Dec. 23, 1969 B. W. MATTHEWS 3,486,159

CONNECTORS FOR USE WITH FLEXIBLE PRINTED CIRCUITS

Filed June 13, 1967 3 Sheets-Sheet 1

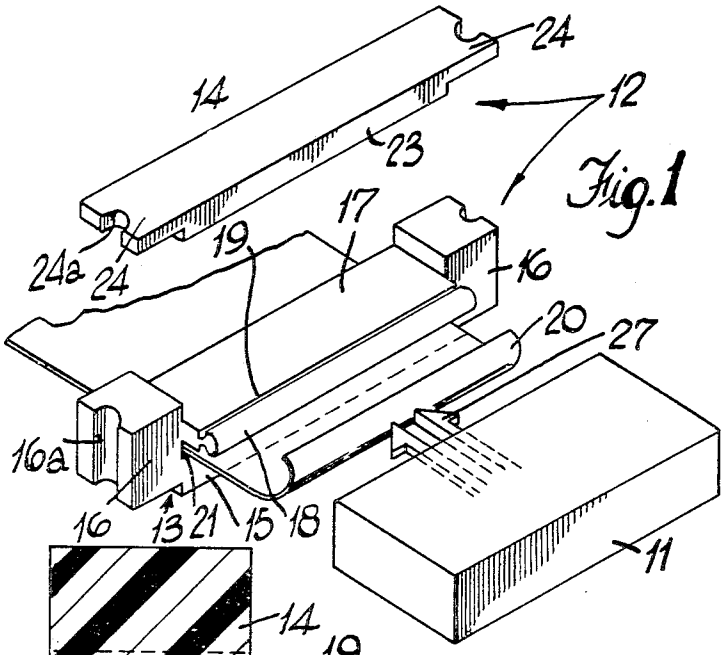


Fig. 1

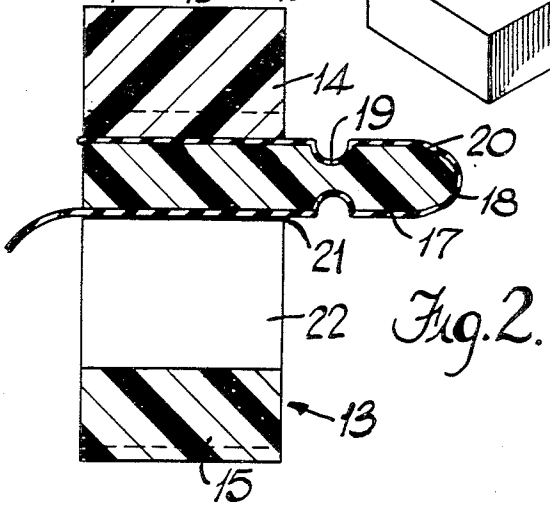


Fig. 2.

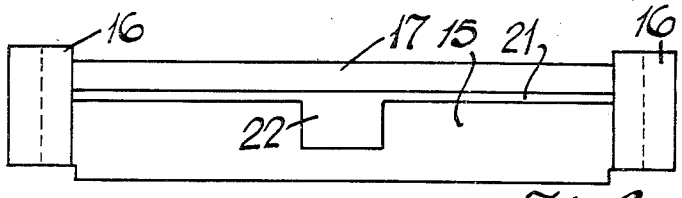


Fig. 3.

CONNECTORS FOR USE WITH FLEXIBLE PRINTED CIRCUITS

Filed June 13, 1967 3 Sheets-Sheet 2

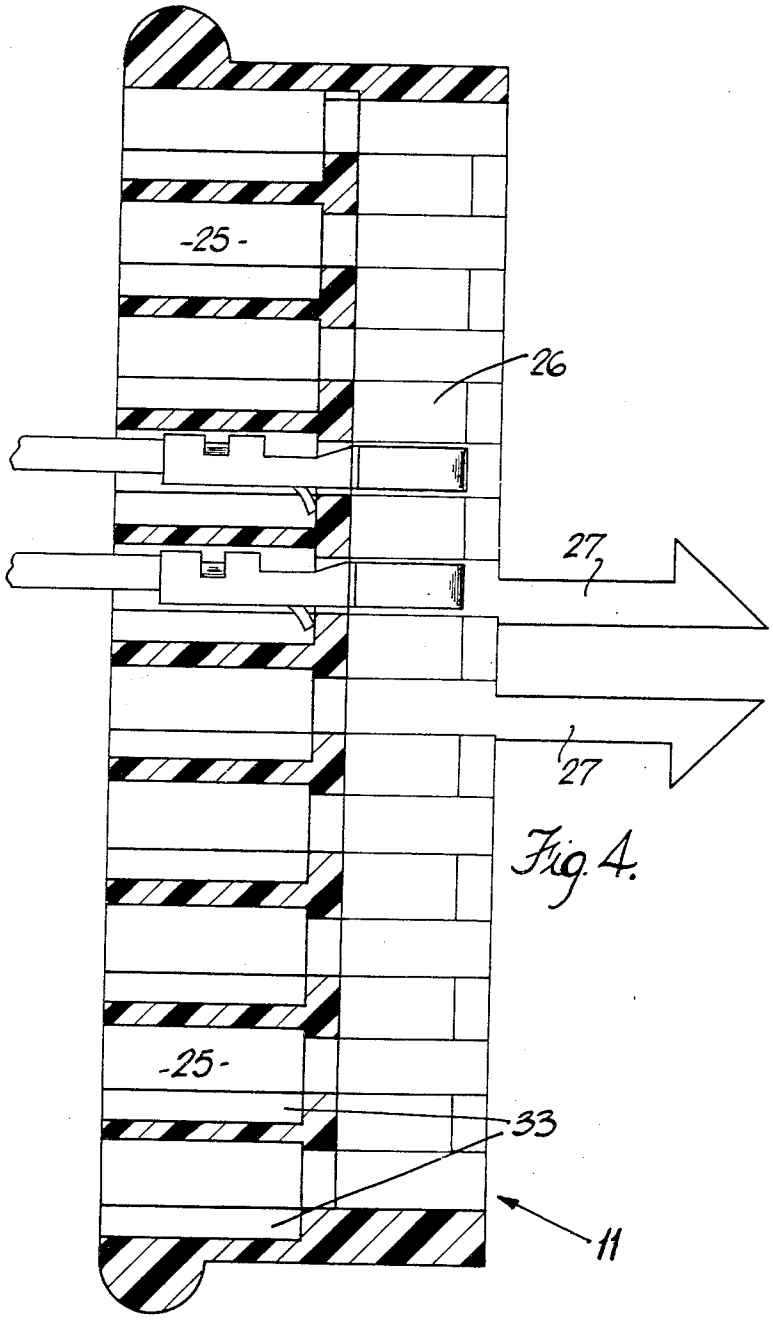


Fig. 4.

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CONNECTORS FOR USE WITH FLEXIBLE PRINTED CIRCUITS

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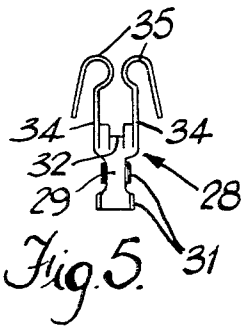


Fig. 5.

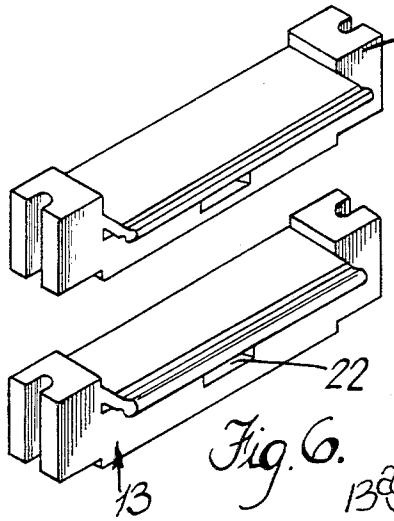


Fig. 6.

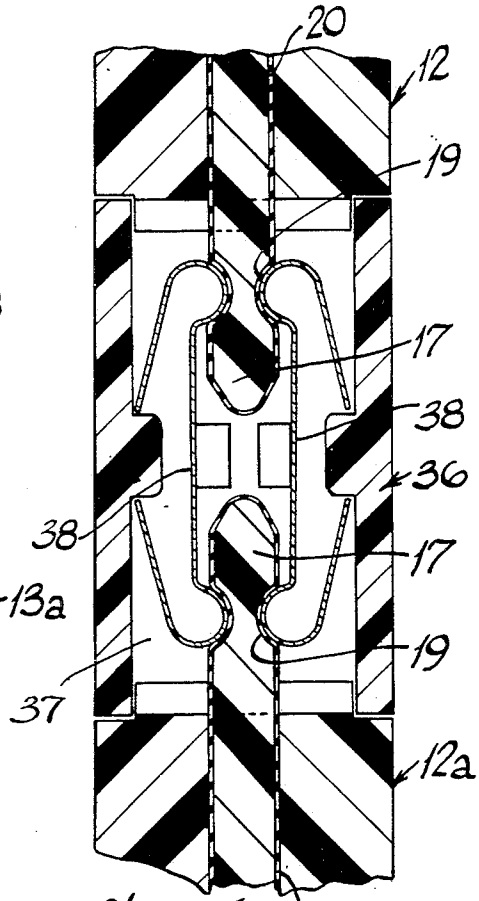


Fig. 7.

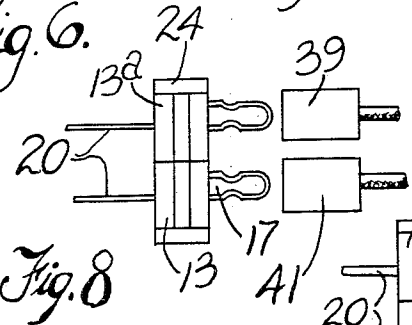
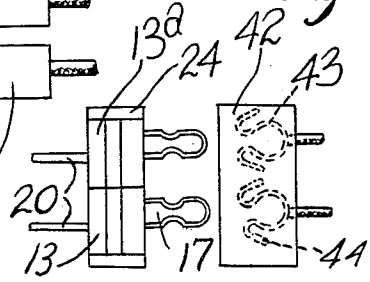


Fig. 8

Fig. 9.



United States Patent Office

3,486,159

Patented Dec. 23, 1969

3,486,159

CONNECTORS FOR USE WITH FLEXIBLE PRINTED CIRCUITS

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Filed June 13, 1967, Ser. No. 645,806
Claims priority, application Great Britain, June 22, 1966, 27,923/66; Aug. 8, 1966, 35,378/66
Int. Cl. H05k *1/00;* H01r *13/54*
U.S. Cl. 339—17 4 Claims

ABSTRACT OF THE DISCLOSURE

A connector for use with flexible printed circuits comprising in combination a first part adapted to support a flexible printed circuit, a second part releasably engageable with the first part, and a plurality of conductive terminals carried by the second part which engage exposed conductive areas of the flexible printed circuit, when said second part is engaged with said first part.

This invention relates to connectors for use with flexible printed circuits.

A connector according to the invention comprises in combination a first part adapted to support a flexible printed circuit, a second part releasably engageable with said first part, and a plurality of conductive terminals carried by said second part which engage exposed conductive areas of the flexible printed circuit when said second part engaged with said first part.

In the accompanying drawings,

FIGURE 1 is an exploded perspective view of a connector according to one example of the invention,

FIGURE 2 is a sectional view of part of the connector shown in FIGURE 1, assembled,

FIGURE 3 is a rear view of part of the plug member of the connector in FIGURE 1,

FIGURE 4 is a sectional view of the socket member of the connector in FIGURE 1, but with the terminals removed,

FIGURE 5 is a plan view of a terminal for use in the socket member in FIGURE 4,

FIGURE 6 is an exploded perspective view of the plug member of a second example of a connector according to the invention, but having the printed circuit removed for clarity,

FIGURE 7 is a sectional view of a third example of a connector according to the invention, and

FIGURES 8 and 9 are end views respectively of two alternative forms of the construction shown in FIGURE 6 partially assembled.

Referring first to FIGURES 1 to 5, the connector includes a socket member **11** and a plug member **12**, the plug member **12** being in two parts, a body part **13** and a clamping part **14**.

The body part **13** is moulded in synthetic resin and comprises a rectangular base **15** having integral therewith at opposite ends thereof a pair of posts **16**. The posts **16** are formed with grooves **16***a* within which screws (not shown) are engaged to secure the plug member **12** in a desired position. Integral with the posts **16** and extending therebetween in parallel spaced relationship to the base **15** is a rib **17** which projects beyond the edge of the base **15**. The outermost edge **18** of the rib **17** is rounded in profile and the upper and lower faces of the rib are each formed adjacent the edge **18** with a longitudinal groove **19**. The rib **17** defines with the base **15** a slot **21** the base **15** being further formed with a transverse groove **22** which communicates with the slot **21**.

The clamping part **14** is also moulded in synthetic resin and comprises a strip like portion **23** of length substantially the same as the rib **17** and having at its ends lugs **24** which in use engage the tops of the posts **16** and are formed with grooves **24***a* which correspond in use with the grooves **16***a* in the posts **16**.

In order to secure a flexible printed circuit **20** to the plug member **12**, the printed circuit is threaded through the slot **21** and is then bent around the edge **18** of the rib **17** to lie in contact with the upper face of the rib **17**. The printed circuit is then further bent into the grooves **19**. The clamping part **14** is then engaged with the body part **13** in such a manner that the printed circuit is trapped between the portion **23** of the part **14** and the rib **17**. The parts **13**, **14** are secured together and to a support (not shown) by screws which extend within the grooves **16***a*, **24***a* in the parts **13**, **14**, respectively.

The socket member **11** (FIGURE 4) comprises a synthetic resin body which is rectangular in section and is formed with a plurality of transversely extending stepped channels **25** each of which communicates at its inner narrow end with a longitudinal slot **26**. Extending from the body are a pair of resilient barbed latch member **27** and the arrangement is such that in use when the members **11** and **12** are interengaged, the latch members **27** are engaged in the slot **22** in the member **12** and the rib **17** is housed within the slot **26**.

A conductive terminal **28** (FIGURE 5) is housed in each of the channels **25** in the socket member **11**. Each terminal includes a base portion **29** which is formed with tags **31** which in use are deformed to grip and make electrical contact to a conductive lead. The base portion **29** further includes an outwardly directed tongue **32** which engages a groove **33** in the wall of the channel **25** to secure the terminal therein. Integral with the base portion **29** is a pair of resilient arms **34** which extend from the channel **25** into the slot **26** and are shaped to define a pair of part circular portions **35** which in use, engage exposed areas of the printed circuit located within the grooves **19** in the rib **17**.

In the alternative construction shown in FIGURE 6 the clamping part **14** is replaced by a second body part **13***a*, the lower face of which is shaped to engage the upper face of the first body part **13**. Thus a plurality of flexible printed circuits can be secured one above the other. In this alternative construction the two plug members can be engaged either by separate socket members **39**, **42**, FIGURE 8, or by a socket member **42**, FIGURE 9, having two sets of conductive members **43**, **44** positioned one above the other.

In the further construction shown in FIGURE 7 the socket member **36** comprises a synthetic resin body having passages **37** extending therethrough. Double ended conductive connectors **38** are engaged in the passages **37**, and the arrangement is such that a printed circuit carried by a plug member **12** engaged in one end of the member **36** will be electrically interconnected with a similar printed circuit carried by a second plug member **12***a* engaged in the other end of the member **36**.

It will be appreciated that the body parts **13** and the clamping parts **14** of the plub members **12** could be injection moulded around members constituting the ribs **17**, the flexible printed circuits **20** being bent around the members prior to the moulding operation. In this case the upper of a pair of plug members **12** would not constitute the clamping part **14** of the lower plug member. Moreover it will further be appreciated that the rib **17** could be a separate part which is clamped to the base **15** of the body part **13** by the clamping part **14** in flexible printed circuit being bent around the rib **17** and trapped

between the base **15** and the rib **17** and the rib **17** and the part **14.**

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

1. A connector for use with a flexible printed circuit, comprising in combination, a first plug member having a projecting rib over which exposed conductive areas of a flexible printed circuit extend in use, a socket member having therein a passage capable of receiving said projecting rib, a plurality of conductive terminals carried by said socket member and housed in said passage, said terminals engaging said exposed conductive areas of the flexible printed circuit when said projecting rib is engaged in said passage, a second plug member substantially identical to the first plug member, and engageable with the first plug member, and clamping surfaces defined on said first and second plug members, between which said flexible printed circuit is trapped when the first and second plug members are interengaged.

2. A connector as claimed in claim **1** wherein the plug members are engaged by separate socket members.

3. A connector as claimed in claim **1** wherein the plug members are engaged by a single socket member carrying two sets of correspondingly positioned conductive terminals.

4. A connector as claimed in claim **1** wherein the plug and socket members are provided with interengageable releasable latch means which maintain the plug and socket members into engagement against accidental disengagement.

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U.S. Cl. X.R.

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