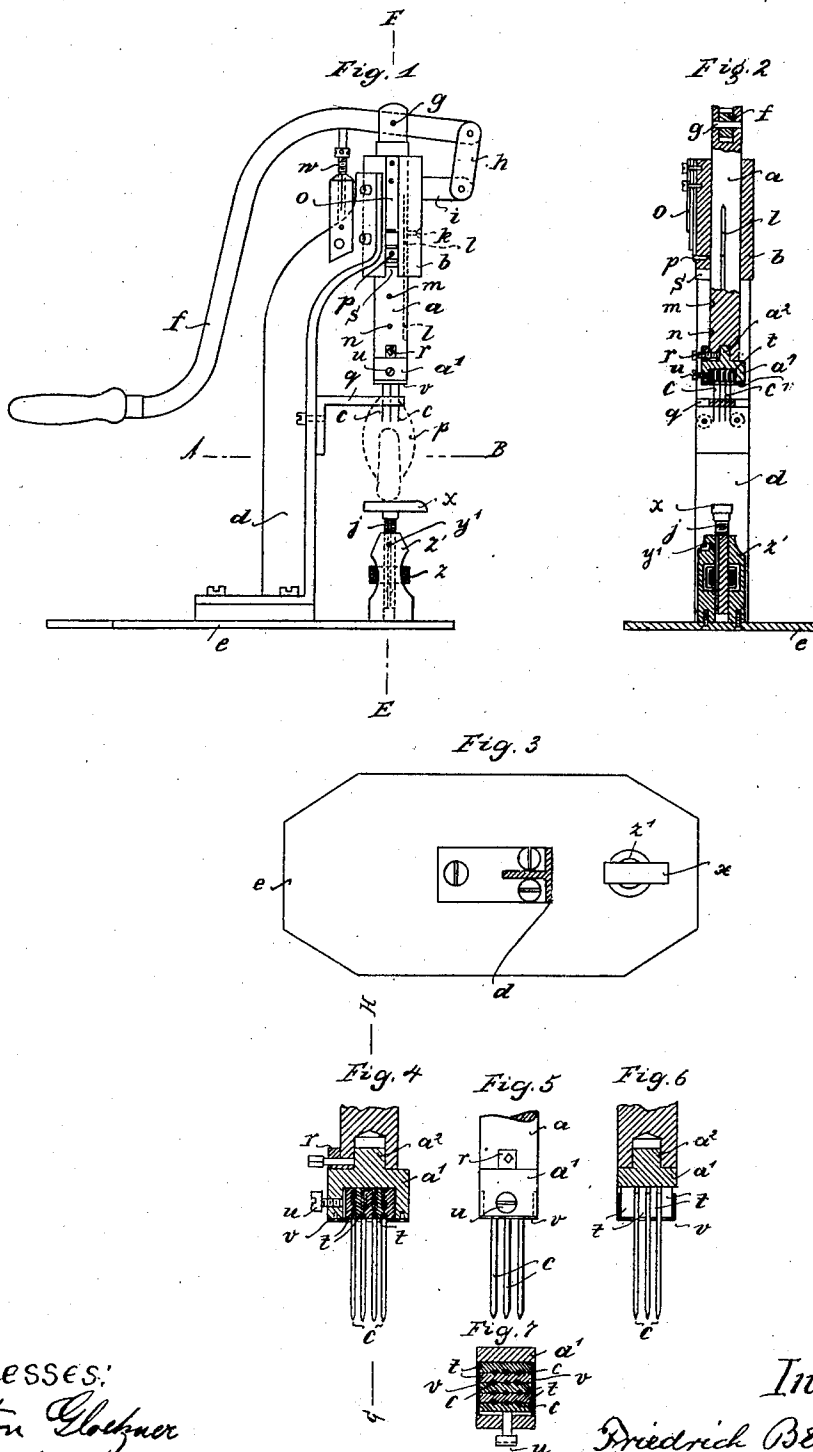


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DEVICE FOR LOOSENING PIANO HAMMER FELTS.

APPLICATION FILED MAR. 15, 1902. RENEWED MAY 13, 1903.

NO MODEL.



Witnesses:
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UNITED STATES PATENT OFFICE.

FRIEDRICH BEHRINGER, OF MUNICH, GERMANY.

DEVICE FOR LOOSENING PIANO-HAMMER FELTS.

SPECIFICATION forming part of Letters Patent No. 738,877, dated September 15, 1903.

Application filed March 15, 1902. Renewed May 13, 1903. Serial No. 157,019. (No model.)

To all whom it may concern:

Be it known that I, FRIEDRICH BEHRINGER, a subject of the King of Bavaria, and a resident of Munich, Bavaria, Germany, have invented a certain new and useful Improved Device for Loosening Piano-Hammer Felt, of which the following is a full, clear, and exact description.

The present invention consists of an apparatus for loosening and adjusting the felt coverings of the hammers of pianos.

In order to render the present specification easily intelligible, reference is had to the accompanying drawings, in which similar letters of reference denote similar parts throughout the several views.

Figure 1 is a side elevation of the device; Fig. 2, a vertical section on line E F; Fig. 3, a sectional plan on line A B, both lines being shown in Fig. 1. Figs. 4 to 7 are detail views of the needle-carrying head, Fig. 4 being a section taken also on the line E F, Fig. 5 a side elevation, Fig. 6 a vertical section on line G H of Fig. 4, and Fig. 7 a horizontal section through the needle-holding head.

In adjusting and tuning pianos in the factory it is, as is well known, necessary to loosen the felt coverings of the hammers after the former have been attached to the latter, it being necessary that all the felts should have equal softness in order to produce the proper soft sound when they strike the strings or wires. This operation of loosening the felt coverings has hitherto been performed by hand; but according to the present invention an apparatus is provided by means of which the work is more evenly accomplished and takes less time. The loosening operation is effected by means of a series of needles which are inserted through the felt repeatedly and advantageously penetrate the same at each stroke down to the wood or other material of the actual hammer.

According to the present invention the set of needles *c* is mounted in the head *a'* of a vertically-reciprocatory bar *a*, guided in the guideway *b*. The latter is supported on the standard *d*, having base-plate *e*, and the bar *a* is reciprocated by hand by means of the handle *f*, pivoted to the upper end of the said bar at *g* and linked to the bracket *i* of the standard by means of the link *h*. When the handle is

swung up and down, the bar *a* will be vertically reciprocated, as will be readily understood.

The set of needles *c* is attached in the head *a'* of the bar *a* in the manner illustrated in Figs. 4 to 7. The lower end of the bar is provided with a recess into which the stem *a²* of the head *a'* passes and is secured therein by means of a set-screw. The lower end of the head is provided with a rectangular recess in which a series of plates *t* are secured by means of a screw *u*. These plates are advantageously provided with a set of vertically-disposed grooves in which the needles are clamped by means of the said screw *u*, Fig. 7. A covering-plate *v* may be provided to prevent the plates from falling out when the screw *u* is loosened to remove the needles.

The stroke of the bar *a* is limited at the top end by a stop *r*, which may be attached to the lower end of the bar *a* by the same screw as that which holds the stem *a²*, Fig. 4, while the downward stroke is limited by an adjustable screw-stop *w*, Fig. 1, mounted in the standard *d* and against which the handle *f* strikes on its downward movement. This adjustable stop is necessary to enable the stroke of the needles to be adjusted for felt coverings of different thicknesses. The bar may further be retained in two other positions provisionally by means of a pin *p*, supported on a spring *o*, attached to the upper part of the standard and engaging through the slide-guide *b* in recesses *m* and *n* of the bar *a*. The needles *c* pass through corresponding openings of a guide-plate *q*, attached to the standard *d*. When the bar is retained in the position for the pin *p* to engage the recess *m*, the needles will be held up while the finished hammer is being removed and a fresh one placed under the needles. When the latter are raised far enough to enable the pin *p* to engage the recess *n*, the needles will be withdrawn from the guide-plate *q* and may be removed and fresh ones substituted therefor.

The hammer to be worked is placed on a table *x*, which is adjustable vertically by means of its screw-stem *j*, working in a nut *z*, having a milled edge and being supported in the table-supporting block *z'*. The stem is prevented from turning when the nut is turned by means of a stud *y'* engaging a cor-

responding groove in the said stem, Fig. 1. The bar *a*, if it is of a circular cross-section, is prevented from turning in its guide *b* by means of a stud *k*, mounted in the said guide 5 *b* and engaging a groove *l* of the said bar *a*. The stop *r* is adapted to engage in a suitable recess of the guide *b* when the bar has attained the limit of its upward stroke.

In operation the hammer (shown in dotted 10 lines in Fig. 1) is placed on the table *x* and the handle *f* worked up and down, whereby the needles *c* will be driven in and out of the felt. The screw *w* is adjusted to the thickness of the felt to be worked or loosened, so 15 that the needles will penetrate the same down to the material of the hammer.—*i. e.*, will pass completely through the felt covering.

I claim as my invention—

1. A device for loosening the felt coverings 20 of the hammers of pianofortes, consisting of vertically-disposed needles, means for reciprocating the same, and means for regulating the extent of such reciprocation.

2. A device for loosening the felt coverings 25 of pianoforte-hammers, consisting of perforating means mounted on a sliding bar, means for guiding and reciprocating the bar, and means for regulating the length of stroke.

3. A device for loosening the felt coverings 30 of pianoforte-hammers, consisting of a set of needles, a sliding bar to support the same, means for reciprocating the said bar, and means for adjusting the length of stroke of said bar.

35 4. A device for loosening the felt coverings of pianoforte-hammers, consisting of a set of needles, a reciprocatory bar having a head with a lower recess, a series of plates having 40 grooves in their faces in which the needle-shanks fit, said grooved plates being mounted in the recess of said bar-head, means for clamping the plates to the needles, a covering-plate secured over the grooved plates and provided with perforations for receiving the needles, and means for reciprocating the said bar. 45

5. A device for loosening the felt coverings of pianoforte-hammers consisting of a set of needles, a bar to carry the same and means

for guiding and reciprocating the said bar, means for limiting the stroke of the same and 50 a spring-pin and two recesses in the bar to enable the pin by engagement with one or the other of the said recesses to hold up the needles provisionally in two different positions. 55

6. In a machine for loosening piano-hammer felts, the combination of a support for the hammer, a needle-guide above said support, a set of needles adapted to move through said guide, and means for reciprocating the 60 needles.

7. In a machine for loosening piano-hammer felts, the combination of a standard, a needle-bar mounted in said standard, a stop 65 near the lower end of the needle-bar adapted to impinge against the standard and limit the upward movement of the needle-bar, a lever pivotally connected to the upper end of the needle-bar, a link connecting the end of the lever with the standard, and an adjustable 70 stop on the standard to limit the downward movement of the lever.

8. In a machine of the character described, the combination of a needle-bar having a 75 socket in its lower end, a head secured in said socket, a series of grooved needle-clamping plates secured in said head, needles engaging the grooves of said plates and held thereby, and a covering-plate secured over the end of the head and passing over the edges of the 80 needle-clamping plates.

9. A device for loosening the felt coverings of pianoforte-hammers, consisting of a set of needles carried by a bar mounted for reciprocatory movement within a standard, means 85 for regulating the extent of the reciprocatory movement, and an adjustable support for the hammer consisting of a sliding standard mounted within a tubular support and provided with an adjusting-nut. 90

In witness whereof I have hereunto set my hand in presence of two witnesses.

FRIEDRICH BEHRINGER.

Witnesses:

WOLDEMAR HAUPT,
HENRY HASPER.