

June 4, 1968

L. C. FRIEND

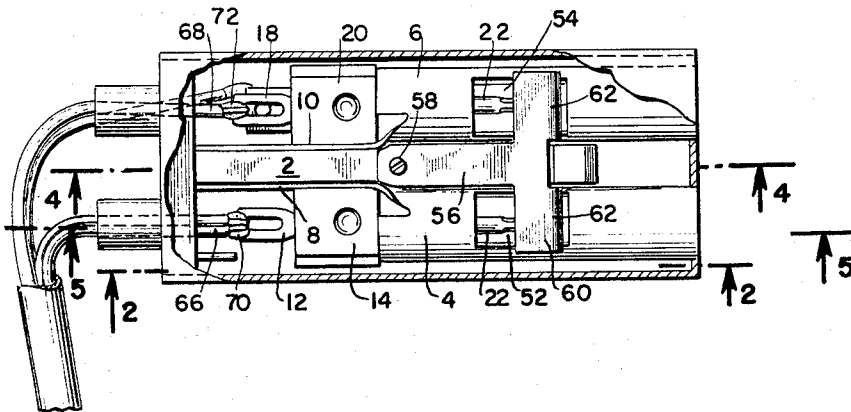
3,387,104

TWO-HOLE VIDEO JACK

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Fig 1.



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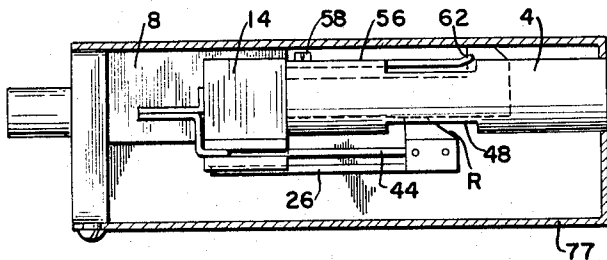
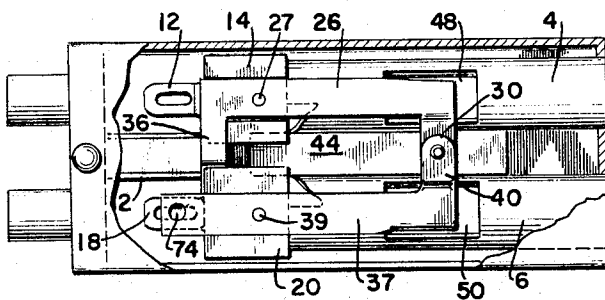


Fig 3.



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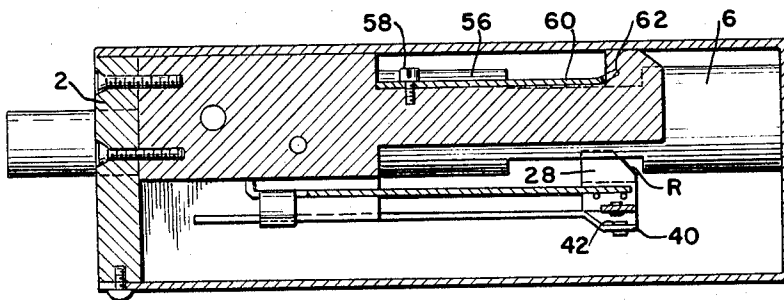
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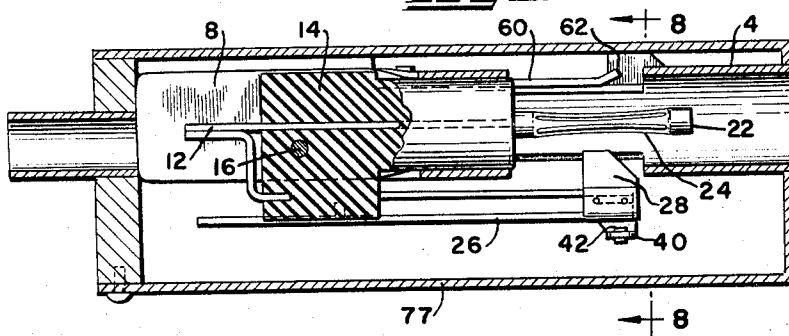
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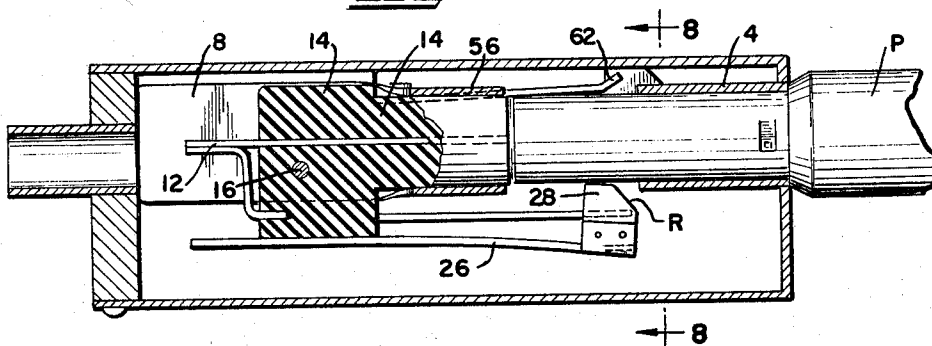
Fig 4.



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FIG. 7

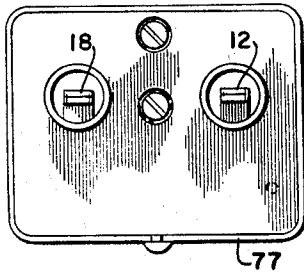


FIG. 8

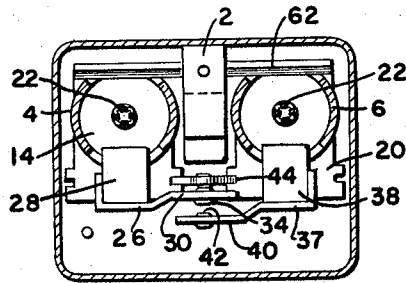


FIG. 9

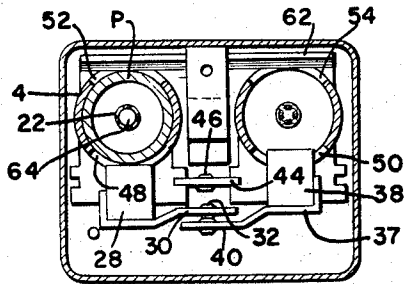


FIG. 10

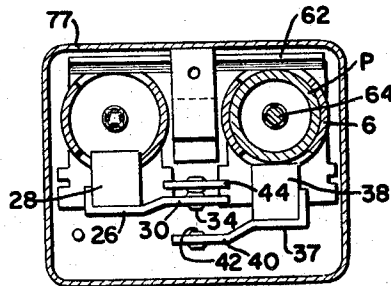


FIG. 11

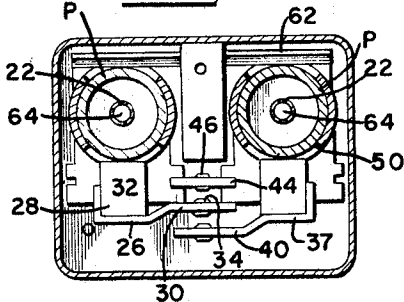
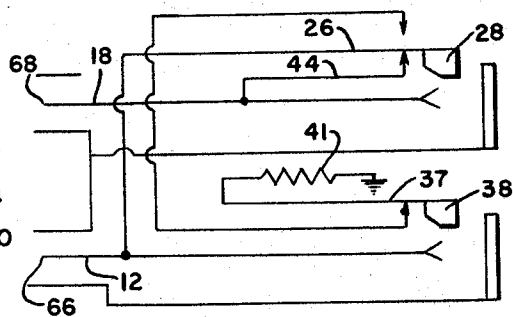


FIG. 12



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TWO-HOLE VIDEO JACK

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AMP Incorporated, Harrisburg, Pa.
Filed Feb. 14, 1967, Ser. No. 616,029
8 Claims. (Cl. 200—51.1)

ABSTRACT OF THE DISCLOSURE

A two-hole jack which normally connects two input cables to each other. By inserting a plug carrying an output cable in one hole of the jack, both input cables are connected to the output cable. By inserting a similar plug in the other hole, one input cable is connected to the output cable. By inserting plugs in both holes each input cable is connected to a separate output cable.

This invention relates to a two-hole video jack and more particularly to a self-normalling electrical switch for use in television systems and the like.

Self-normalling switches are known in the prior art as exemplified by the patents of Neenan (3,020,365) and Kienlen (3,036,169). However, in order to provide the desired switching patterns, it is necessary to mount a plurality of switches to produce a jack-field and to insert plugs in selected jacks. The prior art video jacks have also suffered from one or more of the problems of poor impedance matching, high insertion loss, and crosstalk.

The problems of the prior art are materially reduced by the present invention whereby impedance discontinuity insertion loss and crosstalk are materially reduced and patch plugs and U-shaped plugs are eliminated. This is provided by the use of a pair of spaced parallel shields secured to a support with an insulator having a conductor positioned within each shield. The support includes three contacts secured thereto, two of the contacts being in engagement with a different one of the conductors and each other, the third contact being insulated from the other two contacts. The first two contacts are disengaged by the insertion of a plug into one of the shields, to engage the second and third contacts and the second and third contacts are disengaged by the insertion of a plug into the other of the shields.

It is therefore an object of this invention to provide a self-normalling jack structure which can be used in a jack-field to reduce the number of single jacks necessary to obtain the desired patterns.

It is a further object of this invention to provide a two-hole jack which introduces minimum impedance discontinuity, insertion loss and crosstalk.

It is a still further object of this invention to provide a two-hole video jack in which the only movable elements are the spring arms mounting the switch contacts.

These and further objects of the invention will become apparent to those skilled in the art upon reading of the following description of a preferred embodiment thereof when taken in conjunction with the accompanying drawings, wherein:

FIGURE 1 is a top view of the jack of this invention;
FIGURE 2 is a section on the line 2—2 of FIGURE 1;
FIGURE 3 is a bottom view of the jack of this invention;

FIGURE 4 is a section on the line 4—4 of FIGURE 1;
FIGURE 5 is a section on the line 5—5 of FIGURE 1;
FIGURE 6 is a view similar to FIGURE 5 but showing a plug in the jack;

FIGURE 7 is an end view of the jack of this invention;
FIGURE 8 is a view taken on the line 8—8 of FIGURE 5;

FIGURE 9 is a view taken on the line 9—9 of FIGURE 6 showing a single plug in the jack;

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FIGURE 10 is a view similar to FIGURE 9 but showing a plug in the other hole of the two hole jack of this invention;

FIGURE 11 is a view similar to FIGURE 9 showing plugs in both holes of the jack; and

FIGURE 12 is a schematic diagram of the jack.

In the drawings there is shown a two-hole video jack comprising a metallic support 2 to which are secured metal tubes 4 and 6 by tabs 8 and 10 (FIGURE 1) formed integral therewith. A conductor 12 is mounted in tube 4 within an insulator 14 which in turn is secured to the support 2 by a pin 16 (FIGURES 5 and 6). A conductor 18 is similarly mounted in tube 6 by an insulator 20 secured to the support by a pin (not shown). Each conductor (12 and 18) has a slotted tube portion such as 22 formed at one end thereof and bent inwardly, as shown in FIGURE 6, to provide spring arms 24 for gripping a male conductor carried by a plug as more fully described hereinbelow. The opposite ends of the conductors 12 and 18 are formed with apertures for connection to an input cable as shown in FIGURES 1 and 3.

A leaf spring 26 is secured as by a pin 27 (FIGURE 3) to the lower surface of insulator 14 and carries, at the free end thereof, a cam element 28 formed of an insulating material such as nylon. The free end of the spring 26 is formed with a lateral extension 30 (FIGURES 8 to 11) which has secured thereto contacts 32 and 34. The opposite end of the spring is formed with an extension 36 (FIGURE 3) formed integrally with conductor 18.

A leaf spring 37 (FIGURES 3 and 8 to 11) is secured as by a pin 39 (FIGURE 3) to the lower surface of insulator 20 and carries a cam element 38 formed of an insulating material such as nylon at the free end thereof. The free end of this spring 37 (FIGURES 8 to 11) is also formed with a lateral extension 40 which has secured thereto a contact 42.

A leaf spring 44, which is formed integrally with conductor 12, is mounted in slots in insulators 14 and 20 and has a contact 46 (FIGURES 8 to 11) secured thereto. The springs 26 and 44 are prestressed to normally maintain the contacts 32 and 46 in the engaged position as shown in FIGURES 8 and 10.

Tubes 4 and 6, which form electrical shields, are cut away, as at 48 and 50 (FIGURE 3) to provide openings through which the cams 28 and 30 extend. The tubes are also formed with additional openings 52 and 54 diametrically opposite openings 48 and 50 respectively. A contact member comprising a spring metal arm 56 is secured to the support 2 as by a screw 58. Integral with the arm is a contact bar 60 having out-turned edges 62 which operate as camming surfaces as described hereinbelow.

Plugs such as indicated by the letter P (FIGURE 6) are formed of metal and are tubular. An insulator supports a conductor 64 therein for insertion into gripping engagement with slotted tube 22. An output cable (not shown) is connected to conductor 64 in any suitable manner.

In use, input cables 66, 68 (FIGURE 1) are connected to conductors 12 and 18 respectively and are soldered thereto as at 70, 72. Contact 42 is a reference potential or grounded through a resistor 41 (FIGURE 12) connected to spring arm 37 by a connection at opening 74. When no plugs are inserted into tubes 2 and 4, as illustrated in FIGURE 8, the prestressed spring arms engage contacts 32 and 46 to short cables 66, 68. If a plug is inserted into tube 4 only, as shown in FIGURE 9, contacts 32 and 46 are separated, contacts 34 and 42 are engaged and conductors 22 and 64 are connected to complete a circuit from input conductor 18 directly through the jack. If a plug is inserted in tube 6 only, as shown in FIGURE 10, contacts 34 and 42 are separated and contacts 32 and 46

are engaged to complete a circuit from input conductors 12 and 18 to output conductor 64. If plugs are inserted in both tubes 4 and 6, all the contacts are separated and input conductor 12 is directly connected to one plug conductor 64 while input conductor 18 is directly connected to the other plug conductor 64. The contacts are separated and engaged as the plugs are inserted and removed by engagement of the end of the plug with the ramp portions R of the cams 28 and 38. The ends of the plugs engage the edges 62 to cam outwardly the contact bar 60 and flex the spring arm 56 to thereby provide good contact between the metal shield of the plug and the support of the jack.

Protector tubes 74 and 76 are fixedly secured to the support 2 and a housing 77 of non-magnetic material is also secured to the support to enclose the entire assembly.

Though the invention has been described with respect to a specific preferred embodiment thereof, many variations and modifications will immediately become apparent to those skilled in the art. It is therefore the intention that the appended claims be interpreted as broadly as possible in view of the prior art to include all such variations and modifications.

What is claimed is:

1. A two-hole self-normalling video jack comprising a support, a pair of spaced parallel tubular shields secured to the support, an insulator mounting a conductor in each shield, means mounting a first contact on the support in permanent engagement with one of the conductors, means mounting a second contact on the support in permanent engagement with the other of the conductors, and means mounting a third contact on the support insulated from both conductors; means normally holding the first and second contacts in engagement, means is one of said shields for disengaging the first and second contacts and engaging the second and third contacts upon insertion of a first plug therein, and means in the other of said shields for separating the second and third contacts

to maintain all the contacts separated upon the insertion of a second plug therein.

2. A jack as defined in claim 1, wherein the means mounting each of the contacts comprises a leaf spring and the contact is mounted on the free end of the spring.

3. A jack as defined in claim 2, wherein the means for disengaging the first and second contacts comprises an opening in one of the shields and a cam of insulating material secured to the leaf spring mounting the second contact extending through said opening.

4. A jack as defined in claim 2, wherein the means for separating the second and third contacts comprises an opening in one of the shields and a cam of insulating material secured to the leaf spring mounting the third contact extending through said opening.

5. A jack as defined in claim 4, wherein the means for separating the first and second contacts comprises an opening in the other of said shields and a cam of insulating material secured to the leaf spring mounting the second contact extending through said opening.

6. A jack as defined in claim 1, wherein the contacts are colinear and the means for engaging and separating the contacts comprise cams extending into the shields.

7. A jack as defined in claim 6, further including an opening in each shield opposed to each of the first mentioned openings and a contact extending through each opening in engagement with the support.

8. A jack as defined in claim 7, wherein the last mentioned contact comprises a spring arm secured to the support and a cam bar integral with the arm extending through said last mentioned opening.

References Cited

UNITED STATES PATENTS

3,109,997 11/1963 Giger et al. ----- 200—51 X

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D. SMITH, *Assistant Examiner.*