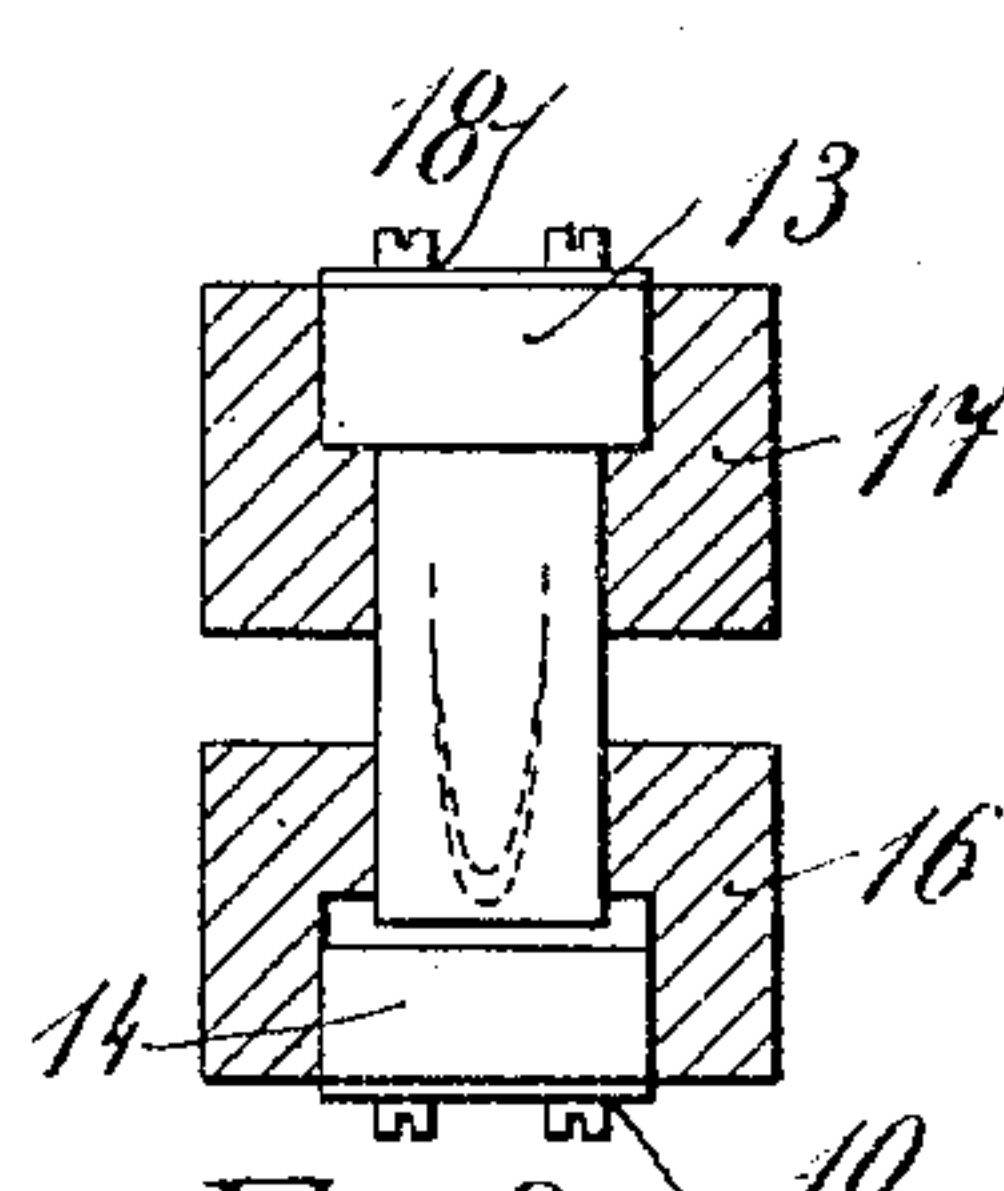
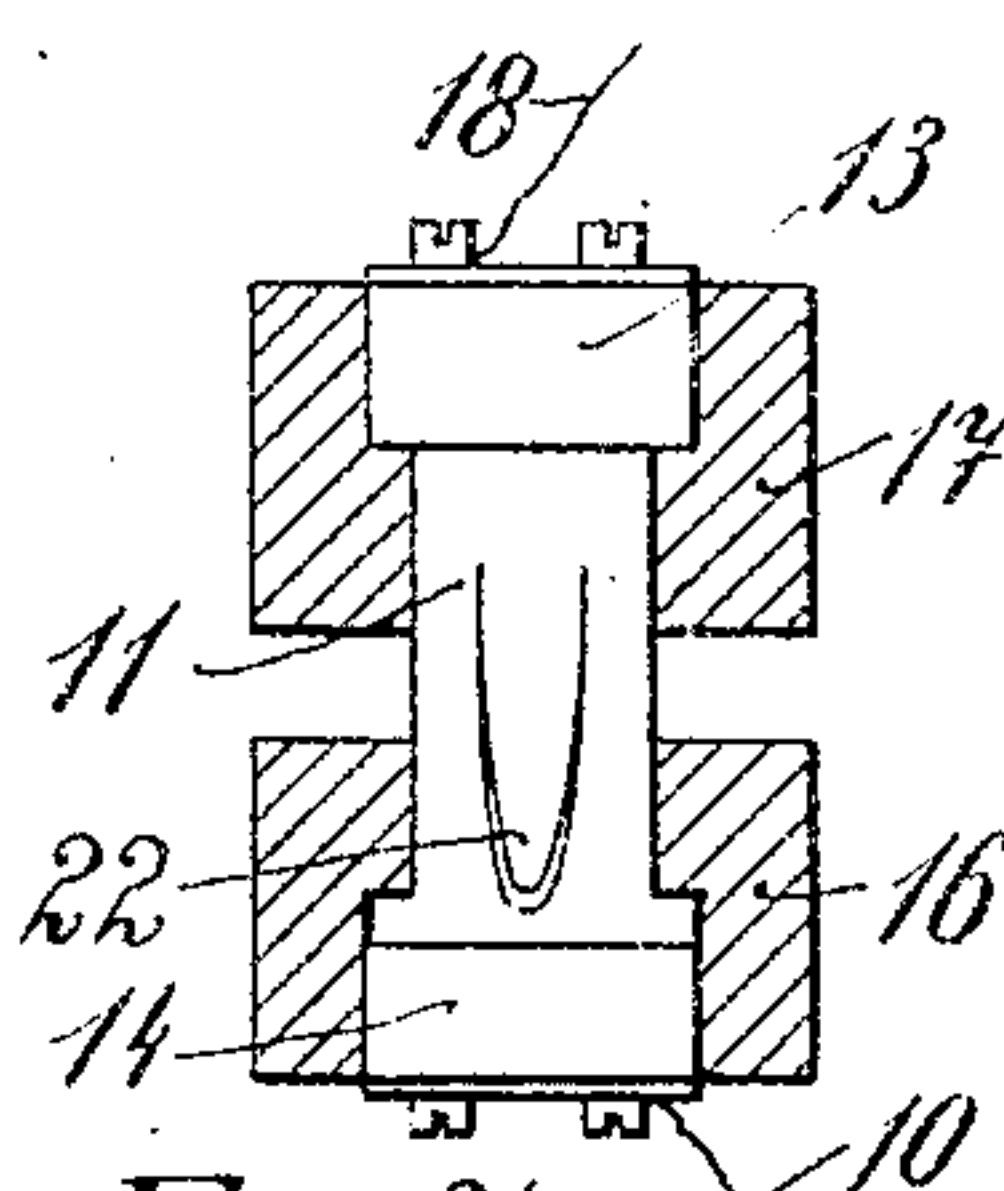
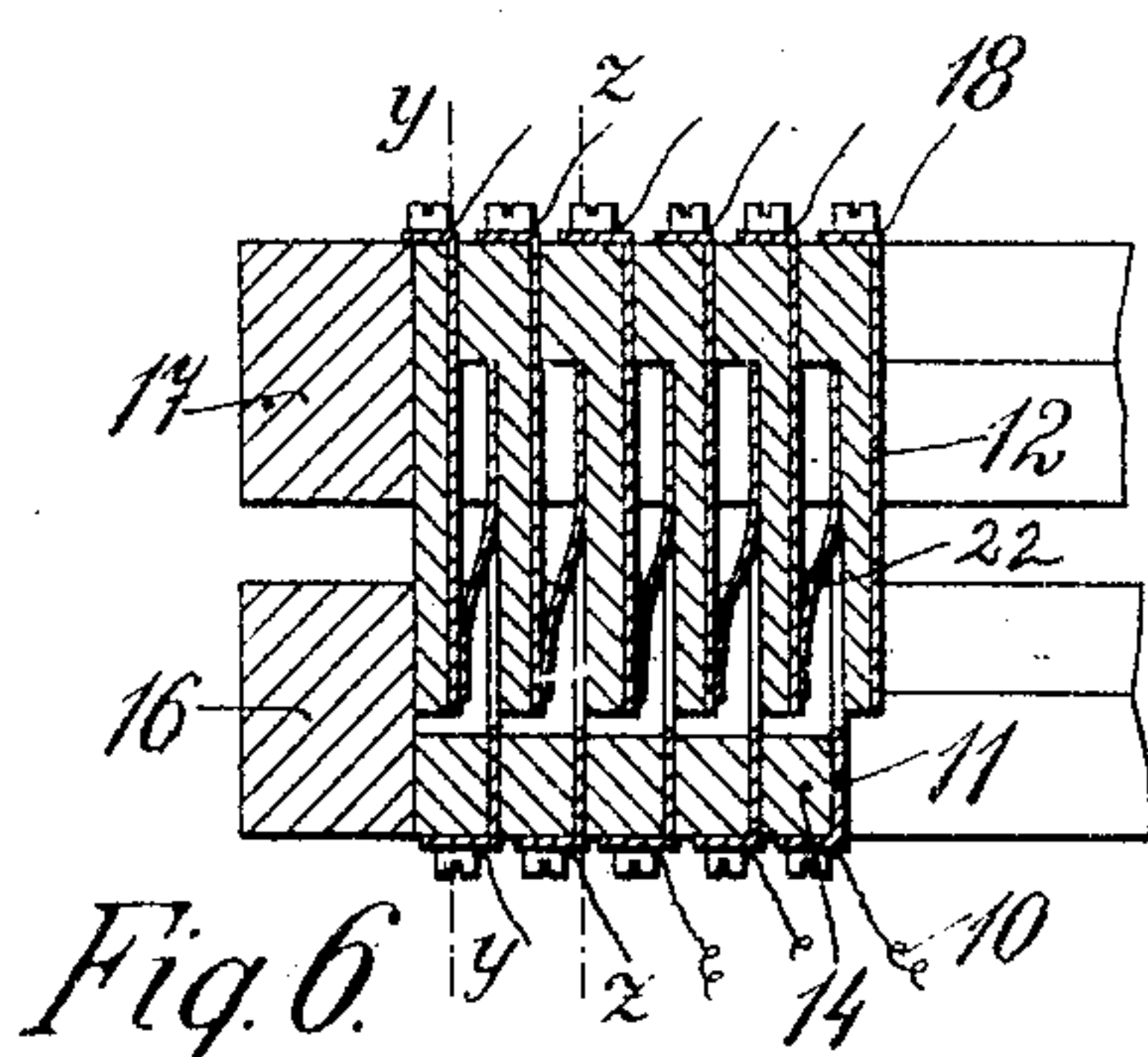
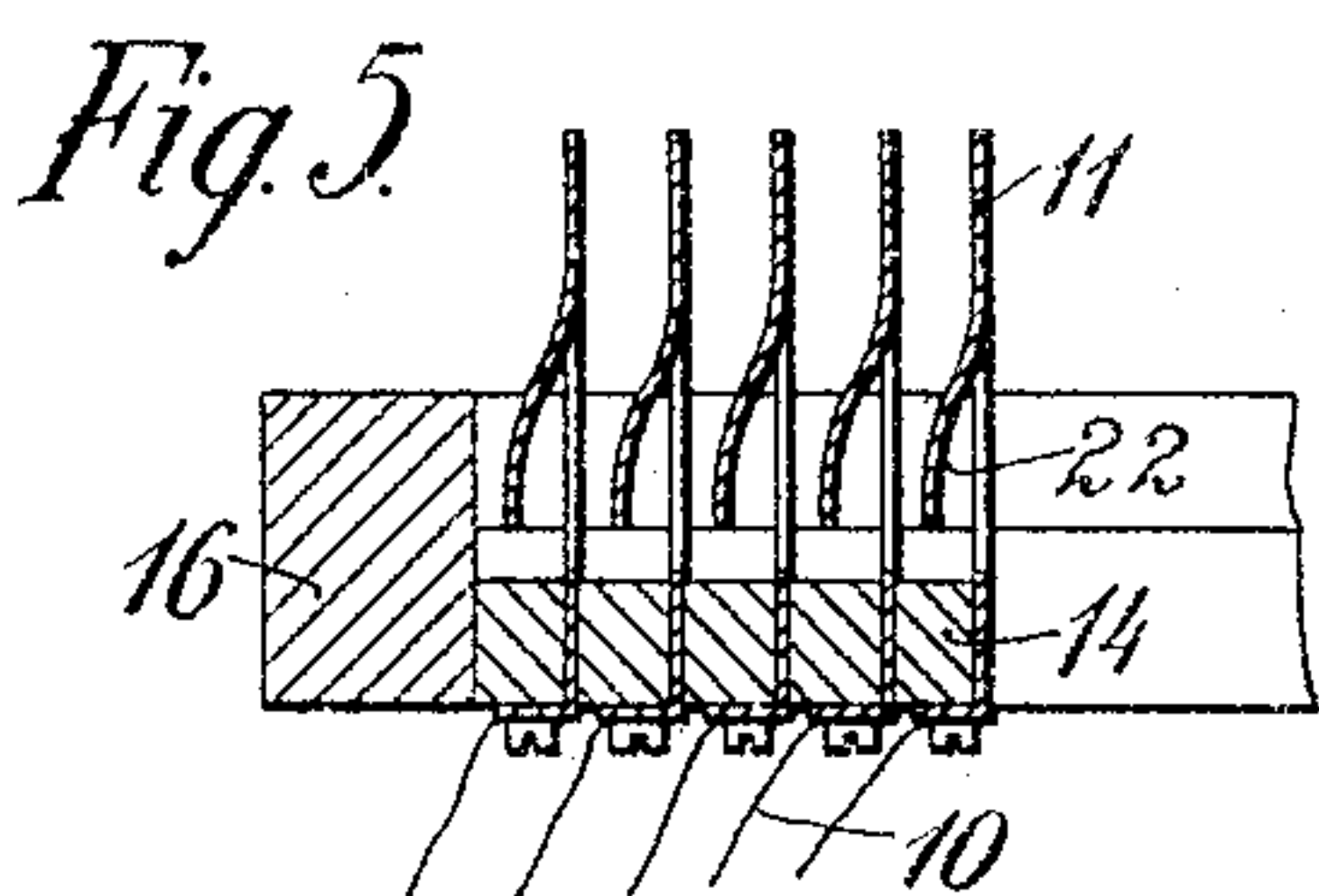
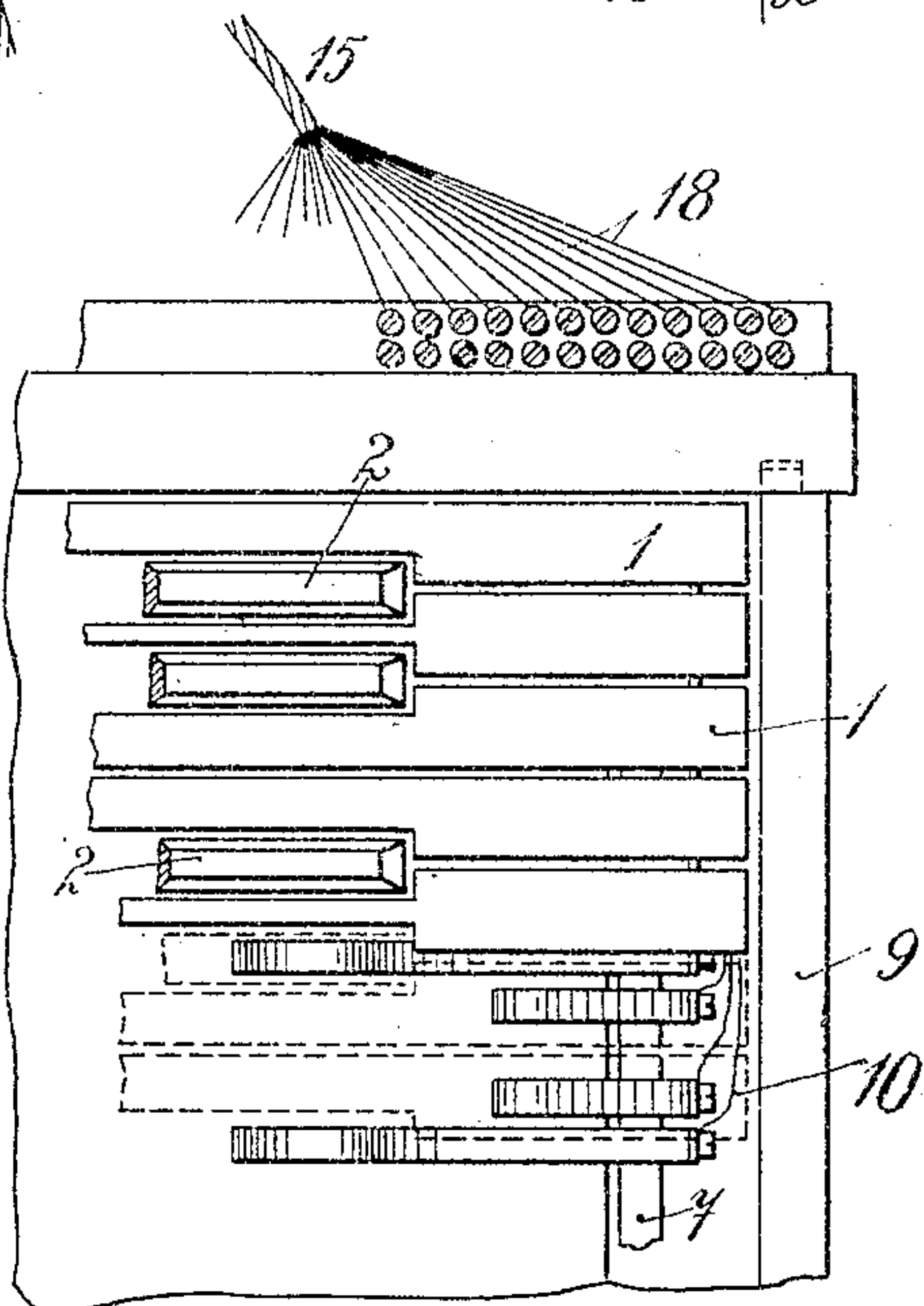
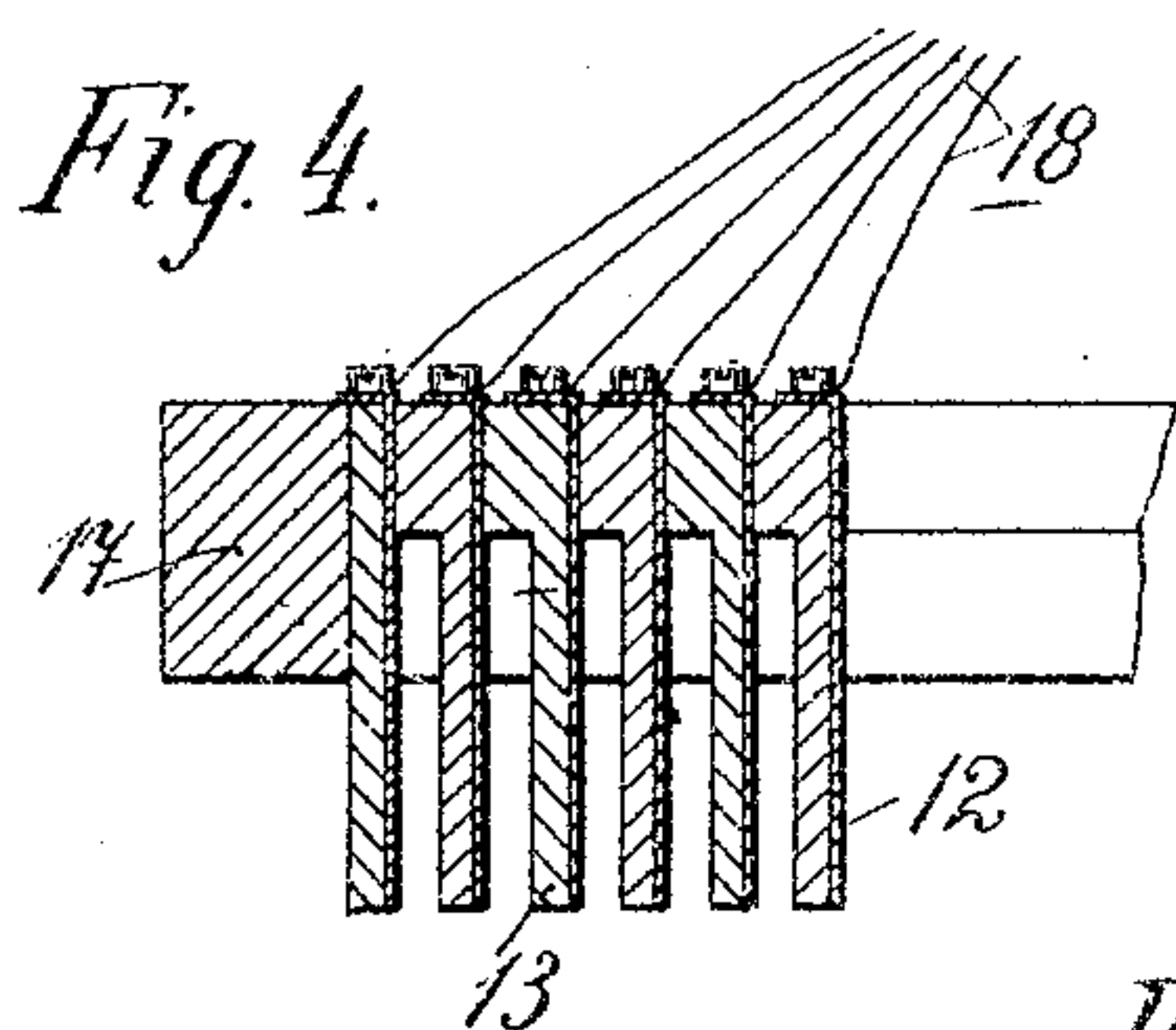
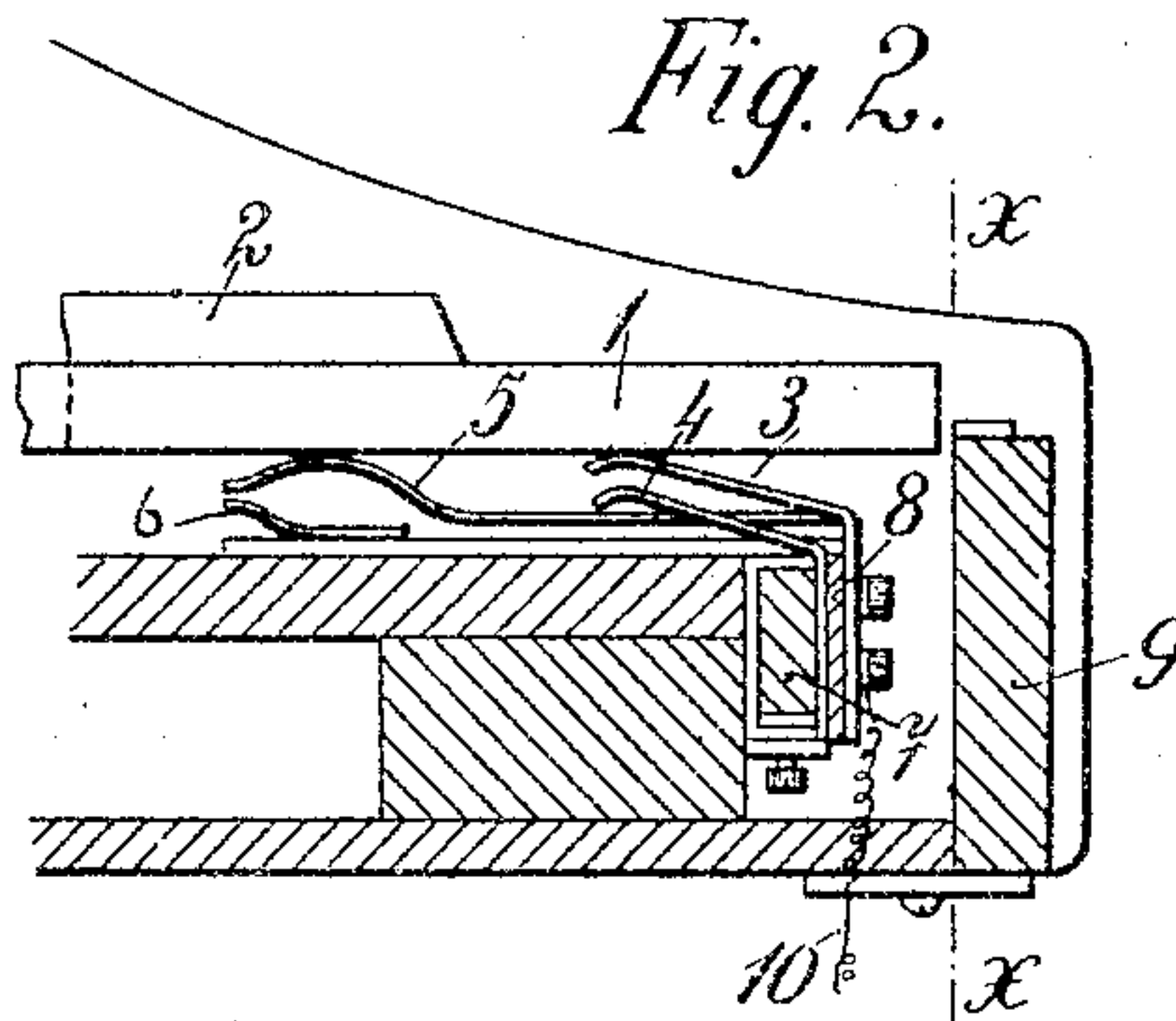
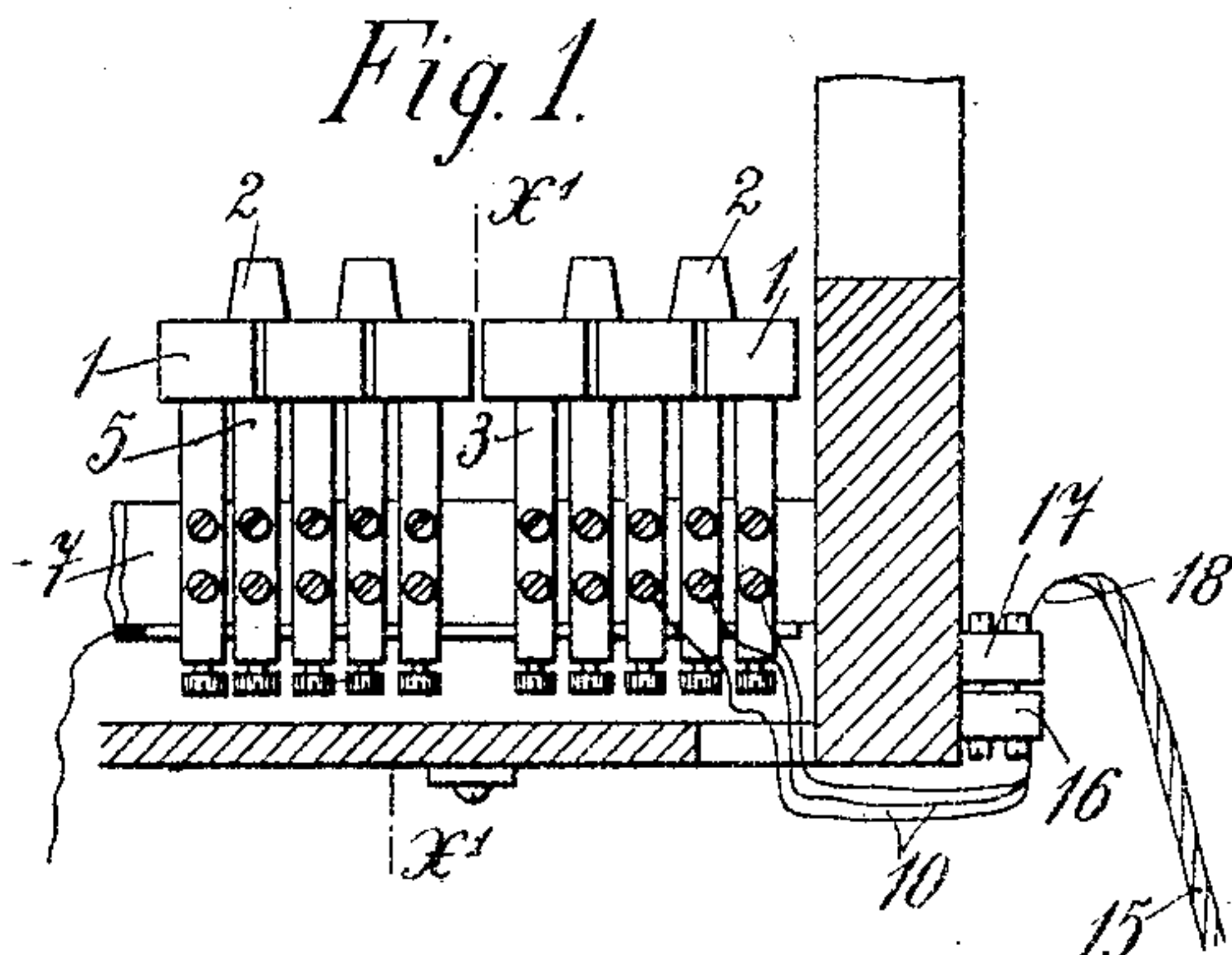


J. BUNZL-FEDERN.
MUSIC RECORDING MACHINE.

APPLICATION FILED AUG. 19, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses.

C. Heymann
L. Staldman

Inventor.

Julius Bunzl-Federn
by B. Singer

Att'y.

J. BUNZL-FEDERN.
MUSIC RECORDING MACHINE.

APPLICATION FILED AUG. 19, 1903.

NO MODEL.

2 SHEETS—SHEET 2.

Fig. 9.

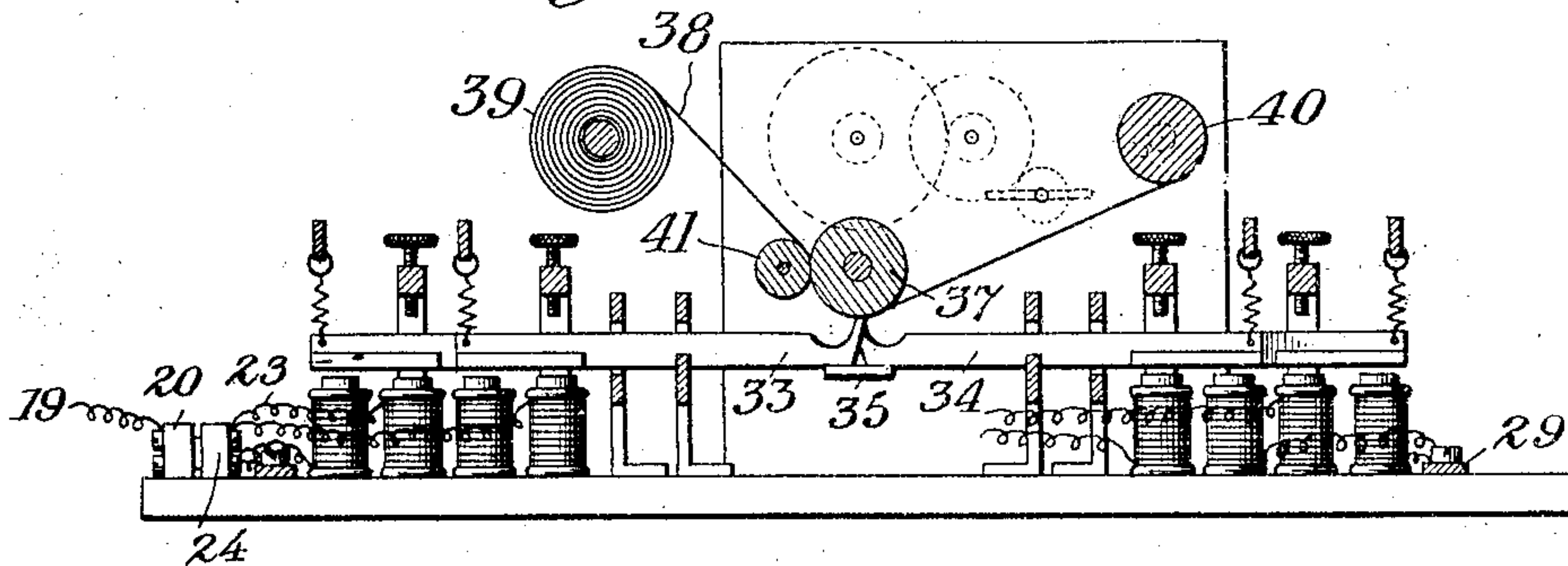


Fig. 10.

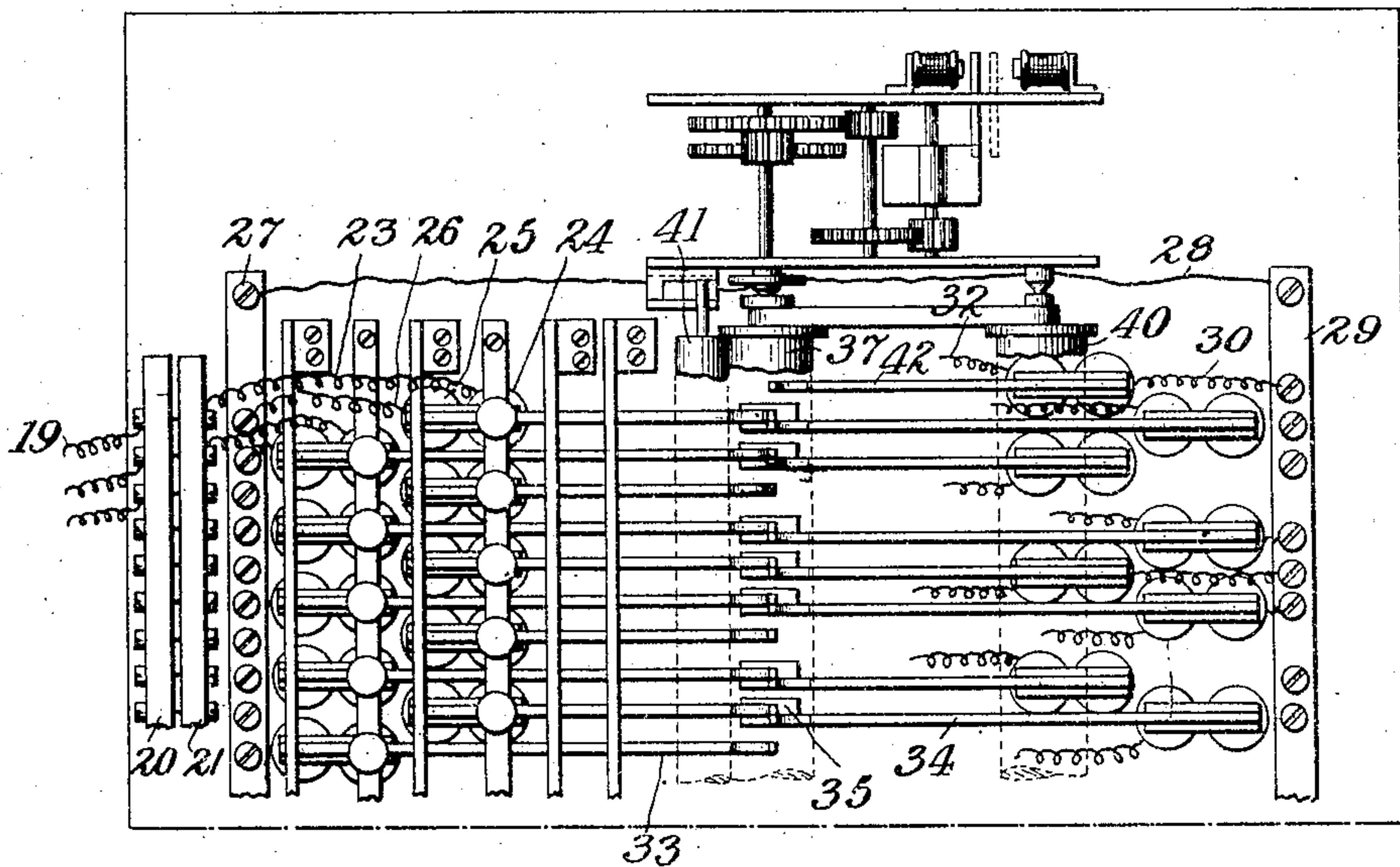


Fig. 11.

Tact	---
c.c. #	---
d.d. #	---
e	---
f.f. #	---
g.g. #	---
a.a. #	---
b	---
c.c. #	---
d.d. #	---
e	---

Witnesses:
C. Hymann.
L. Waldman.

31 36 Inventor:
Julius Bunzl-Federn
by B. Singer atty.

UNITED STATES PATENT OFFICE.

JULIUS BUNZL-FEDERN, OF PRAGUE, AUSTRIA-HUNGARY.

MUSIC-RECORDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 777,179, dated December 13, 1904.

Application filed August 19, 1903. Serial No. 170,004. (No model.)

To all whom it may concern:

Be it known that I, JULIUS BUNZL-FEDERN, a subject of the Emperor of Austria-Hungary, residing at Prague, in the Kingdom of Bohemia, Austria-Hungary, have invented a new and useful Improvement in Music-Recording Machines for Instruments of Music which are Played with Keys, of which the following is a specification.

My invention relates to improvements in music-recording machines; and one of the objects that I have in view is to provide a compound system of automatical recording of the music to be played which would be directly, easily, and distinctly readable without the help of rulers and the like.

A further object of my invention is a convenient arrangement of the electrical contacts, each key having its own current, while all the currents arise from one and the same electrical source.

With these ends in view my invention consists in the novel construction and arrangement of parts which will be hereinafter fully described and claimed. The signs which are recorded when playing the white keys differ very distinctly from those recorded when touching the black keys; but they are all distinctly indicated upon horizontal lines just as would be the usual music-notes, and the roll of paper is only half as broad in comparison to the roll of paper which is needed for other known note-writers—as, for instance, for the German Patents No. 13,928 and No. 39,794.

I have illustrated the preferred embodiment of my invention in the accompanying drawings, which form a part of this specification, and in which—

Figure 1 is a part of the keyboard seen from its front and a cross-section through X X in Fig. 2. Fig. 2 is a cross-section through X' X' in Fig. 1. Fig. 3 is a plan view of the keyboard. Figs. 4 and 5 show in cross-section corresponding contact-blocks shown separately, and Fig. 6 shows the same assembled. Fig. 7 is a section through Y Y in Fig. 6, and Fig. 8 is a section through Z Z in Fig. 6. Figs. 9 and 10 show the note-recording machine in a vertical and a plan view

and partly in section. Fig. 11 is a facsimile of the note-record.

Similar numerals refer to similar parts throughout the several views.

1 represents the white keys, and 2 represents the black-keys. Contact-springs 3 and 5 touch them from below, each key having its own contact-spring. Under each of said springs is a counter-spring 4 and 6, mounted so that their ends do not touch each other, except if their key is being pressed down in playing. All the lower springs 4 6, &c., are mounted upon a wooden or the like bar 7 and are connected by a conductor, while all the upper springs 3 5, &c., are also fastened upon the same bar, but are insulated, as shown in 8, Fig. 2. Bar 7 preferably is detachable, with all the said springs of contact mounted upon it. It is covered by the front board 9. By this arrangement said bar of contact can easily be applied for any instrument of music which is played with keys.

Each upper spring 3 5 is connected with a conduct wire 10 on the bar 7, and all of these wires 10 are connected onto another bar 16, from where the current is conducted through a cable 15 to the recording-machine. Said cable is connected at both its ends with a double frame 16 17, Figs. 4 to 8, and 20 21, Figs. 9 and 10. Figs. 5 to 8 show contact-springs 11 with their spring-tongues 22, these springs being insulated from each other in the lower frame, on which they are mounted close to each other. The tongue 22 is preferably formed by being cut out and bent up from the body of the spring 11, so that if the upper frame 17, carrying the counter-springs 12, is mounted over the frame 16 each tongue 22 engages with its counter-spring 12, as shown particularly in Fig. 6. Each tongue-spring then sits between two consecutive springs 12 of the upper frame. From each contact-spring 12 a wire 18 leads in a cable 15 to a pair of contact-bars, where each contact 19 is again separated in the known way, having each its wire 23, Figs. 9 and 10, by which the current is sent to its own electromagnet.

37 is the recording-cylinder. The writing-levers 33 34 are mounted transversely to its

axis and are placed in the same consecutive order as the keys on the keyboard of the instrument are; but the levers 33 of the white keys are placed in opposite direction to those, 5 34, of the black keys. The recording-points of all of the black and white keys are arranged to strike in alinement along the surface of the recording-cylinder 37. The ends of the levers 34, representing the black keys, are provided 10 with lugs or plates 35, which are adapted to engage with the ends of the levers 33, representing the white keys. By means of this arrangement if the black key is operated it will also cause the white key to strike the record; 15 but if the white key is operated it will not actuate the other lever. In the former case the result will be a double line 31 upon the paper, while in the latter case a single line 36 is written, Fig. 11. A special lever 42 records 20 the signs of tact. Each of said levers 33 and 34 forms also the armature of its respective electromagnet. These levers write upon an endless paper 38, which is rolled off from 39 over 37 upon 40 by means of a clockwork 41, 25 being a pressing-roller. The clockwork is preferably provided with a detaching device. Springs 42 are preferably used for balancing the levers elastically, as known in similar cases.

It will be remarked that 27 and 29 are transmitting-bars preferably mounted on both 30 outer sides of the electromagnets and are connected with a conductor 28. The current runs from 29 through wires 30 into the right-hand electromagnets and from these through wires 35 32 back to the source of electricity. On the opposite side the wires 23 connect with the spools 24 of the electromagnets, while the corresponding spools 25 are connected, by means of wires 26, to the plate 27.

I am aware that similar note-recording machines have been patented before my present invention; but they were not provided with said lugs or plates on the printing-levers, and therefore did not produce the system of double and single signs for the white and black 45 keys. Therefore the double breadth of paper was required and the notes were by far not so readable as they are in my method and apparatus of note-recording, and still less so because I preferably use horizontally-lined paper 50 bands to write the note-signs 31 36 upon, as shown by Fig. 11.

What I claim, and desire to secure by Letters Patent of the United States, is—

In an apparatus for musical note-recording, 55 the combination of a recording-cylinder, recording-levers arranged with the recording-points adapted to record in alinement along said cylinder, the recording-levers representing the white keys being arranged on one side 60 of said cylinder, and those representing the black keys on the opposite side of said cylinder, electromagnets for operating said levers, lugs or plates arranged upon said levers representing the black keys and adapted to co- 65 act with the adjacent lever representing a white key, whereby the latter is caused to record simultaneously with the former, but the white key may be operated independently of the black key, substantially as and for the 70 purpose herein set forth.

In testimony whereof I affix my signature in presence of two witnesses.

JULIUS BUNZL-FEDERN.

Witnesses:

ARTHUR SCHWEZ,
LADISLAW VOJACEL.