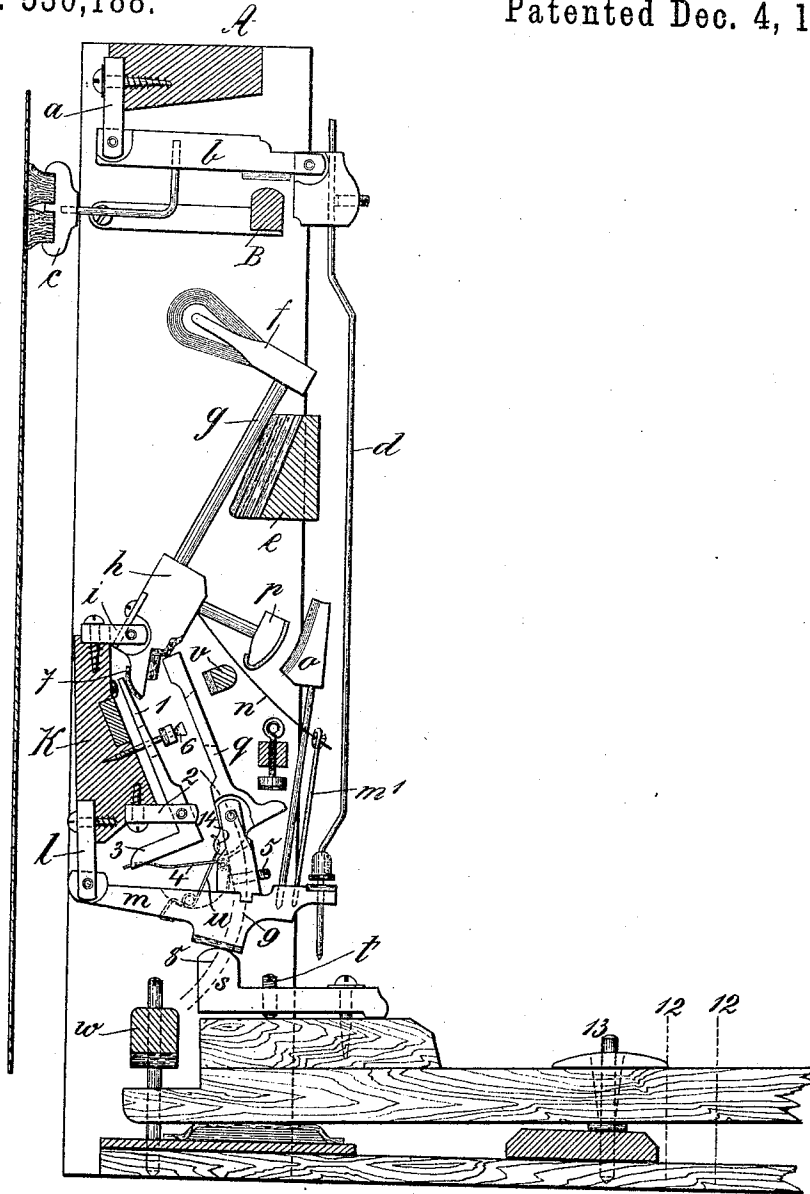


(No Model.)

F. LINDNER.
REPEATING MECHANISM FOR PIANOS.

No. 530,188.

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UNITED STATES PATENT OFFICE.

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REPEATING MECHANISM FOR PIANOS.

SPECIFICATION forming part of Letters Patent No. 530,188, dated December 4, 1894.

Application filed July 3, 1894. Serial No. 516,457. (No model.) Patented in Germany September 27, 1892, No. 74,725, and October 30, 1892, No. 72,928.

To all whom it may concern:

Be it known that I, FRANZ LINDNER, a subject of the King of Saxony, residing at Dresden, Saxony, have invented certain new and useful Improvements in Repeating Mechanism for Pianos, (for which I have received patents in Germany, dated September 27, 1892, No. 74,725, and October 30, 1892, No. 72,928,) of which the following is a specification.

The present invention relates to repeating mechanism for pianos having vertical wires and generally known as "cottage" pianos or "upright" pianos.

A repeating mechanism is understood by those skilled in the branch to be a device by means of which the hammer, after having been struck can be brought into position for the second stroke instantaneously, *i. e.*, when it has only accomplished about a quarter of its return fall into the position of rest, so that the hammer, however rapid the repetition, will strike the wire at each depression of the key, with positive certainty.

Repeating devices for horizontal or grand pianos have already been constructed, but hitherto no satisfactory repeating mechanism has been devised for upright pianos. Generally, a repeating mechanism is supposed to mean a quick return fall of the hammer, without necessarily involving a positively accurate action of the jack in falling under the knuckle before the key has again risen from its depression. Thus with the devices hitherto employed it is easily possible, that the hammer and knuckle may fall onto the jack immediately on the release of the key so that the jack cannot properly get into position under the knuckle until the key has returned to its position of rest. Thus with all the repeating mechanisms hitherto known, shortly after the hammer has struck the wire it reaches a dead center, which cannot be mathematically determined, and at which point the key cannot operate the hammer. This defect becomes more noticeable, when the pivot of the hammer gets worn, after the instrument has been in use a short time, and it is owing to the same that when trilling or when playing very softly, it often happens that the note does not respond to the touch of the key.

In the accompanying drawing a side elevation of a piano mechanism constructed according to the present invention is shown, representing the device by means of which the above enumerated defects are avoided.

The device illustrated in the drawing is in connection with a piano mechanism having an upper muffler device, but the invention may just as easily be applied to pianos with an under muffler system. In order to clearly distinguish the novelties comprised in this invention from what is already known, on the drawing, the latter parts are indicated by means of reference letters while figures are employed to indicate the former.

A is the muffler beam carrying the arms *a* to which the lever *b* is pivoted.

c is the muffler attached to the lever *b* by means of a strong angle wire. To the free end of the lever *b* is pivotally attached the lifting arm *d*.

B is the forte lifting bar. The hammer *f* is in its position of rest with its stem *g* leaning against the cushion *e*, the knuckle *h* being pivotally attached to a bracket *i* of the hanger K. The bracket or arm *l* is also attached to the hanger K. The jack lever *m* is pivoted to the arm *l* and carries at its free end the bridle wire *m'* having bridle *n* attached to the knuckle *h*. *o* is the back check for the reception of the bumper *p*. The "carting" or distance between the top of the jack and the knuckle is regulated by an adjusting screw *t* arranged in the abstract *s*. *v* is the guard and *w* the pressure batten for regulating the play of the keys.

In order to attain the object in view the following parts are employed in connection with the above mentioned mechanism:—an angle lever or fly jack 1—3, pivoted to the bracket 2 of the hanger K and having a spring 4 acting against its lower end, said spring being adjustable by means of a screw 5 arranged in the jack standard. The play of the said fly jack 1—3 is regulated by an adjusting screw 6 penetrating the upper shank of the same and fixed in the hanger K. The upper end of the said fly jack engages under the lower projection 7 of the knuckle *h* and effectually prevents the hammer from falling back from the string too quickly for the jack

top to properly engage under the knuckle. Thus however quickly the note is repeated the jack will always fall into proper position under the knuckle, the movement of the said
 5 knuckle being so regulated by the fly jack as to effectually prevent its falling so quickly as to pass the top of the jack in which case the latter could not get into proper position until the key has returned to its position of rest.

10 Another improvement comprised in this invention is the arrangement of the jack spring *u* as also the construction of the same which is three or four times as strong as usually made. This spring is arranged to contact
 15 with the toe of the jack at 14—i. e., at a point as near as possible to the pivot of the said jack, so that the extra power of the spring is to a certain extent neutralized. The advantage of this arrangement is that owing to the
 20 said spring being stronger it will not break so easily and secondly the friction of the spring against the jack is very considerably reduced.

Another improvement is the arrangement
 25 of the jack on the jack lever *m* so that the pivot of the said jack shall move in the arc of a circle 9 said arc passing the head of the abstract *s* at a certain distance from the point of contact of the said abstract with the jack
 30 lever marked by 8. Thus the jack pivot bears on the jack lever at a point nearer the end of the said jack lever than the point of contact of the latter with the abstract *s* instead of between the latter point and the pivot of
 35 the jack lever as hitherto. In order however to attain the standard play or depth of play of the keys with this novel arrangement of the jack pivot, which is eight to ten millimeters, the pivots of the keys must be shifted
 40 back from 12 to 13, and thus the front part of the key lengthened. The advantage is that by means of this arrangement the keys attain a length equal to that of the keys of first class grand pianos and can be manipulated with
 45 equal elasticity.

I claim as my invention—

1. In an upright piano, the combination with the hammer and its stem, of a hanger
 50 K, spring fly jack 1, 3, pivoted thereto, and knuckle *h* having projection 7, such fly jack adjusted to play within the space between said hanger and said projection, substantially
 as set forth.

2. In an upright piano, the combination
 55 with the hammer and its stem, of a hanger K, fly jack 1, 3, flat spring 4 attached to the jack standard and provided with adjusting screw 5, said spring adapted to press against

the lower arm of the said fly jack, and knuckle
h having projection 7, the upper arm of such
 60 fly jack adjusted to play within the space between said hanger and said projection, substantially as set forth.

3. In an upright piano, the combination with the hammer, and its stem, of a hanger
 65 K, fly jack 1, 3, pivoted thereto, a spring 4 for actuating the same provided with adjusting screw 5, knuckle *h* having projection 7, the upper arm of the fly jack adjusted to play within the space between said hanger and
 70 said projection, and screw 6 for regulating the position of the upper shank of the fly jack, substantially as set forth.

4. In an upright piano, the combination with hanger K, of a spring fly jack 1, 3, knuckle
 75 *h* having projection 7, and regulating screw 6, the upper shank of the fly jack adjusted to play between said hanger and said projection, substantially as set forth.

5. In an upright piano, the combination
 80 with hanger K of a spring fly jack 1, 3, knuckle *h* having projection 7, the upper shank of the fly jack adjusted to play between said hanger and said projection, a jack *q* and a spring *u* adjusted to bear against the lower end of jack
 85 *q* near the pivot of the latter in the manner and for the purposes substantially as set forth.

6. In a piano, the combination with hanger
 K of a fly jack 1, 3, pivotally connected there-
 90 to, knuckle *h* having projection 7, the upper shank of the fly jack adjusted to play between said hanger and said projection, jack lever *m*, and a jack *q* mounted thereon, the distance between the pivot of the jack lever and
 95 its point of contact with the abstract being less than the distance between said pivot and the pivot of the jack, substantially as and for the purposes specified.

7. In a piano, the combination with the fly
 100 jack 1, 3, having spring 4 with adjusting screw 5 and a regulating screw 6 attached to the upper shank of said fly jack, jack *q*, and a spring *u* bearing against said jack near its
 105 pivot the distance between the pivot of the jack lever and its point of contact with the abstract being less than the distance between said pivot and the pivot of the jack, substantially as set forth.

In testimony whereof I have signed my
 name to this specification in the presence of
 two subscribing witnesses.

FRANZ LINDNER.

Witnesses:

HERNANDO DE SOTO,
 OSCAR KELLER.