

Jan. 1, 1929.

K. BÖHME

1,697,221

SWITCH BANK CONTACT

Filed June 23, 1922

2 Sheets-Sheet 1

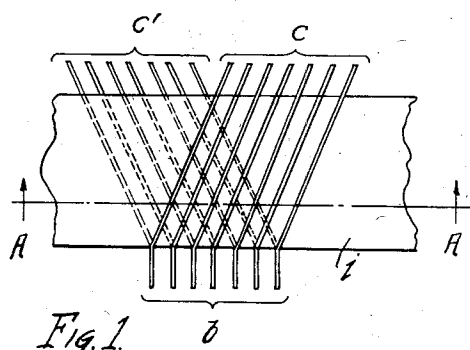


Fig. 1

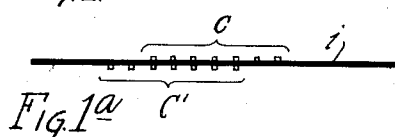


Fig. 1a

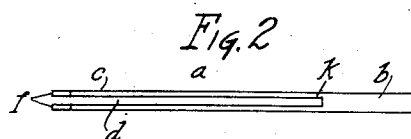


Fig. 2

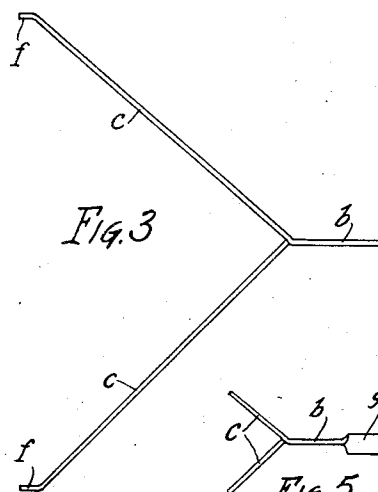


Fig. 3

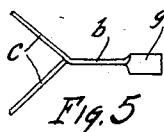


Fig. 5

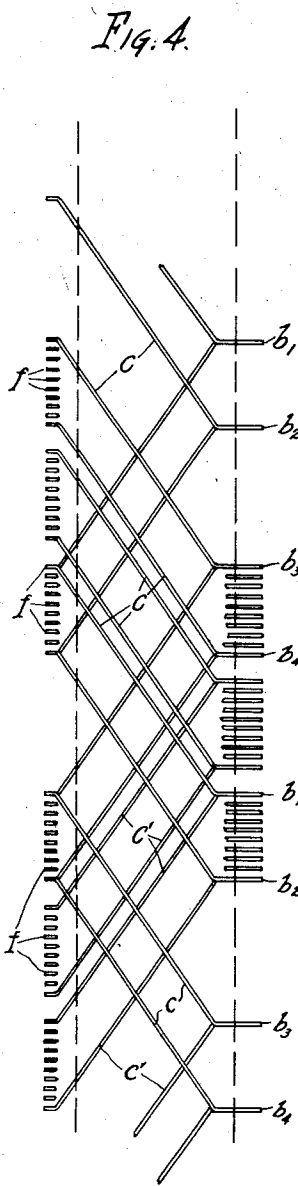


Fig. 4

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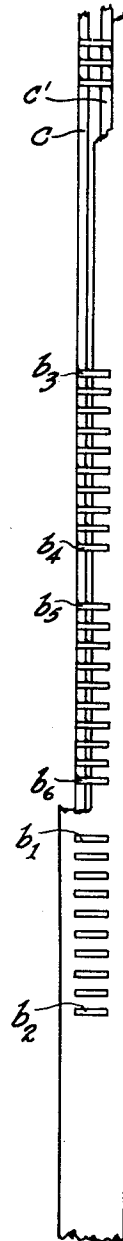
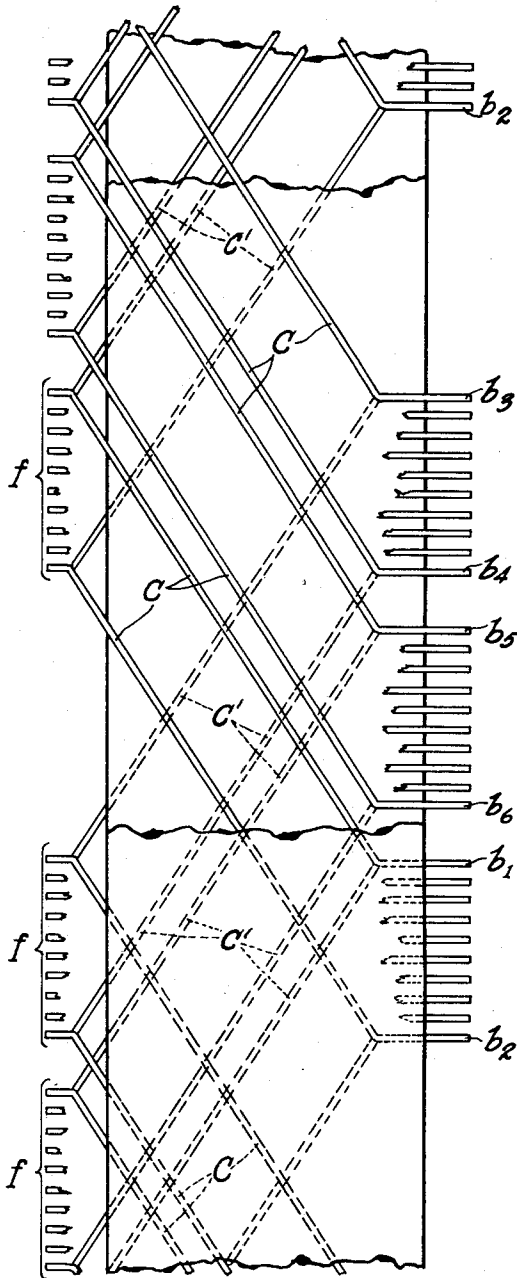
SWITCH BANK CONTACT

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2 Sheets-Sheet 2

Fig: 6

Fig: 7



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UNITED STATES PATENT OFFICE.

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SWITCH-BANK CONTACT.

Application filed June 23, 1922, Serial No. 570,473, and in Germany July 15, 1921.

This invention relates in general to the construction of bank multiple wiring for electric switches, more especially to the construction of the banks and bank multiple employed in a Strowger automatic telephone system.

In the usual arrangement of such a system, certain switches are provided with banks containing ten rows of contacts called levels, each level containing ten pairs of contacts. These switches are mounted in horizontal rows and the banks are multiplied horizontally, that is, the contacts of a level of one switch are connected to the corresponding contacts of the same level of adjacent switches. This multiple comprises insulated wires running from contact to contact, as shown on pages 216 and 217 of the book "Telephony Including Automatic Switching" by Smith. It is to the improvement of a bank arrangement of this kind and to an improved means of multiplying the banks together that this invention is directed.

Certain modifications of the Strowger system shown in the above reference employ a vertical multiple rather than a horizontal multiple. That is, the switches are arranged in vertical rows and the banks are multiplied vertically. In the United States Patent 1,450,352 issued to Böhme on April 3, 1923, is shown a switch mechanism of this modified type and the copending application of Böhme and Giese, Serial No. 603,170, filed November 25, 1922 shows the bank details of such a switch. In the latter application the bank is made up of vertical sections, each section containing a contact set for each level of the bank. The banks are multiplied together with the usual insulated wire multiple. The present invention is in the nature of an improvement on the above Böhme and Giese application, improving principally the method of multiplying the banks.

In a bank of the type illustrated in the above Smith reference, the individual contacts are sheet metal punchings assembled into the bank between insulating strips, the assembly being held together by means of screws. While this arrangement results in a fairly reliable bank, the cost of construction is unduly high. The above mentioned application describes a bank which tends toward cheaper construction by casting the individual terminals into blocks of insulating material.

The present invention has for its principal object the further cheapening of bank construction cost by casting into an insulating block both the bank contacts and the multiple wires, the latter being in the form of extensions of the contacts proper.

Further objects not specifically mentioned will be apparent from the detailed specification and claims which follow.

The drawings comprising Figs. 1 to 7, inclusive, show sufficient details to enable a clear understanding of the structure and construction of a bank built in accordance with the objects of this invention.

Figure 7 shows an elevation of a completed bank with certain portions cut away to enable a clearer understanding of its construction. Figure 6 shows a plan view of the completed bank section with the same portions cut away as in Fig. 7, to disclose the interior.

Figure 5 shows the details of a desirable form of bank contact, which can be employed in this invention.

Figure 4 shows a plurality of bank contacts assembled as they would be in the process of construction just before the insulating compound is applied.

Figure 3 is a detailed view of the elevation of a bank terminal and its associated connecting members as it would appear when ready to be inserted in the assembly shown in Fig. 4.

Figure 2 is a plan view of the bank contact and its associated connecting rod.

Figure 1 is a plan view of bank contact with an associated insulating strip shown to illustrate the principle of construction employed in this invention.

Figure 1^a is a section view of Fig. 1 along the line A—A looking in the direction of the arrows, and clearly shows the insulator *i*, separating the connecting members C and C'.

Referring now particularly to Fig. 6, it will be seen that I have arranged three groups of bank terminals with ten bank terminals in each group in a vertical row. These terminal groups comprise the terminals between *b*¹ and *b*², *b*⁵ and *b*⁶, and *b*³ and *b*⁴. This group of terminals would be a part of the bank terminals of one switch, the switch being of the type shown in the above mentioned Böhme patent. Attached to the bank terminals, *b*⁶ for example, are

two connecting members, member C extending in an upwardly direction, and member C' extending downward. These two members are in different planes, that is, the member C is in a plane above the member C', so that a plurality of members C can cross a plurality of members C' without coming into electrical contact. Figure 7, which is an elevation view of Fig. 6, shows very clearly the relative position of the connecting members C and C'. Immediately above the switch which has access to the contact group bounded by the contacts b^3 and b^2 , is another similar switch, which has access to similar contacts. Accordingly the upward extending member C of the bank contact b^2 of the first switch group is connected at f to the downwardly extending member C' of the bank contact b^2 of the second switch group, and similarly the contacts in the banks of other groups are connected so as to form a vertical multiple. The connecting members f which extend slightly beyond the insulating block are bent together and soldered so that the terminal b^2 is electrically connected to the corresponding terminals in all of the switch banks in the multiple. As will be seen from Fig. 7, this group of bank contacts and connecting members is embedded in the long, narrow slab of insulating material, which is placed adjacent to a plurality of switches arranged in a vertical row. By the arrangement of this kind the contacts in one insulating member, such as that shown in Fig. 7 form one of the contacts in each level of a plurality of switch banks. That is, the contacts b^2 , b^6 , and b^4 might be the first contacts in the first level of the Strowger switch and contacts b^1 , b^5 , and b^3 , the first contacts in the tenth level, it being understood that the Strowger switch employs a three group bank, a group of private lines, a group of negative lines, and a group of positive lines.

In assembling these insulating slabs carrying the contacts b^3 to b^2 , inclusive, I would use a mounting member similar to that shown in the above mentioned Böhme and Giese application, and would place other similar slabs in horizontally adjacent position as shown in Figs. 1 and 2 of that application.

Referring now specifically to Fig. 4 in which I have shown a plurality of bank terminals as they would appear in a mounting jig during the process of assembly and before the insulating material is placed. The contact members b^3 to b^2 , inclusive, and connecting members C and C' and connecting terminals f , will be noted as in Fig. 6. The dotted lines indicate the marginal position of the insulating material which will be subsequently added. This insulating material may be either in the form of an impregnated insulating paper strip placed between the contact members C and C' as shown in Fig. 1 or it may be preferably in the

form of a soluble insulating material which is poured into a suitable mould and subsequently baked on to form a bank as shown in Fig. 7.

The particular type of insulating material used is not an essential part of this invention and its process of hardening need not be explained in detail herein.

The individual bank contacts as shown in Figs. 2 and 3 comprise a contact proper b and two connecting members C and C'. This is in the form of a punching made of suitable sheet metal in the shape shown generally in Fig. 2. The bank terminal proper, b , is projected back into the connecting lugs C and C' which are separated from each other by the air space d . One of these connecting members C, for example, is bent in an upwardly direction and the other C' is bent downward. In assembling the bank I arrange a group of bank terminals as shown in Fig. 1 and insert an insulating member i into the slot d to prevent the possibility of the connecting member C and C' coming together. This insulating member i may be either in the form of an impregnated insulating paper mechanically placed between the connecting members, or preferably in the form of a semiliquid insulator which is poured into a suitable mold and baked with the contacts in it. At the far end of the connecting members C and C' are the connecting lugs f by means of which that bank contact is connected by soldering with the corresponding contact in the bank above and below it, respectively.

Although the bank unit of my invention lends itself particularly well to vertical multiplying, it may also be used in horizontally multiplied banks. In Fig. 5, I have shown the contact of such a bank. The contact proper, g , with which the switch wipers make contact, is formed in a plane parallel to those of the connecting members C and C'. In order to form such a bank, a different spacing is obviously required to allow room for the contact. Moreover, in order that the contacts may be arranged on an arc, as are those shown in the above Smith reference, the contact neck b , Fig. 5, must be made in different lengths to space the contacts g within reach of the wiper, when completely assembled.

Thus it will be seen that I have devised a new and useful means of forming a bank of contacts and of multiplying a plurality of such banks together, a means which is more durable than its predecessor and which lends itself to a cheaper manufacturing cost.

What I consider new and desire to have protected by Letters Patent is pointed out in the appended claims.

1. A switch bank contact comprising a flat metal strip bifurcated for a substantial portion of its length to form two connecting leads and having the said connecting leads bent in opposite directions.

2. A switch bank contact comprising a flat metal strip bifurcated for a portion of its length and bent in opposite directions to form two connecting leads, and the junction of the leads forming the bank contact.
3. A switch bank contact comprising a flat metal strip bifurcated for a portion of its length to form two connecting leads, said leads being bent in opposite directions from each other and extending at an angle from said strip, and a bank contact formed from said strip at the junction of said leads and the portion of said strip that is not bifurcated.

Signed by me at Berlin this 29th day of May, 1922.

KURT BÖHME.