Oct. 16, 1956 H. SENGEBUSCH 2,767,352

BANK ASSEMBLIES FOR FLAT TYPE SWITCHES

Original Filed July 12, 1951 2 Sheets-Sheet 1

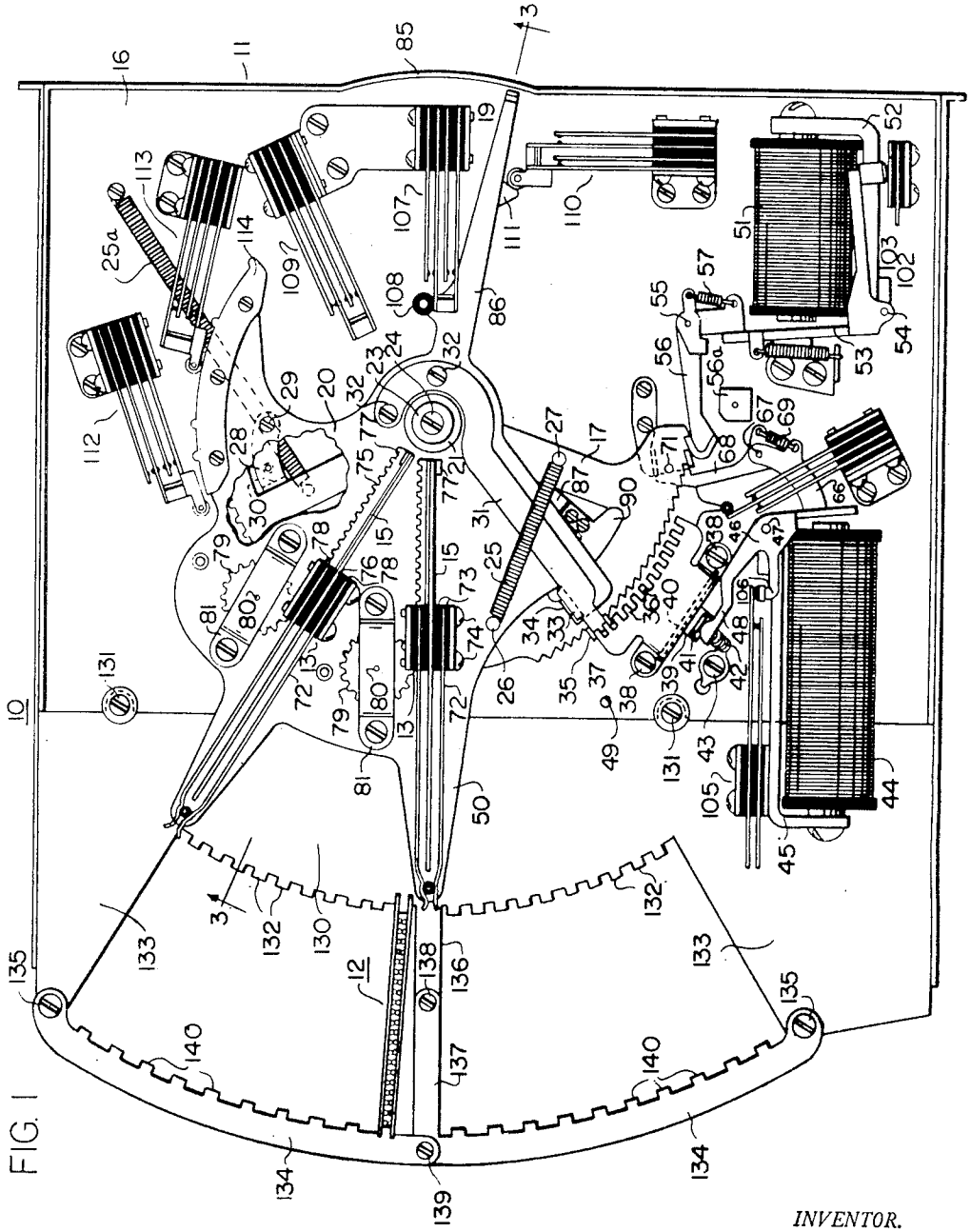


FIG. 1

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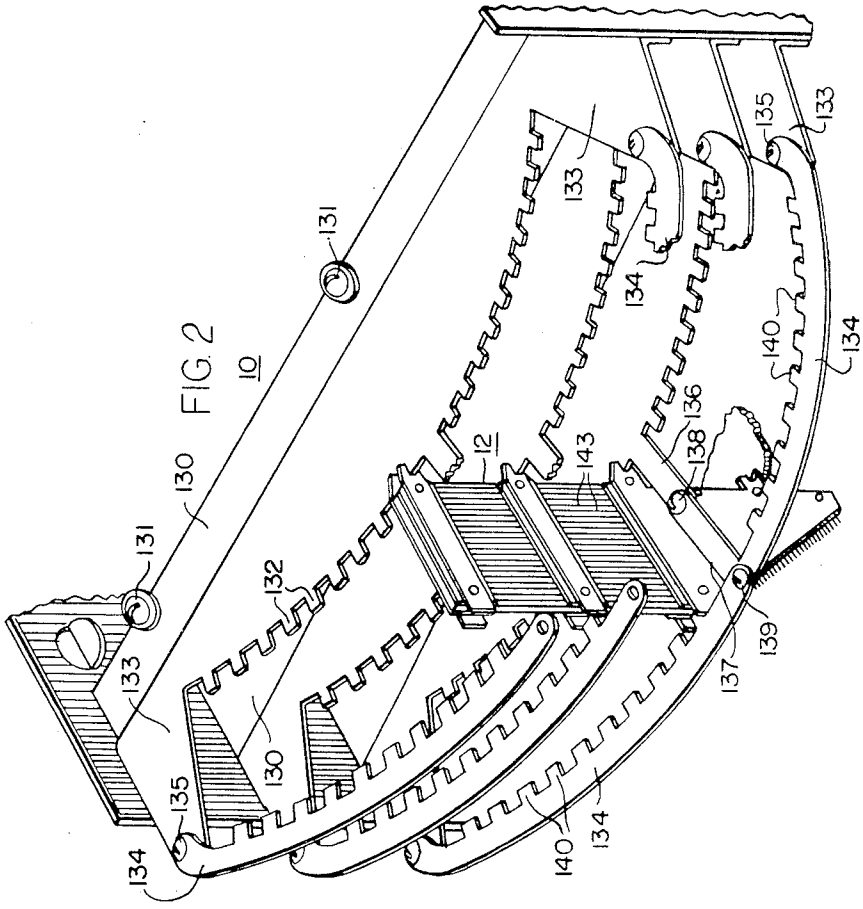


FIG. 2

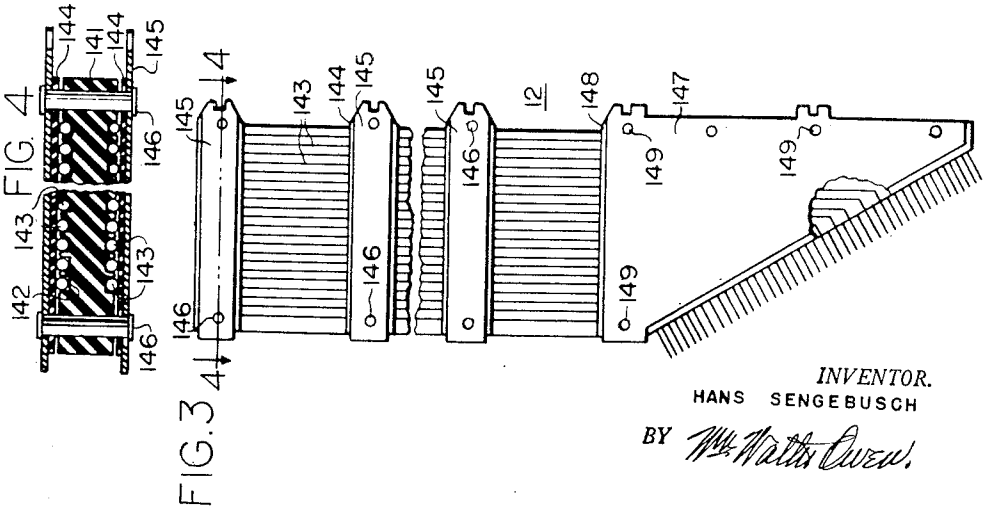


FIG. 4

FIG. 3

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BANK ASSEMBLIES FOR FLAT TYPE SWITCHES

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Original application July 12, 1951, Serial No. 236,377, now Patent No. 2,684,408, dated July 20, 1954. Divided and this application April 10, 1953, Serial No. 347,952

2 Claims. (Cl. 317—112)

The present invention relates to switching apparatus for telephone systems, and more particularly to bare wire bank assemblies thereof.

The object of this invention is to provide a new and novel frame for supporting a plurality of two motion, flat type switches in a vertical direction and for supporting a plurality of contact bank assemblies in alignment therewith.

A feature of this invention is the new and novel bare wire contact mounting means whereby rows of contacts are removably mounted in a contact bank.

This application is a division of applicant's copending application Serial No. 236,377, filed July 12, 1951, now Patent No. 2,684,408, issued July 20, 1954.

Other objects and features of this invention will be brought out more clearly upon a perusal of the following specification and drawings in which:

Fig. 1 is a plan view of the switch mounted in a framework which is provided with one of the novel contact bank assemblies which may be used therewith; Fig. 2 is a perspective view of a portion of the framework which is adapted to maintain the contact bank assemblies in aligned position for a vertical stack of a plurality of switches of the general type described herein; Fig. 3 is a side view of the one of the bank assemblies; and Fig. 4 is an enlarged sectional view taken along line 4—4 of Fig. 3.

The particular embodiment of the switch disclosed herein is capable of performing any of the well known functions of two motion switches, such as telephone linefinders, selectors and connectors. This switch is further adapted for selecting any one of two hundred groups of four conductors each, which are disposed about the switch in banks of insulated bare wires.

Referring now more particularly to Figs. 1 and 2, the apparatus comprises a framework **10** upon which a plurality of switches **11**, of the type more specifically described hereinafter, are stacked in vertical direction. The framework **10** is also adapted for maintaining a plurality of bank contact assemblies **12** in aligned position and arcuately disposed with respect to the switches **11**. Each of the switches **11** includes an assembly of contact wipers **13**, or as shown in the preferred embodiment, two assemblies of contact wipers **13**, which are arranged to be rotated about a central post until such contact wipers **13** are in alignment with a desired contact bank assembly **12**. The wiper assemblies are each slidably mounted on a bar **15** so that they may be moved radially, with respect to the switch, into contact with the elements of the bank assembly **12**, as will be basically shown hereinafter.

Referring to Fig. 1, there is shown what is more commonly referred to as a flat type switch. The switch consists basically of a support plate or carriage **20** mounted for rotational movement about a central post. A driving segment **17**, for actuating the component members of the switch, is mounted on the central post for rotational movement thereabout. A changeover magnet **44** is secured to the base **16** in any well-known manner, and a motor magnet **51** is also secured to the base **16** in any well-known manner. Operation of magnet **44** causes the carriage **20** to be locked to the driving segment **17**. Magnet **51** is then energized and restored a selected number of times causing the driving segment **17** to directly step a selected number of steps. This results in the alignment of the wipers with selected groups of bank contacts such as **12** in the bank. Then magnet **44** is deenergized, causing the carriage **20** to be unlocked from the driving segment **17**. Magnet **51** is then energized and restored a second selected number of times causing the wipers to move in a radial direction into the selected groups of bank contacts. This results in the selection of a particular set of bank contacts by said wipers. A more specific and detailed explanation of the operation of this switch is described in the parent application previously referred to.

Referring now to Figs. 1, 2, 3 and 4, the framework **10** and the bank contact assemblies **12** will be described in detail. The framework is made up of a plurality of shelves **130** which are positioned and maintained one above another by suitable framework elements. Each of these shelves **130** is adapted to serve as the mounting for one of the switches **11** and the switch **11** is secured and positioned in place by any suitable means, such as screws **131**.

The portion of the shelf **130** which is disposed beneath the contact wiper assemblies **113** is arcuately shaped in accordance with the arc described by the tips of the contact wipers **72** during their rotary movement. This arcuate edge of the shelf **130** has a series of radially disposed projections **132**, each of which is disposed along a radial line extending from the center axis of the switch **11**. The distance between the projections **132** is equal to the distance the contact wiper assemblies **13** are moved when the carriage **20** of the switch is rotated one step.

The shelf **130** is further provided with a pair of laterally projecting arms **133**, each of which has a bank locking wing **134** pivotally attached to the end thereof by screws **135**. The shelf **130** also has a center arm **136** extending outwardly therefrom which is secured to an arm **137** of one of the wings **134** by a screw **138**. The two wings **134** that are mounted on any one shelf **130** are fastened together by any suitable means, such as screw **139**. The wings **134** are also provided with a plurality of projections **140** each of which is disposed along a radial line extending through the center axis of the switch **11** of one of the projections **132** of the shelf **130**.

The bank assembly **12**, which is adapted for use with this switching apparatus, is shown in detail in Figs. 3 and 4 and comprises a block of insulating material **141** which has a series of slots **142**, longitudinally disposed along opposite sides thereof. A conductor wire or contact **143** is positioned and maintained in each of the slots **142** by a series of strips of insulating material **144**. The strips **144** on each side of the bank are each provided with a metallic reinforcing plate **145** and each strip **144** and plate **145** laterally traverses all of the contacts **143**. Each end is then fastened to the insulating block **141** by a rivet **146**. The strips **144** and plates **145** are spaced along the assembly **12**. When the contact bank assembly **12** is mounted in the framework **10**, one of the retaining plates **145** will be disposed opposite each shelf **130**. In this way the bare outer surface of the contacts **143** are exposed and unobstructed for contact by the contact wipers **72** of the switch **11**. The bottom portion of the bank assemblies **12**, as seen in Fig. 3, has a diagonally disposed surface from which the terminating ends of the contact rods **143** are exposed. These terminating ends are accessible for connection to such further circuits as

are desired. This connection may include an adaptable plug-in type jack such as would permit disconnection and reconnection with relative ease. The terminating end of the contact bank assembly is provided with a suitable retaining plate **147** on either side of the bank assembly and each of which covers a suitable insulator **148**. These plates and insulators **147**, **148** are fastened to the structure by rivets **149**.

The width of the projections **132**, **140** are adjusted so that they will fit between the retaining plates **145** and **147** of the bank assembly **12**. The portions of the retaining plates **145** and **147** which extend forwardly beyond the edge of the insulating block **141** are each notched, the notches in each case being wide enough to engage the thickness of the shelf **130**. As will be seen in Fig. 2, when the contact bank assembly **12** engages the arcuately shaped surface of the shelves **130**, one of the projections **132** of each of the shelves **130** is positioned between each pair of retaining plates **145** and **147** and the notches of the retaining plates engage the thickness of the shelves **130**. After the bank **12** is so positioned, the wings **134** are rotated about their pivots **135** until the projections **140** engage the rearwardly extending portion of the retaining plates **145** and **147**. The wings **134** are rotated inwardly an additional amount until the projections **132** and **140** tightly engage the insulating block **141**, at which time each pair of wings are fastened together by screws **139** and the projection **137** is fastened to the arm **136** of each of the shelves **130**. The contact bank **12** is thereby positioned along a radial line extending from the central pivot **14** of the switch **11**. Since the contact wiper assemblies **13** and each switch are adapted to move along such a radial line, and since each of the projections **132** is positioned at one of the rotary steps of the wipers **13**, the contact bank which is connected to the framework as described above will be correctly positioned for engagement with the wiper during a selected radial movement thereof.

Having described the invention, what is considered new and is desired to be secured by Letters Patent is:

What is claimed is:

1. A mounting arrangement for the bare wire contact banks of a series of flat type switches comprising two vertical supporting walls, a plurality of first and second positioning elements mounted horizontally between said walls and adjacent to each other in a plurality of horizontal planes, a series of teeth projecting from said first and second elements and disposed along the edges thereof which face each other, each tooth being in vertical alignment with the teeth above and below it, a plurality of mounting plates having projections on each end, one of each of a pair of plates mounted on opposite sides of the bare wires of one of said banks, said banks removably mounted in adjacent vertical positions between said first and second elements with said projections extending between the teeth on said first and second elements, the vertically positioned bare wire contacts of each bank rigidly attached to its associated mounting plates, said first positioning elements being pivotally mounted and rotatable about their pivot points so that the mounting plates together with the bare wire contacts attached thereto may be slid in or out of said mounting arrangement, each plate having one projection extending over one of said elements to hold the banks in vertical position.

2. In an assembly for a plurality of flat type switches, in which the switches are mounted horizontally between two parallel vertical supporting walls, a plurality of first members mounted in substantially the same plane as said switches, each of said first members having an arcuate shaped portion thereon, said arcuate shaped portions having teeth spaced along said arcs, a plurality of arcuate second members pivotally mounted in pairs on opposite ends of said first members and placed end to end in a concentric relationship to and in the same plane as said arcuate portion of said first members, two of said second members forming an arc concentric to said arcuate portion of said first members, said second members having teeth thereon disposed opposite the teeth on said first member, a plurality of contact assemblies, a plurality of bare wire contacts carried by each of said contact assemblies, a plurality of plates insulated from said contacts and mounted in pairs with one of each pair on opposite sides of a contact assembly, said pairs spaced vertically throughout the length of said assemblies, said plates having projections at each end thereof, said assemblies mounted between said first and second members with said projections meshing with said teeth on said first and second members so that said bare wire contacts are engageable by all of said switches, and said second members are rotatable about their pivot points so that any contact assembly may be removed and replaced without disturbing the assembly of said flat type switches.

References Cited in the file of this patent

UNITED STATES PATENTS

1,460,913	Lienzen	July 3, 1923
2,239,329	Lindstrom	Apr. 22, 1941

OTHER REFERENCES

Ericsson Review, No. 2, 1949, outside front cover page and page 49. A publication by Hemming Johansson.