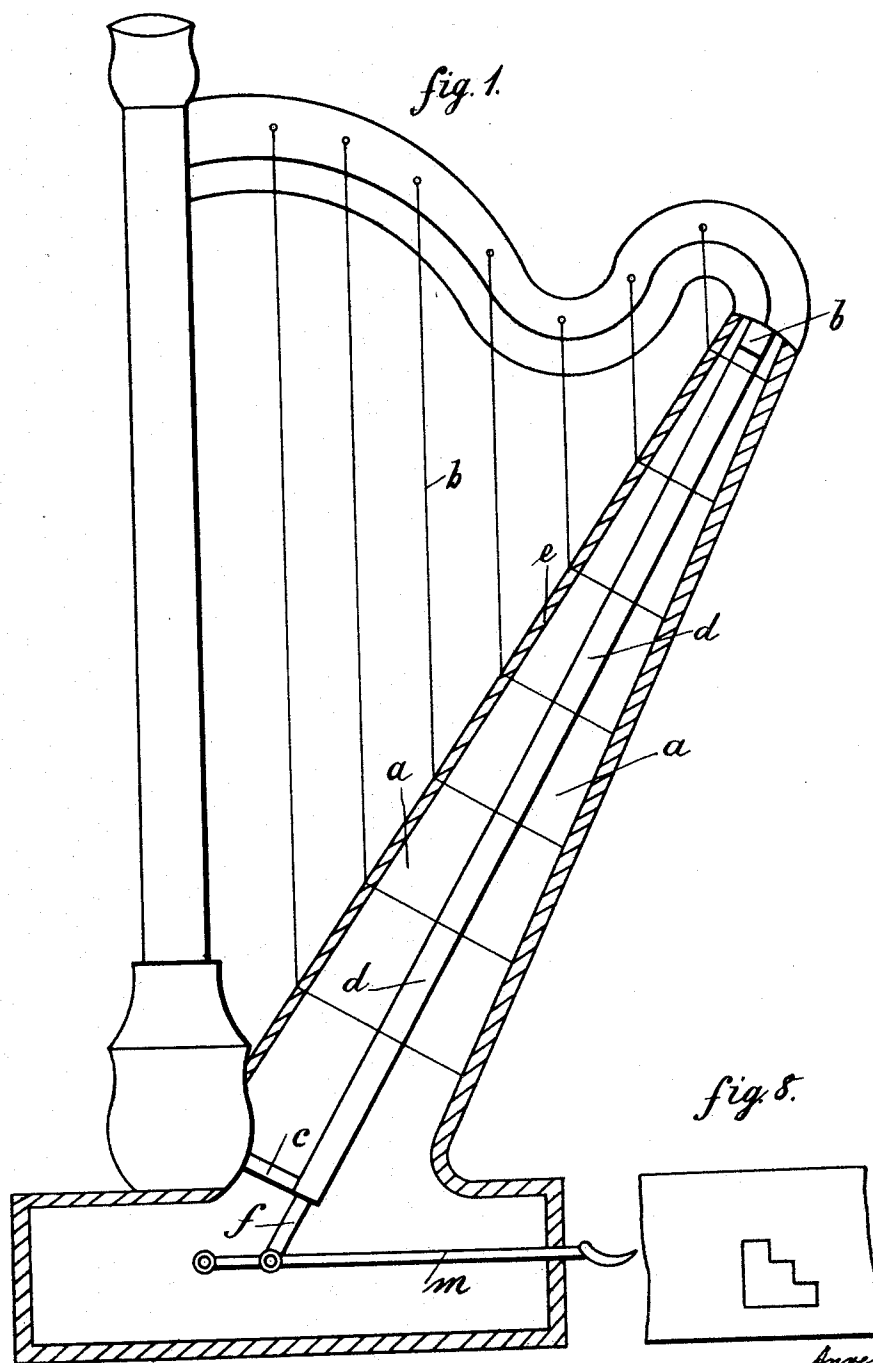


P. STARK.
HARP.

No. 586,573.

Patented July 20, 1897.



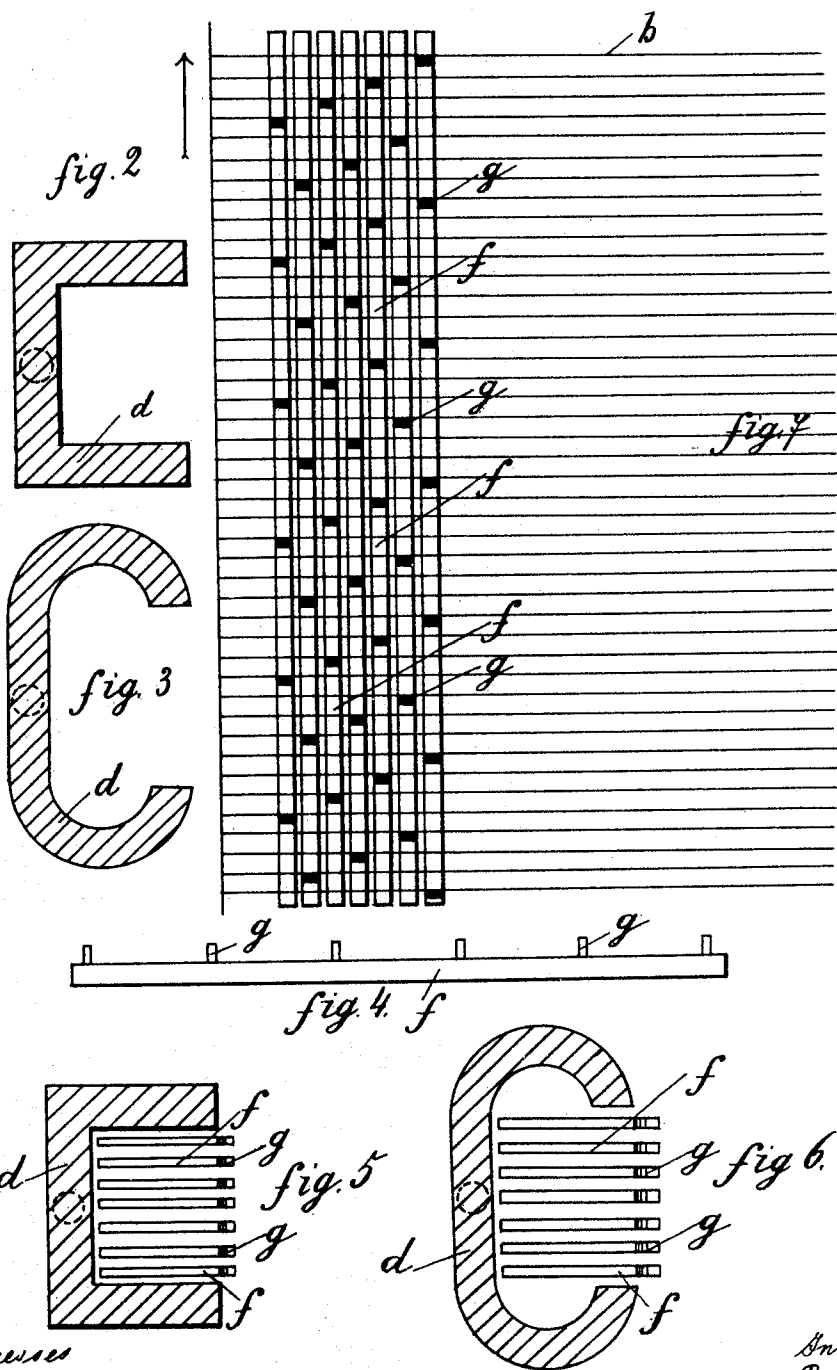
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fig. 11.

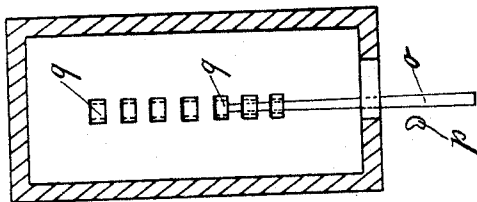


fig. 10.

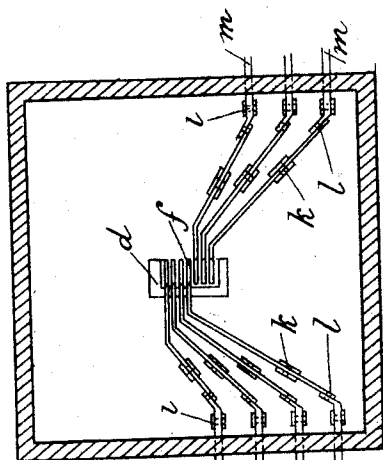


fig. 12.

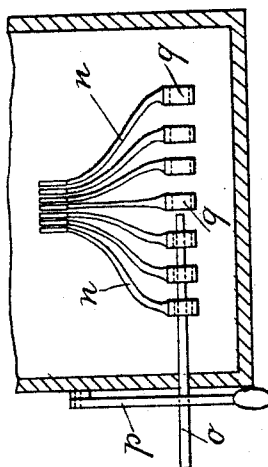
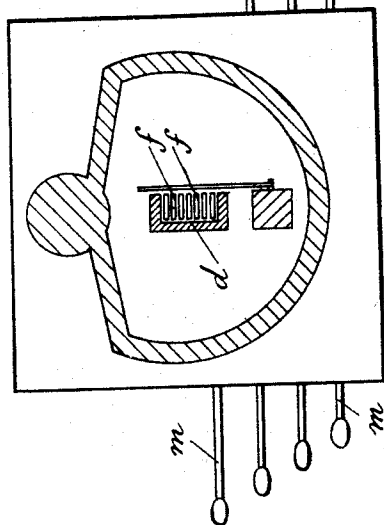


fig. 9.



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UNITED STATES PATENT OFFICE.

PAUL STARK, OF MARKNEUKIRCHEN, GERMANY.

HARP.

SPECIFICATION forming part of Letters Patent No. 586,573, dated July 20, 1897.

Application filed July 3, 1895. Serial No. 554,827. (No model.)

To all whom it may concern:

Be it known that I, PAUL STARK, a subject of the King of Saxony, and a resident of Markneukirchen, in the Kingdom of Saxony, German Empire, have invented certain new and useful Improvements in Harps, of which the following is a full, clear, and exact description.

The present invention relates to pedal-harps; and it consists of a device by means of which the pedal mechanism is considerably simplified, and the harsh tone as at present caused by the sudden stretching of the strings when the pedal is employed is avoided.

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

Figure 1 is a side elevation of the harp; Figs. 2 and 3, sections through two forms of guides for the pedal-arms; Fig. 4, a side elevation of the pedal-arms with pins to actuate the strings; Figs. 5 and 6, similar sections to those of Figs. 2 and 3, showing the pedal-arms in position in the guide. Fig. 7 is a diagrammatical representation. Fig. 8 is a detail hereinafter referred to; and Fig. 9 is a sectional plan of the lower part of the harp, showing one arrangement of pedals. Fig. 10 is a plan of the same arrangement as shown at Fig. 9 with the cover of the pedal-casing removed. Fig. 11 is a vertical section through the foot of the casement, showing a modified lever arrangement, the section being taken in front of the ends of the levers. Fig. 12 is a sectional plan showing the lever arrangement as indicated in Fig. 11.

The mechanism for raising or lowering the pitch to which the harp is set consists of the following parts: A guide *d*, having U-shaped mutilated circular or other section, Figs. 2 and 3, is fixed in the casement *a* of the harp in suitable bearings *b* and *c*, so as not to contact with the sounding-board *e* at any point which would depreciate the tone of the instrument. Within this guide are arranged seven thin battens or rods *f*, Fig. 4, one beside the other, said rods corresponding to the notes B F C G D A E, when the harp is tuned to E^b major. The arms or rods *f* are provided with teeth or pins *g*, Fig. 5, along their length,

said pins being arranged at such distance apart as to embrace all the strings of an octave between each two pins, so that the first pin will rest on or contact with the first string of an octave, the second pin with the eighth, third with the fifteenth, and so on. The arms *f* are very thin and arranged directly side by side, being shown a small distance apart in the drawings merely for the sake of greater clearness. The rods *f* from B to A major are each provided with six pins *g*, and at E major with seven pins, Fig. 7, since the harp has six octaves and consequently forty-three strings.

Fig. 8 shows the shape of the orifice at the foot of the harp, through which each pedal-lever projects. The said openings are provided with steps or rests, so that the pedal-lever may be arrested in any one of the different heights. The pedal-lever is placed on the first step or rest when the pitch is to be raised half a tone, and if several or all the pedals are placed in this position, so that the pitch of the harp is varied, then by placing one in the next step higher the respective strings may be pitched half a tone higher still.

In Fig. 1 of the drawings the six octaves are represented by the first string of each octave. The arms serving to vary the pitch of the strings are connected with pedals, which actuate the said arms downward, causing their pins *g* to press against and stretch the strings with which they contact, as may be seen from the diagrammatical representation in Fig. 7. Thus, for instance, if the E string is to be raised half a tone the E pedal must be depressed, thus stretching the first, eighth, fifteenth, twenty-second, twenty-ninth, thirty-sixth, and forty-third strings and rendering them half a tone sharper.

Fig. 7 shows how the arms affect the strings. Thus: the E pedal will operate the first, eighth, fifteenth, twenty-second, twenty-ninth, thirty-sixth, and forty-third strings; the A-pedal strings, Nos. 5, 12, 19, 26, 33, and 40; the D-pedal strings, Nos. 2, 9, 16, 23, 30, 37; the G-pedal strings, Nos. 6, 13, 20, 27, 34, 41; the C-pedal strings, Nos. 3, 10, 17, 24, 31, 38; the F-pedal strings, Nos. 7, 14, 21, 28, 35, 42, and the B-pedal strings, Nos. 4, 11, 18, 25, 32, 39.

The pedals *m* are advantageously arranged,

four on one side and three on the other side of the harp-foot, being mounted on the fixed pivots *i* and *k*, as shown at Figs. 9 and 10, the arms having pin-and-slot connection at *l*.
 5 Thus on depressing the pedal-lever *m* the corresponding rod *f* will also be depressed, stretching its strings. If it is desired to actuate all the arms from one pedal, Figs. 11 and 12, then the ends *g'* of all the pedal-levers *n* should be arranged in one plane and
 10 provided with holes, through which a conical rod *o* may be extended. Said rod is passed through the lever ends with the foot and will depress all the levers when operated by means
 15 of the pedal *p*.

When playing on a harp of the present construction, the strings are set to the key of the piece, the levers—all or part, as the case may be—being in their central position vertically.
 20 Further adjustment of any one or several pedals for accidentals may then be effected by raising or lowering the said pedal or pedals.

I claim as my invention—

1. In a pedal-harp the combination of a series of arms having pins arranged as specified
 25 to actuate the strings, a common guide for all said arms, a pedal device to actuate said arms

and means for retaining said pedal device in a position to raise or lower the pitch of the harp and to vary the various strings half a
 30 tone in one of two directions substantially as described.

2. The combination of a series of thin arms *f* having pins *g* to contact with the harp-strings as specified, a guide *d* in the harp-
 35 casement for said arms, and pedal device to operate said arms in the manner and for the purpose substantially as described.

3. The combination of a series of thin arms *f* having pins *g* to contact with the harp-
 40 strings as specified, a guide *d* in the harp-casement for said arms, and pedal device to operate said arms consisting of a series of pedal-levers attached to said arms and hav-
 45 ing their ends perforated and extending in one and the same plane, a conical rod to enter said perforations and a pivoted pedal to operate said rod substantially as described.

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

PAUL STARK.

Witnesses:

A. LIES,
 W. BAUTZE.