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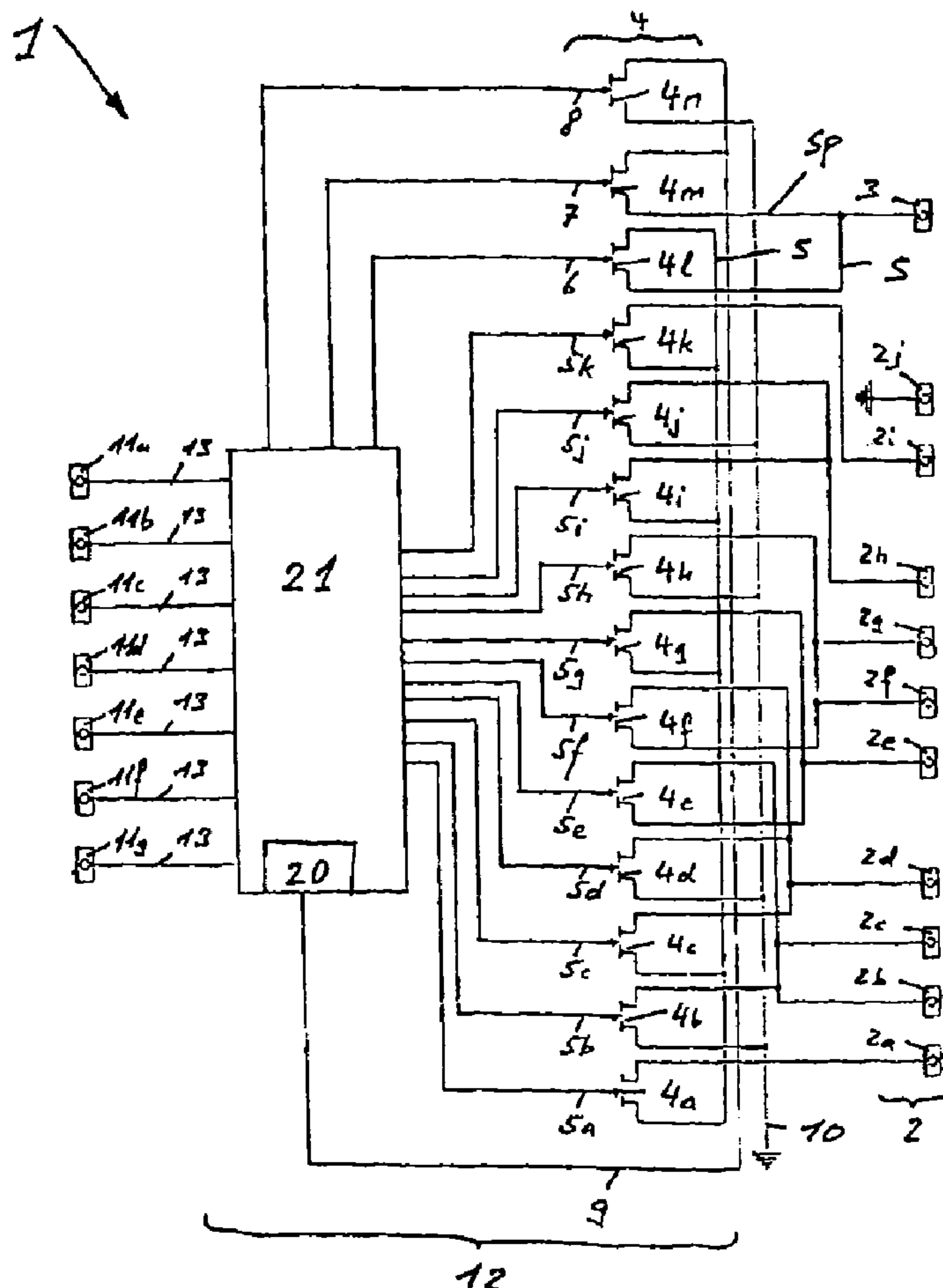
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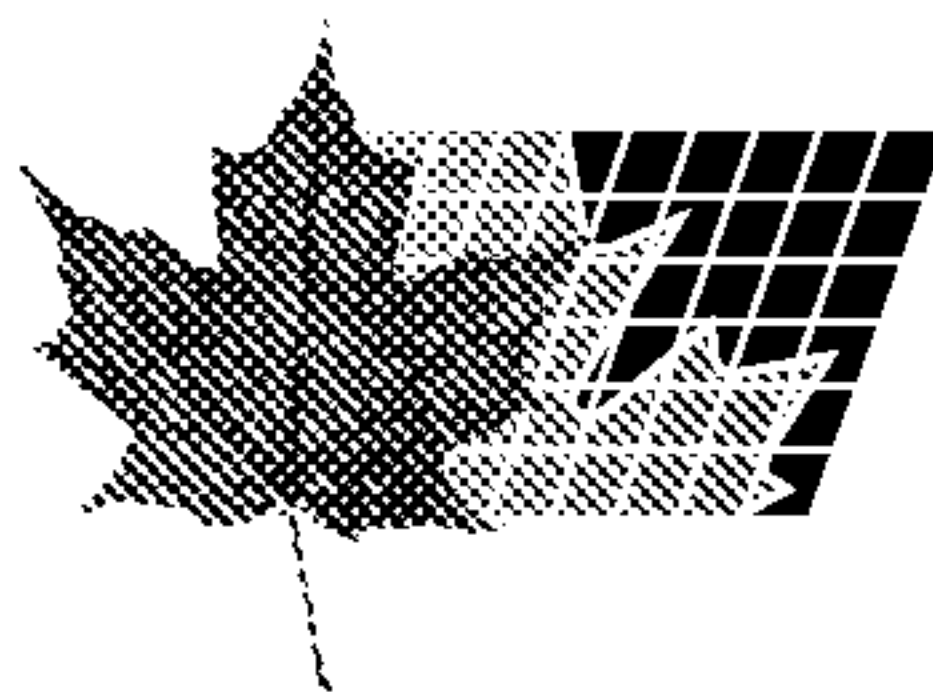
(54) **DISPOSITIF DE SELECTION DE MICROS POUR INSTRUMENT
A CORDES, ET INSTRUMENT A CORDES**

(54) **SOUND PICKUP SELECTOR DEVICE FOR A STRING
INSTRUMENT, AND STRING INSTRUMENT**



(57) L'invention concerne un dispositif de sélection de micro (1) pour instrument à cordes comportant plusieurs micros (14, 15, 16, 17, 18, 19), en particulier une guitare électrique, qui comprend un sélecteur (12) actionnable qui est destiné à relier les bobines (14a, 14b, 15a, 15b, 16a, 17a, 18a, 19a) des micros (14, 15, 16, 17, 18, 19) selon différentes combinaisons pour produire un signal de sortie (S) pouvant présenter des sonorités différentes.

(57) The invention relates to a sound pickup selector device (1) for a string instrument such as an electric guitar, comprising several pickups (14, 15, 16, 17, 18, 19). The inventive device includes a selector device (12) which can be actuated and which is designed to connect the coils (14a, 14b, 15a, 15b, 16a, 17a, 18a, 19a) of the sound pickups (14, 15, 16, 17, 18, 19) in various combinations so that an output signal (S) of varying



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Le dispositif comporte en outre un dispositif de production de signal vocal (20), qui, en fonction de l'état du sélecteur (12), produit un signal vocal (SP) décrivant ledit état. L'instrument à cordes selon l'invention comprend un dispositif de production de signal vocal (20) au moyen duquel les états de l'instrument à cordes peuvent être indiqués vocalement.

sounds can be produced. The inventive device further includes a voice signal generator (20) which produces a voice signal (Sp) indicating a given state depending upon an actual state in the selector device (12). The string instrument comprises a voice signal generator (20) providing vocal information on the states of said string instrument.



Abstract

The sound pickup switching apparatus (1) for a string instrument having a plurality of sound pickups (14, 15, 16, 17, 18, 19), in particular an electric guitar, comprises an operable switching apparatus (12) which is intended to connect the coils (14a, 14b, 15a, 15b, 16a, 17a, 18a, 19a) of the sound pickups (14, 15, 16, 17, 18, 19) in different combinations in order to produce an output signal (S) of different tonality, and furthermore comprises a voice signal production apparatus (20) which, depending on the respective state of the switching apparatus (12), produces a voice signal (Sp) designating the state. The string instrument includes a voice signal production apparatus (20) using which it is possible to output states of the string instrument by means of voice.

(Fig. 1)

FILE, ~~PIN IN THIS AMENDED~~
TEXT TRANSLATIONSound pickup switching apparatus for a string instrument
as well as a string instrument

The invention relates to a sound pickup switching
5 apparatus for a string instrument, in particular an
electric guitar, as claimed in the descriptive part of
claim 1. The invention furthermore relates to a method
for adjusting a sound pickup switching apparatus for
string instruments, as claimed in the descriptive part of
10 claim 8. The invention furthermore relates to a string
instrument having a sound pickup as claimed in the
descriptive part of claim 11.

Sound pickups for string instruments, in
particular for electric guitars, normally have either one
15 coil or else a so-called double coil which has two
electrically separate coils arranged on the sound pick-
up. Such a double coil is also called a "humbucker
pickup". In electric guitars, a plurality of sound
pickups are normally arranged spaced apart in the direc-
20 tion in which the strings run. The best known arrange-
ments are the so-called "GIBSON tonality", which com-
prises two sound pickups with a double coil, and the so-
called "FENDER tonality", which comprises three sound
pickups, each having one coil. In addition, other
25 arrangement variations of sound pickups are known, for
example an arrangement in which a further sound pickup
with one coil is arranged between two sound pickups each
having a double coil and detects the oscillations of the
strings.

30 WO-92/13335 discloses a sound pickup switching
apparatus for an electric guitar, which allows the
individual coils of a plurality of sound pickups to be
connected in various combinations in order to play the
electric guitar with different tonality. This known sound
35 pickup switching apparatus has the disadvantage that both
the number of the sound pickups which can be connected
and their combination options are very limited.

The object of the present invention is to improve
the range of selections and the operability of the sound

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pickup switching apparatus and of the string instrument.

This object is achieved by a sound pickup switching apparatus having the features of claim 1. The object is furthermore achieved by a method for adjusting a sound pickup switching apparatus and having the features of claim 8.

A further object of the present invention is to provide a string instrument having more versatile capabilities.

10 The object is achieved in particular by a sound pickup switching apparatus which comprises an operable switching apparatus which is intended to connect the coils of the sound pickups in different combinations in order in this way to produce an output signal of different tonality, and which, in addition, comprises a voice signal production apparatus which, depending on the respective state of the switching apparatus, produces a voice signal designating the state.

The object is furthermore achieved in particular 20 by a string instrument, such as a guitar for example, which comprises means for detecting a state of the string instrument as well as a voice signal production apparatus, the voice signal production apparatus producing a voice signal which describes the detected state 25 with the aid of voice. The voice signal is fed to an electroacoustic transducer such as a loudspeaker or a headset, so that the voice signal can be listened to by the person playing the instrument and, possibly, by the public as well.

30 The string instrument according to the invention has the advantage that its states can be described by the use of a voice signal, so that the person playing the instrument is informed in a simple and pleasant manner of the respective state of the string instrument. An 35 electronic guitar may have a multiplicity of different states, for example the wiring of the coils, the charge state of the battery, the setting of the volume control, connected filters etc., whose respective state can be described by the voice output. If, for example, the

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battery is virtually discharged, then this state can be described by the "battery low" voice signal, and can be output via the loudspeaker.

The string instrument and the sound pickup
5 switching apparatus always require a voice signal production apparatus. There are a wide range of options for the design of the other components, as a mechanical switch in one simple embodiment or comprising a micro-computer in a high-performance embodiment.

10 The switching apparatus may be designed as a mechanical switch which has a plurality of permanently preset combination options for the coils of the sound pickups, the switch being operated to select one of the permanent preset connections and the individual coils
15 being connected to one another accordingly, the signal from the coils connected in such a manner being passed to a downstream electroacoustic transducer, in particular a loudspeaker. In addition, the selected switching state is passed to a voice production apparatus which produces a
20 voice signal that describes the selected state in words. This voice signal is preferably passed to the loudspeaker mentioned above, it also being possible to output the voice signal via an additional electroacoustic transducer, for example via a headset or a built-in loud-
25 speaker in the guitar.

In a refinement, the sound pickup switching apparatus has an electronic drive apparatus with switches which can be controlled selectively, it being possible to connect any coil to a switch. The switches are designed
30 to be electromechanical, for example comprising an electromagnet and a make contact, or electronic, for example comprising only an FET transistor.

In a preferred refinement, the drive apparatus is designed to be programmable and, in addition, has a
35 plurality of memories, each of which can be used to store one connection combination of coils. During a programming process, one connection combination can be selected, for example, from a large number of possible coil connections and can be assigned to a memory, it being possible to

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activate the drive apparatus or the memory, for example, via a push-button switch arranged on the guitar. A guitar may have, for example, six push-button switches, it being possible to assign a connection combination in a freely
5 programmable manner to each push-button switch. One advantage of the apparatus according to the invention is that the preferred connection combinations can be assigned as required to the push-button switches, and thus it is possible to switch over very quickly between
10 connection combinations programmed in such a manner, by operation of the respective push-button switch.

A further advantage of the apparatus according to the invention is that a connection combination, in particular the current function of a push-button switch,
15 can be interrogated in a simple manner by means of a voice output. A further advantage is that the voice output can be produced via the same loudspeaker that is also used to output the sound signal from the guitar.

In a preferred refinement, the programming
20 process is likewise output by a voice signal in which, for example, instructions for the required inputs or the stored settings are described and output via the loudspeaker during the programming process by means of appropriately selected words.

25 One advantage of the apparatus according to the invention is that the output of a voice signal considerably simplifies the operation of the sound pickup switching apparatus for a guitarist, since any state of the switching apparatus can be interrogated in a simple
30 manner, and since the preferred combinations of coils, or the preferred tonalities, can be assigned to the push-button switches in a simple manner by a programming process.

One advantage of the sound pickup switching
35 apparatus according to the invention is that the loudspeaker which is always required for an electric guitar can also be used for the output of the voice signal, so that no additional display apparatus, in particular no visual display, is required. The acoustic signal in

addition has the advantage that the guitar can be programmed in widely different light conditions, even in darkness or with the eyes closed. Furthermore, the guitar can also be operated by people with visual impairments,
5 such as the blind.

A further advantage is that programming is carried out in a very acceptable manner by setting a connection combination of coils in a first phase, the voice signal stating which programming step is currently
10 being carried out or stating the connection combination, and in that, in a second phase, the selected tonality can be listened to directly by operating the strings. If the tone does not have the desired tonality, the programming mode can be used to select directly a further connection
15 combination, which can once again be listened to by operating the strings. The function of the push-button switches with different connection combinations can thus be carried out very quickly and conveniently.

A further advantage is that an original signal
20 produced by the sound pickups is available as the output signal of the guitar, without any preamplification or distortion, and thus uncorrupted.

The invention is described in detail using an exemplary embodiment. In the figures:

- 25 Fig. 1 shows a circuit diagram of a sound pickup switching apparatus;
- Fig. 2 shows a configuration of sound pickups for GIBSON tonality;
- Fig. 3 shows a configuration of sound pickups for
30 FENDER tonality;
- Fig. 4 shows a flowchart of a dialog during a programming process.
- Fig. 5 shows a guitar according to the invention;
- Fig. 6 shows a further exemplary embodiment of a
35 programmable switching apparatus;
- Fig. 7 shows a further exemplary embodiment of a programmable apparatus;
- Fig. 8 shows a table with states and an associated voice signal.

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The electrical circuit diagram of a sound pickup switching apparatus 1 illustrated in Fig. 1 has a plurality of electrical connecting elements 2, each of the connecting elements 2a, 2b, 2c, 2d, 2e, 2f, 2g, 2h, 2i, 2j being designed, for example, as a terminal apparatus or as a plug, in order to produce an electrically conductive connection to the coils 14a, 14b, 15a, 15b, 16a, 17a, 18a, 19a from sound pickups 14, 15, 16, 17, 18, 19 arranged on the guitar. The connecting element 2j is grounded and the connecting elements 2a, 2b, 2c, 2d, 2e, 2f, 2g, 2h, 2i, 2j are connected to switches 4 via electrical conductors, some of which, as illustrated, are also connected to one another. The individual switches 4a, 4b, 4c, 4d, 4e, 4f, 4g, 4h, 4i, 4j, 4k, 4l, 4m, 4n are configured as field-effect transistors (FET transistors). These switches 4a, 4b, 4c, 4d, 4e, 4f, 4g, 4h, 4i, 4j, 4k, 4l, 4m, 4n could also be configured in another manner, for example as controllable electro-magnetic relays. The switches 4a, 4b, 4c, 4d, 4e, 4f, 4g, 4h, 4i, 4j, 4k can be driven individually via switching signal lines 5a, 5b, 5c, 5d, 5e, 5f, 5g, 5h, 5i, 5j, 5k and are connected to a drive apparatus 21. This arrangement of switches 4 allows the coils 14a, 14b, 15a, 15b, 16a, 17a, 18a, 19a of the sound pickups 14, 15, 16, 17, 18, 19 to be combined in a very wide range of ways, as is illustrated in more detail in the example of the configuration of sound pickups in Fig. 2. The configuration of sound pickups 14, 15, 16 for GIBSON tonality has two sound pickups 14, 15 each having two coils 14a, 14b; 15a, 15b, also called a double coil, as well as a sound pickup 16 with a single coil 16a. The individual coils 14a, 14b, 15a, 15b, 16a can, as illustrated, be connected to the corresponding electrical connecting elements 2a, 2b, 2c, 2d, 2e, 2f, 2g, 2h, 2i, 2j.

In the sound pickup switching apparatus 1, the electrical connecting elements 2a, 2b, 2c, 2d, 2e, 2f, 2g, 2h, 2i, 2j are wired up to one another as well as to the individual switches 4a, 4b, 4c, 4d, 4e, 4f, 4g, 4h, 4i, 4j, 4k in such a manner that the individual coils

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14a, 14b, 15a, 15b, 16a can be interconnected in a large number of combinations by selective operation of the switches 4a, 4b, 4c, 4d, 4e, 4f, 4g, 4h, 4i, 4j, 4k, in order to produce an output signal S from the sum of the
 5 individual signals from the coils 14a, 14b, 15a, 15b, 16a. By way of example, a number of connection options for the two sound pickups 14, 15 to coils 14a, 14b, 15a, 15b are illustrated in the following text, from the large number of possible combinations. For example, the output
 10 signal S could be produced by the following combinations of the coils 14a, 14b, 15a, 15b:

- coil 14a connected in parallel with coil 14b
- only coil 14a
- only coil 14b
- 15 - coil 14a connected in parallel with coil 15b
- coil 14a connected in series with coil 15b
- coil 14b connected in parallel with coil 15a
- coil 14b connected in series with coil 15a
- coil 14a connected in parallel with coil 14b, coil
 20 15a connected in parallel with coil 15b, and both parallel circuits connected in series,
- only coil 15a
- only coil 15b
- coil 15a connected in parallel with coil 15b
- 25 - etc.

This large number of combinations can be set by the switching apparatus 12, which comprises the drive apparatus 21 and the switches 4. The drive apparatus has a programmable microprocessor with a memory. The inputs
 30 to the drive apparatus are passed via the electrical connecting elements 11a, 11b, 11c, 11d, 11e, 11f, 11g, which are connected via signal lines 13 to the drive apparatus 21. For example, six push-button switches are arranged on a guitar, which can be operated individually
 35 by a slight pushing movement and are connected via a cable to the electrical connecting elements 11a, 11b, 11c, 11d, 11e, 11f, 11g. These push-button switches can be used to program the programmable switching apparatus 12, the respective state of the switching apparatus 12

being designated by a voice signal S_p which is generated by a voice signal production apparatus 20 connected to the drive apparatus 21 and is emitted to a voice signal line 9, corresponding to the state of the switching apparatus 12. In the illustrated exemplary embodiment, the voice signal production apparatus 20 forms part of the drive apparatus 21.

The output signal S is passed via a further switch 41, which can be driven by the drive apparatus 21 via a switching signal line 6. After the switch 41, the output signal S is passed to an electrical connecting element 3, where the output signal S is picked off and is normally fed to a downstream amplifier system with loudspeakers. The switch 41 allows the output signal S to be connected to or disconnected from the connecting element 3.

The voice signal S_p is passed via a further switch 4m, which can be controlled by the drive apparatus 21 via a switching signal line 7. After the switch 4m, the line which transmits the voice signal S_p is connected to the line which transmits the output signal S , and is passed jointly to the electrical connecting element 3. By appropriate control of the switches 41, 4m, it is thus possible to pass only the output signal S , only the voice signal S_p or a superimposition of both signals S , S_p to the connecting element 3. The further switch 4n is used, with the switching signal line 8, to connect the voice signal S_p to ground 10 or, by additional switching of the switch 4m, also to connect the output signal S , which is present at the electrical connecting element 3, to ground 10.

One advantage of this arrangement and of the use of FET transistors is that the changeover takes place without any clicking, so that no clicking noises occur on the downstream loudspeaker.

Fig. 3 shows a further configuration of the sound pickups 17, 18, 19, which each have a single coil 17a, 18a, 19a and which are connected to one another via the electrical connecting element 2 for FENDER tonality and

can be connected in different combinations, corresponding to the switching apparatus 12 options.

Fig. 4 uses a flowchart to show a programming process for the drive apparatus 21 for the switching apparatus 12. In method step 30, key number 1 is pressed, this key being arranged on the guitar, being designed as a push-button switch and being connected via the connecting element 11a to the drive apparatus 21. Key number 1 is assigned a memory, with a stored switching state of the switches 4, in the drive apparatus 21. In method step 32, the time for which the key is pressed is monitored and, if the key is pressed for less than two seconds, the process moves to method step 31. The state stored for key number 1 is applied to the individual switching signal lines 5a, 5b, 5c, 5d, 5e, 5f, 5g, 5h, 5i, 5j, 5k and is correspondingly connected to switches 4a, 4b, 4c, 4d, 4e, 4f, 4g, 4h, 4i, 4j, 4k, so that, when the strings are operated, an output signal S can be produced with corresponding interconnection of the coils 14a, 14b, 15a, 15b, 16a. In an analogous manner, switch number 2 and number 3 etc. can be operated to set the respectively stored switching state.

If the time for which the key is pressed in method step 32 exceeds two seconds, then the drive apparatus 21 changes to a program mode and, in the subsequent method step 33, a voice signal Sp is produced whose content is "switch number one is now in programming mode". Then, in method step 34, a voice signal Sp is output with the designation of the switching state contained in the memory at that time, for example by the message "neck and bridge", which means that the coil 14a is connected in parallel with the coil 14b, the coil 15a is connected in parallel with the coil 15b, and both parallel circuits are connected in series. The switches 4 are, in addition, connected in accordance with this memory content, so that the tonality of this output signal S can be listened to by operating the strings.

In a subsequent method step 35, the push-button switch with the key number 1 is pressed again, the time

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duration being monitored in method step 36. If the push-button switch is pressed once briefly, then a jump is made to method step 38 which causes the next state from a permanently preset list of switching states to be applied
5 to the switches 4 and, in addition, to be output acoustically by a voice signal Sp as well, for example by the message "neck and bridge outer coil parallel". The newly set combination can once again be listened to by operating the strings. Pressing key number 1 briefly once
10 again causes, after method step 36, a further jump to method step 38, so the next state stored in the permanently preset list of switching states is applied to the switches 4 and is at the same time output acoustically. It is thus possible to run through the list
15 of preset switching states very quickly and conveniently and, if desired, to listen to them as well by operating the strings. As soon as a combination is set which it is desired to store, key number 1 must either be pressed for more than two seconds or there must be no more key inputs
20 for more than 30 seconds, so that a jump is made from method step 36 to method step 39, which ends the programming process with the message "switch number one the setting has now been saved". The selected combination is thus stored and can be called up at any time by
25 operating key number 1, as illustrated by method step 31. If the key is operated twice briefly in method step 36, then a jump is made to method step 37, and a jump back is made in the list of permanently preset switching states, that is to say a jump in the opposite direction to method
30 step 36. Thus, in method step 36, it is possible by operating the push-button switch once or twice to jump forward or backward, respectively, in the permanently preset list of switching states.

The illustrated flowchart should be regarded as
35 only one example of a large number of options of how the drive apparatus 21 could be programmed.

In addition, a visual display could also be used as an output means for displaying the switching states. Instead of or in addition to the push-button switches,

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other means could be provided as the input means, for example in which operation of the strings is detected by a sound pickup, and an input signal is produced from this. In this case, in each case one string is, for example, pressed in such a manner that it touches the sound pickup, the string normally being grounded and the contact in the sound pickup producing a pulse which can be detected by an appropriately designed electronic switching apparatus, in order to produce a switching signal. The contact between the string and the sound pickup must last, for example, for at least a quarter of a second or at least half a second, in order to be accepted as a switching signal. In this way, it is possible to distinguish between inadvertent contact with the sound pickup, as can occur while playing, and deliberate contact with the sound pickup. Furthermore, an electronic voice identification apparatus could also be used as the input means, so that the guitar can be programmed by spoken words.

In addition to the control of the switches 4, other components, such as capacitors, which influence the tonality of the output signal S, could also be driven in a programmable manner by the drive apparatus 21 in order to change the output signal S and to allow an even greater range of selectable tone variations.

Fig. 5 shows a guitar 22 having a body 22a, a neck 22b, strings 23 and sound pickups 14, 15. Pressure or tension sensors are arranged in the bridge 25, which allow the stress in the individual strings 23 to be measured and the stress levels to be passed on by the signal line 28 to the switching apparatus 12. The programmable switching apparatus 12 is arranged inside the body 22a and is connected via electrical signal lines 2, 13, 28 to the coils 14, 15, to the sensors of the bridge 25, as well as to the operating switches 11a, 11b, 11c, 11d, 11e, 11f, 11g. The output signal S as well as the voice signal Sp of the switching apparatus 12 can be tapped off at the electrical connecting element 3, which is designed as a socket for a cable plug.

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Fig. 6 shows a further exemplary embodiment of a programmable switching apparatus 12, which comprises a programmable drive apparatus 21 as well as a voice signal production apparatus 20. Various means are provided for
5 detecting a state of a string instrument. These means may comprise the switches 11a, 11b, 11c, 11d, 11e, 11f, 11g which are connected via signal lines 13 to the drive apparatus 21. These means may furthermore, for example, comprise a regulator 26, a measurement apparatus for the
10 voltage applied by the battery 27 to the lines 27a, 27b, a signal line 28 for a pressure or tension sensor, or the output signal S from individual coils or from all the coils. An electric guitar may have a large number of states, which can be detected using appropriately
15 designed means and can be fed to the drive apparatus 21. The programmable switching apparatus 12, including the drive apparatus 21, may, as is illustrated by way of example in Fig. 7, comprise a microprocessor (CPU) 21b which is connected via data lines D2, D3, D4 to an
20 input/output apparatus (I/O) 21a, to a memory 12c (RAM, ROM) and to the voice signal production apparatus 20. All the states of the lines 10, 13, 2a-2j, 6, 7, 8, 28, 29a are detected via the input/output apparatus 21a. The signal S from the coils 17, 18, 19 is detected via the
25 lines 2a-2j and is fed as individual signals or as a sum signal S of the connected coils 17, 18, 19 by the input/output apparatus 21a to the voice signal production apparatus 20. In addition, data can be interchanged with an external apparatus via a data line D1 which is
30 designed, for example, as a MIDI interface. The voice signal Sp as well as the signal S from the coils are output via the socket 3. The voice signal production apparatus 20 includes a table according to Fig. 8, in which various states and corresponding texts, voice or
35 music signals are stored. The states may be stored as alphanumeric text, the voice signal production apparatus 20 allowing a synthetic voice signal Sp to be produced from this text. This voice signal Sp, which is initially in electrical form, is converted via an internal or

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external loudspeaker into an acoustic signal. The description of the states can also be stored as acoustic signals stored in digitized form, these signals being output as a voice signal Sp via a digital/analog
5 converter. One advantage of storing the signals in digitized form is that it is possible to store signals with any desired content, even including entire welcoming texts, identifications, commentaries or else advertisements, which may include music as well as voice.

10 The string instrument designed as a guitar 22 allows, for example, the following states to be detected and to be output with a descriptive voice signal:

- the connection of the coils 17, 18, 19, as already described in Fig. 1 and Fig. 4;
- 15 - tone settings and corresponding pickup connection;
- tone control, setting of the potentiometers 26, filters used as well as filter settings;
- tone effects, distortion selected or frequencies additionally modulated on;
- 20 - volume setting;
- battery state; particularly when the battery is virtually discharged, it is possible, for example, to draw attention to this state by the "battery low" voice signal;
- 25 - tuning of the strings. The frequency of the signal S can be analyzed, and the tuning of the string can be output using a voice output. At the same time, the voice output can also be used as an aid for tuning the strings, by outputting, for example, the statement "too high" or
30 "too low" depending on whether the string is tuned to a frequency that is too high or too low. In addition, it would be possible to use the signal S to carry out a frequency analysis such that, for example, the chord being played is identified and is output by means of the
35 voice output.

The programmable switching apparatus 12 may be externally programmable by, for example, connecting a computer to the external digital line D1, the table illustrated in Fig. 8 also being programmable with

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assignment of states and corresponding voice signals. The programmable switching apparatus 12 can also be designed without a digital line D1, in which case it is possible to provide, for example as illustrated in Fig. 6, an analog or digital input 29 via which, for example, a voice signal can be stored directly in the table according to Fig. 8, for example via a microphone. For example, a guitar player could very easily also store a welcome message directly via a microphone as a state in the table according to Fig. 8, and call it up at any suitable time by operating the switches 11a, 11b, 11c, 11d, 11e, 11f, 11g, and feed it as a voice signal Sp to a downstream loudspeaker.

The memory 21c arranged in the guitar may be designed as a read only memory (ROM), as a volatile memory (RAM) or as a magnetic memory such as a floppy disk, a hard disk, or an optical memory such as a magneto-optical disk, a compact disk or a minidisk.

List of reference symbols

1	Sound pickup switching apparatus
2	Electrical connecting elements
2a-2j	Electrical connecting elements
3	Electrical output (output signal)
4	Switches (FET transistors)
4a-4j	Switches
5a-5k	Switching signal lines
6	Switching signal line
7	Switching signal line
8	Switching signal line
9	Voice signal line
10	Ground (electrical ground)
11a-11g	Electrical connecting elements
12	Programmable switching apparatus
12a	
12b	
13	Switching signal lines
14, 15, 16, 17, 18, 19	Sound pickups
14a, 14b, 15a, 15b	Coils of a sound pickup
20	Voice signal production apparatus
21	Drive apparatus
22	Guitar
22a	Guitar body
23	Strings
24	Pressure sensor
25	Tension sensor
26	Regulator
27	Battery
28	Signal line from the pressure or tension sensor
29	Input for a signal (voice, advertisement etc., digital or analog)
D1, D2, D3, D4	Digital line

Figure 4 captions

- 30 Press key number 1
- 31 Stored combination is set
- 32 Longer than 2 seconds
- 33 Voice output: "switch number one is now in programming mode"
- 34 Voice output of the currently stored state, e.g. "neck and bridge", and setting of this state
- 35 Press key number 1
- 36 2x short 1x short
longer than 2 seconds
- 37 Switch to the preceding, predetermined state and voice output: e.g. "neck and bridge inner coil parallel"
- 38 Switch to the next predetermined state as well as voice output, e.g.: "neck and bridge outer coil parallel"
- 39 Completion of programming
voice output: "switch number one - the setting has now been saved"

J = Y

Figure 8 captions

Zustand = State

Sprache = Voice

Text = Text

Patent Claims

1. A sound pickup switching apparatus (1) for a string instrument having a plurality of sound pickups
5 (14, 15, 16, 17, 18, 19), in particular an electric guitar,
comprising an operable switching apparatus (12),
which is intended to connect the coils (14a, 14b, 15a,
15b, 16a, 17a, 18a, 19a) of the sound pickups (14, 15,
10 16, 17, 18, 19) in different combinations in order to
produce an output signal (S) of different tonality,
comprising a voice signal production apparatus (20)
which, depending on the respective state of the switching
apparatus (12), produces a voice signal (Sp) designating
15 the state.

2. The sound pickup switching apparatus (1) as
claimed in claim 1,
wherein the switching apparatus (12) is designed as an
20 electronic drive apparatus (21) having switches (4) which
can be controlled selectively, wherein each coil (14a,
14b, 15a, 15b, 16a, 17a, 18a, 19a) can be connected to
one of the switches (4), and wherein, in particular,
switches (4) are used which can be operated
25 electromagnetically or electronically and, in particular,
have an FET transistor.

3. The sound pickup switching apparatus (1) as
claimed in claim 2,
30 wherein the electronic drive apparatus (21) is
programmable and has a memory.

4. The sound pickup switching apparatus (1) as
claimed in one of the preceding claims,
35 wherein the voice signal production apparatus (20), while
being programmed, produces a voice signal (Sp) which
designates the respective state.

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5. The sound pickup switching apparatus (1) as claimed in one of the preceding claims, wherein the switching apparatus (12) supplies either the output signal (S), the voice signal (Sp) or a
5 superimposition of the output signal (S) and voice signal (Sp) to an electrical output (3).

6. The sound pickup switching apparatus (1) as claimed in one of the preceding claims,
10 wherein the voice signal production apparatus (20) forms a component of the drive apparatus (21).

7. The sound pickup switching apparatus (1) as claimed in one of claims 2 to 7,
15 wherein an input means can be connected to the drive apparatus (21), and wherein the input means is designed, in particular, as a switch or as an electronic switching apparatus which detects the string being touched by the respective sound pickup (14, 15, 16, 17, 18, 19).

20

8. A method for adjusting a sound pickup switching apparatus (1) for a string instrument having a plurality of sound pickups (14, 15, 16, 17, 18, 19), in particular an electric guitar,
25 wherein a plurality of connection states of coils (14a, 14b, 15a, 15b, 16a, 17a, 18a, 19a) of the sound pickups (14, 15, 16, 17, 18, 19) are predetermined, wherein an operable switching apparatus (12) is used to select one state, and the coils (14a, 14b, 15a, 15b, 16a,
30 17a, 18a, 19a) are connected in a corresponding manner, and wherein a voice signal (Sp) is produced which describes the selected state in words.

9. The method as claimed in claim 8,
35 wherein, while programming the switching apparatus (12), a voice signal (Sp) is produced which describes the respective state in words, and wherein after a connection state of the coils (14a, 14b, 15a, 15b, 16a, 17a, 18a, 19a) have been selected, their output signal (S) is

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output in order to listen to the tonality of the output signal (S) by operation of the strings.

10. A string instrument, in particular a guitar,
5 having a sound pickup switching apparatus as claimed in one of claims 1 to 7 or operated using a method as claimed in one of claims 8 or 9.

11. A string instrument having a sound pickup (14,
10 15, 16, 17, 18, 19), in particular including a sound pickup switching apparatus as claimed in one of claims 1 to 7, distinguished by a voice signal production apparatus (20) as well as means (11a, 11b, 11c, 11d, 11e, 11f, 11g) for detecting a state of the string instrument
15 and means (21) for feeding the detected state to the voice signal production apparatus (20), the voice signal production apparatus (20) having means for producing an appropriate voice signal (SP) as a function of the detected state, which voice signal (SP) can be fed to an
20 electroacoustic transducer.

12. The string instrument as claimed in claim 11, wherein the means for detecting a state of the string instrument are designed as a switch (11a, 11b, 11c, 11d,
25 11e, 11f, 11g), as a regulator (26), as a digital interface (D1) or as a sensor such as a coil (17, 18, 19), a tension sensor (25), a pressure sensor (24) or a stress sensor.

30 13. The string instrument as claimed in one of claims 11 or 12, wherein the means (21) for feeding the detected state to the voice signal production apparatus (20) are designed as a microprocessor (21b) including an input/output apparatus (21a) and a memory (21c).

35

14. The string instrument as claimed in one of claims 11 to 13, wherein the voice signal production apparatus (20) includes a table in which various states and the voice signals (SP) corresponding to them can be stored.

1

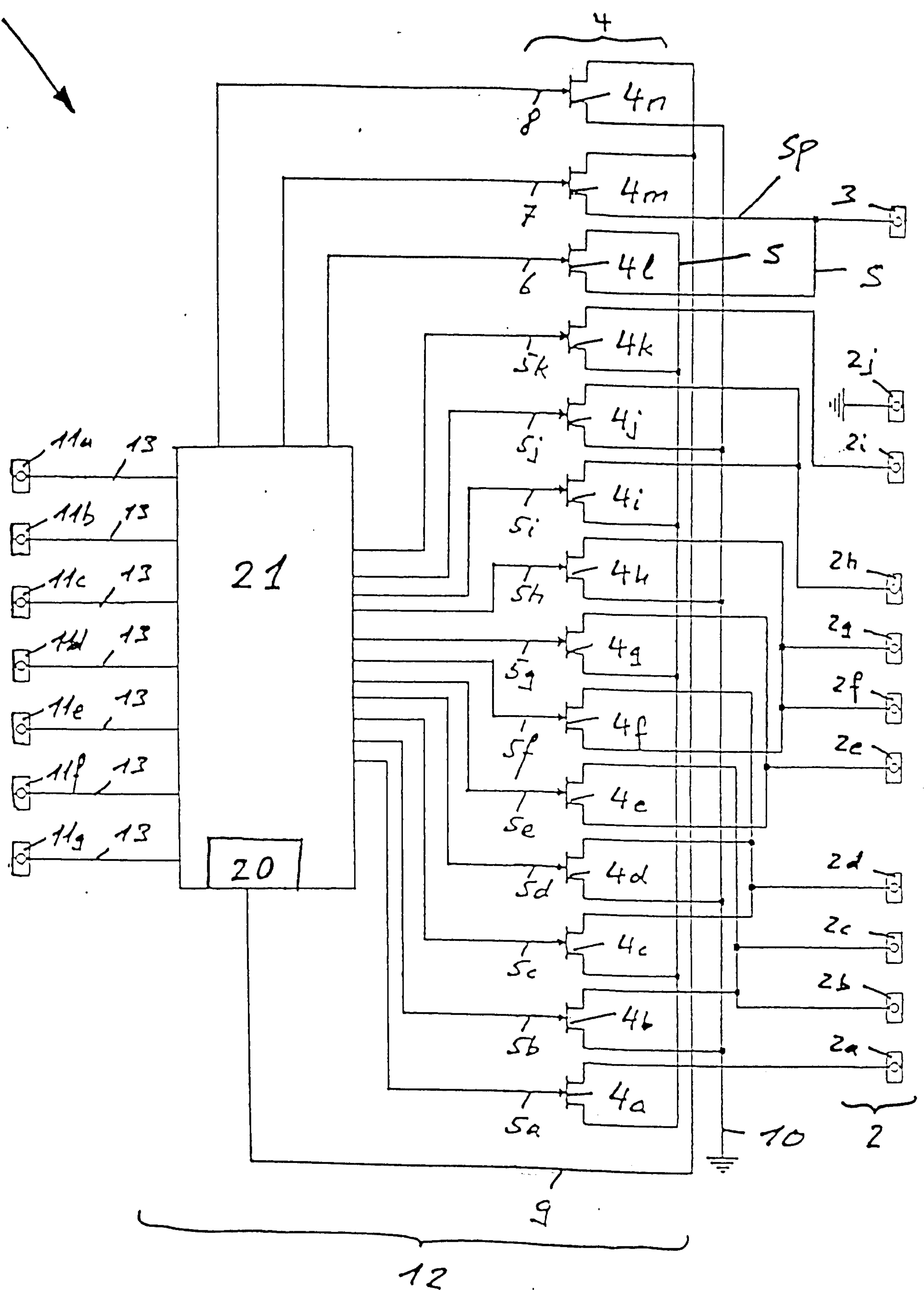


Fig. 1

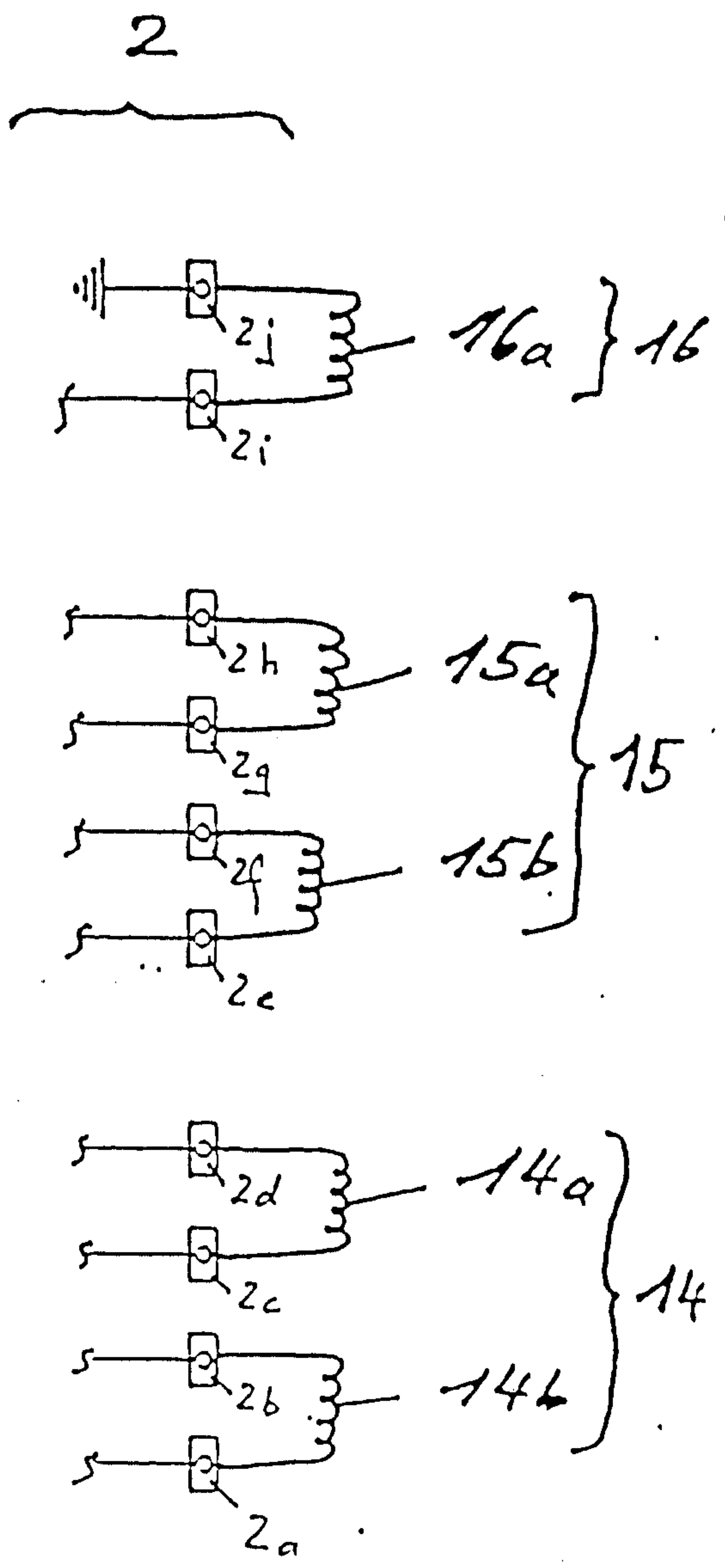


Fig. 2

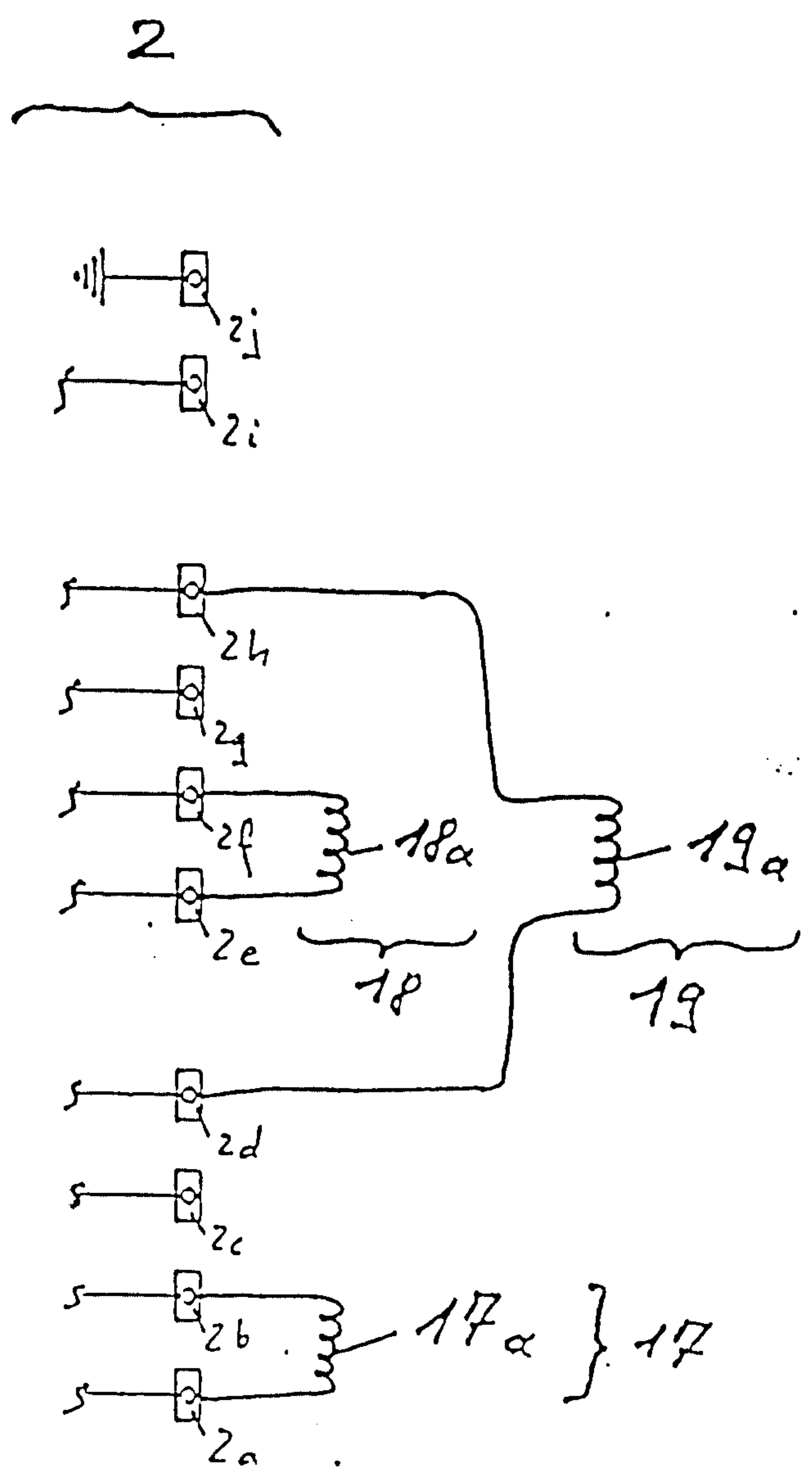


Fig. 3

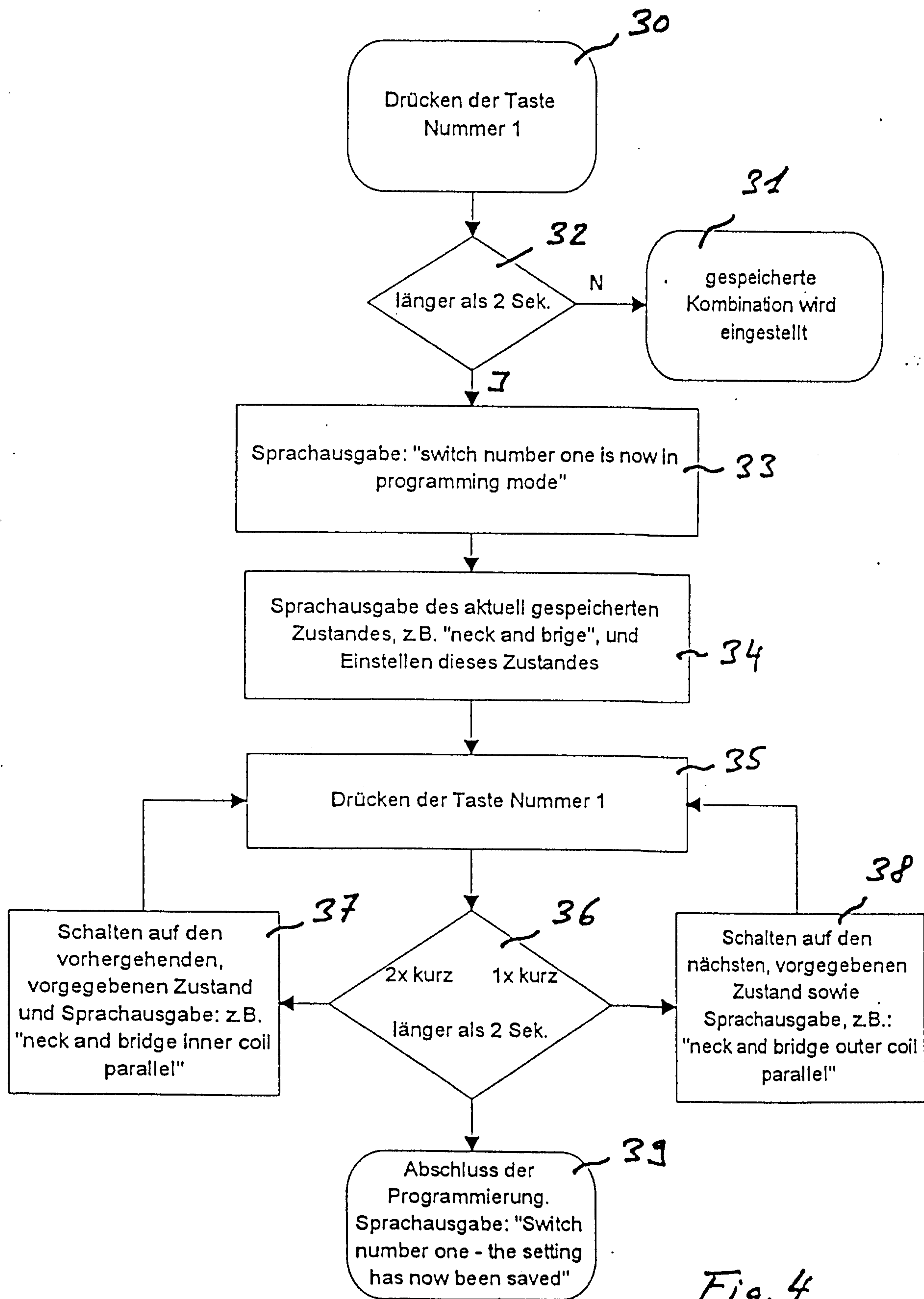


Fig. 4

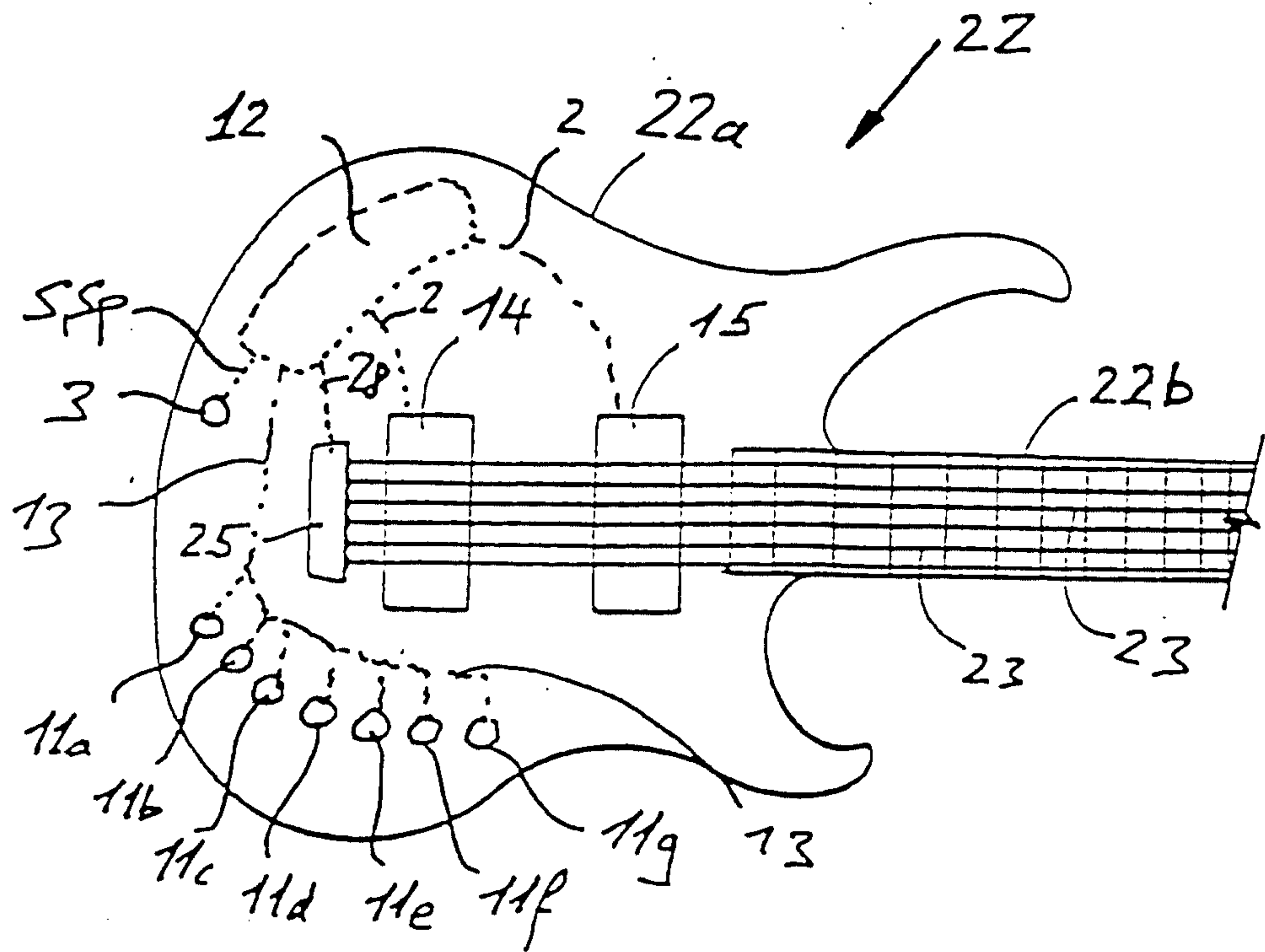


Fig. 5

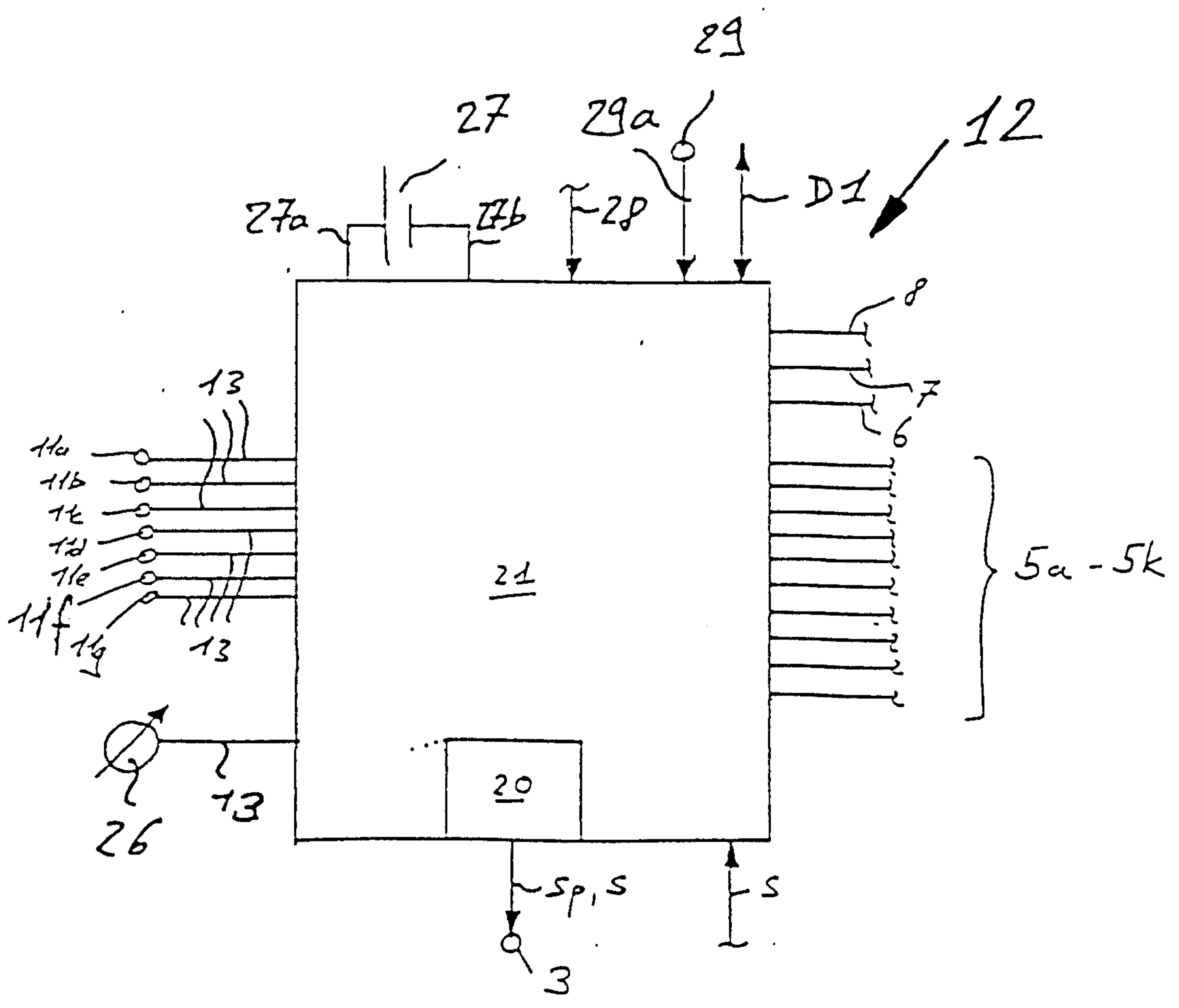


Fig. 6

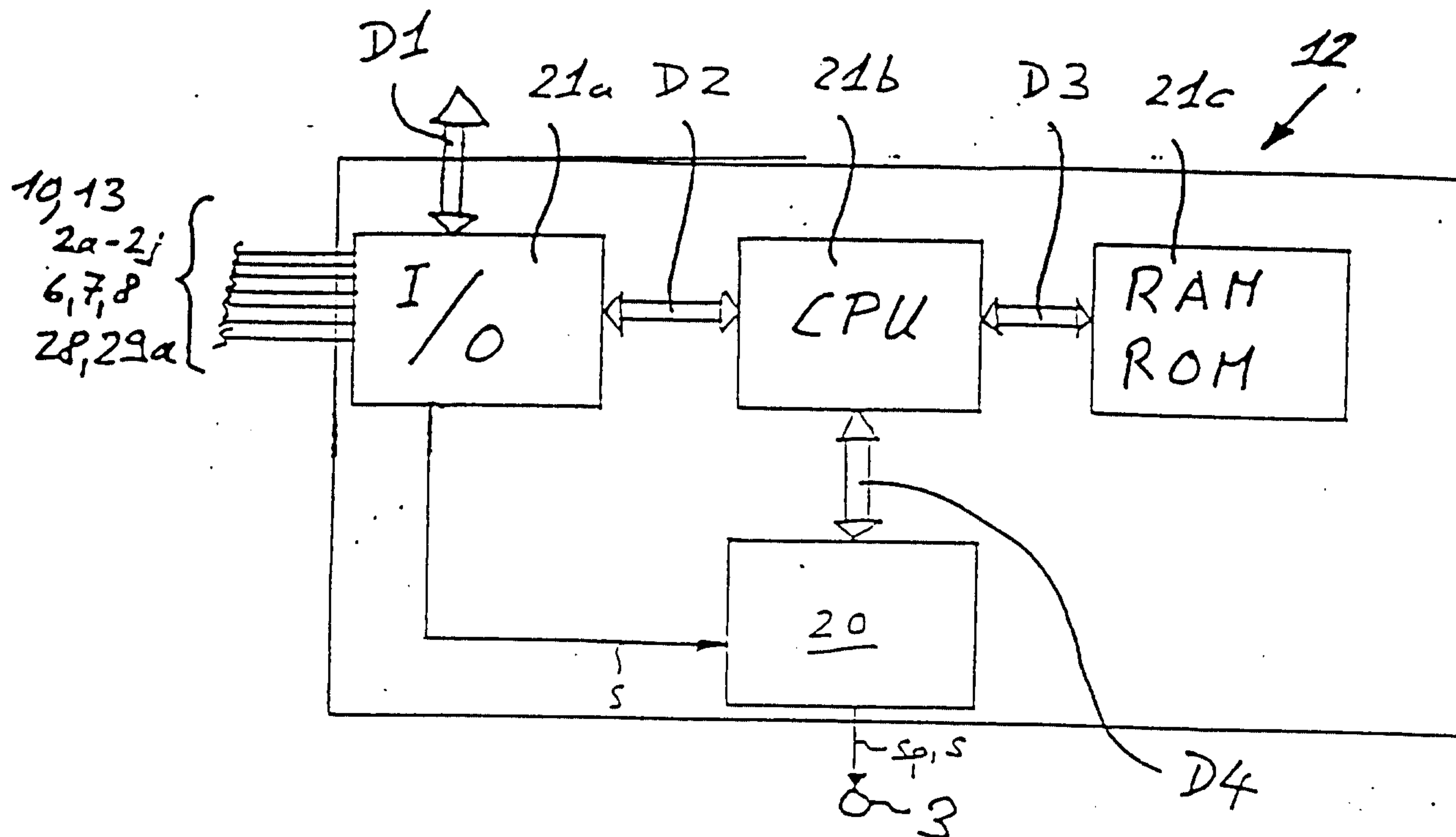


Fig. 7

Zustand	Sprache, Text
1	switch number...
2	neck and bridge
3	neck and
4	
5	

Fig. 8