Jan. 13, 1942. C. H. THOMAS 2,269,493

SLIDE JOINT

Filed May 27, 1940

Fig. 1.

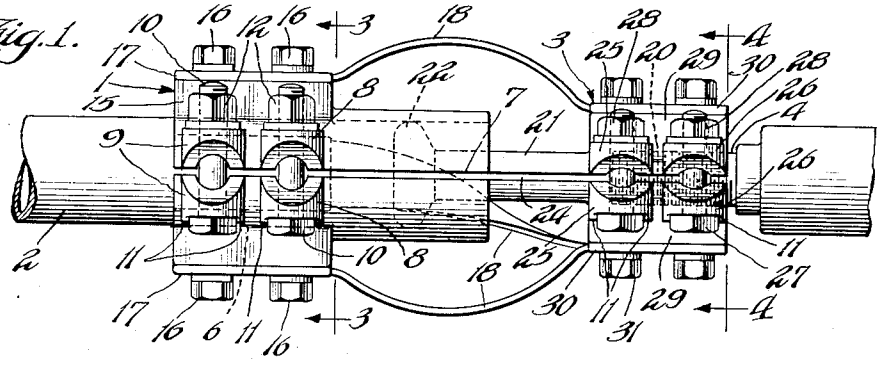


Fig. 2.

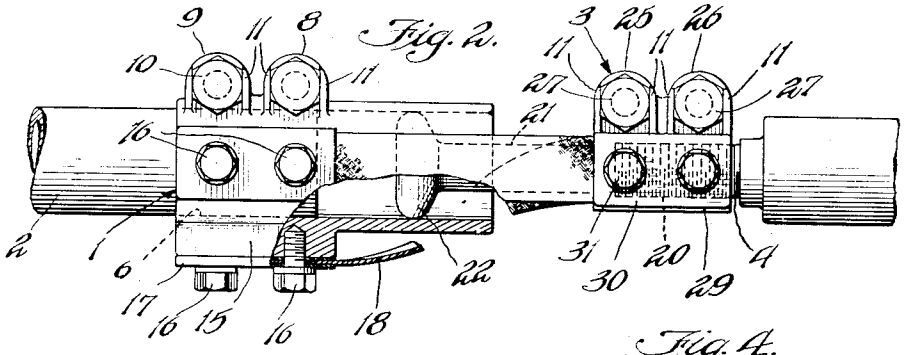


Fig. 3.

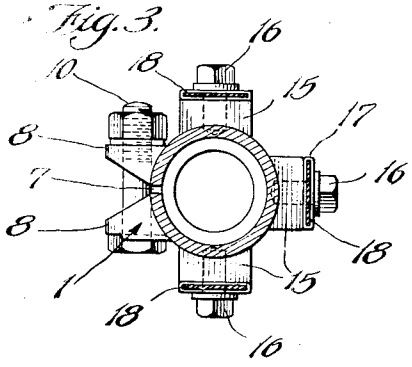


Fig. 4.

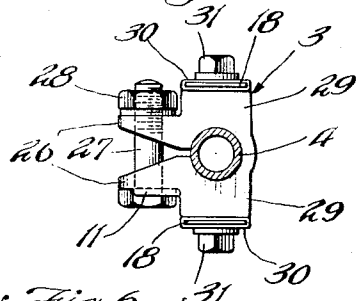


Fig. 5.

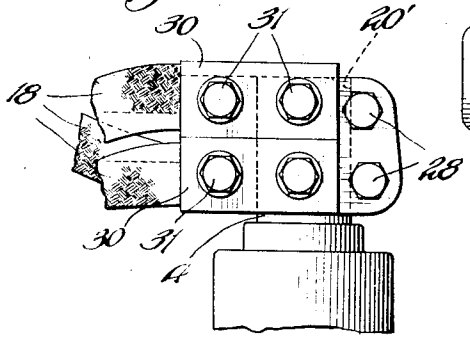
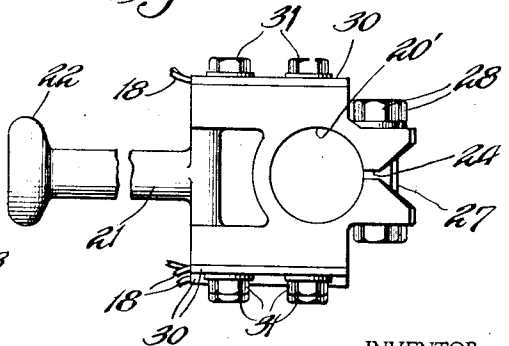


Fig. 6.



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Patented Jan. 13, 1942

2,269,493

UNITED STATES PATENT OFFICE

2,269,493

SLIDE JOINT

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Application May 27, 1940, Serial No. 337,352

5 Claims. (Cl. 173—324)

This invention relates to slide joints for electrical conductors and particularly to flexible expansion connectors for permitting relative expansion and contraction of two electrically connected conductors while maintaining a proper electrical connection between them.

Slide joints of the type with which the present invention is concerned are used for connecting adjacent lengths of busbars or for connecting a bus or other conductor to a substantially stationary terminal, such as a terminal bushing of a condenser, a transformer, a circuit breaker, or the like.

It is one of the objects of the present invention to provide a connector adapted to be secured to the free end of a comparatively rigid conductor and which will allow free expansion and contraction of the connected conductors, which connector is of a simple, inexpensive and durable construction, and may be readily applied in the field.

It is a further object of the present invention to provide a two piece connector comprising male and female members, one of which is adapted to be connected to one conductor and the other of which is adapted to be connected to the other conductor, terminal or bushing to be joined with the first conductor, and wherein the two connector parts have a telescoping fit which permits relative movement of the two while at the same time maintaining the parts in relative alignment.

It is a further object of the present invention to provide a connector of the above mentioned character wherein one of the two connector members may be standardized for use in establishing connections between a conductor and another conductor, or a terminal or bushing.

The attainment of the above and further objects of the present invention will be apparent from the following specification taken in conjunction with the accompanying drawing forming a part thereof.

In the drawing:

Figure 1 is a top view of an expansion stud connection embodying the present invention;

Figure 2 is a side view of the connection of Figure 1;

Figure 3 is a sectional view taken along the line 3—3 of Figure 1;

Figure 4 is a sectional view taken along the line 4—4 of Figure 1;

Figure 5 is a side view of a different form of stud connector; and

Figure 6 is a plan view of the connector of Figure 5.

Referring now more particularly to the drawing, the connection of Figure 1 comprises a sleeve connector clamp member 1 adapted to be clamped to a bus 2, and a stud connector clamp member 3 adapted to be clamped to a conductor 4 which may be a bus or a terminal bushing of a condenser, transformer, circuit breaker or the like. The clamp member 1 is a pipe-like structure having an interior bore 6 adapted to be slid over the bus 2. The member 1 is preferably made of material having high electrical conductivity such as, for instance, roller metal, whereby when the clamp 1 is secured to the bus 2 it makes good electrical connection therewith. The bore 6 may be machined to facilitate the establishment of good electrical and mechanical connection with the bus 2. Thereafter a longitudinally extending slot 7 is milled through the wall of the connector. The connector has two pairs of projecting lugs 8—8 and 9—9 which have aligned bolt receiving bores each for receiving a bolt 10. The head of each bolt 10 is held against rotation by a pair of very short projections 11. A nut 12 threads on the opposite end of each bolt 10 for clamping the pipe connector clamp firmly on the bus 2. If desired, the operation of machining the bore 6 may be entirely omitted, since even without machining of the bore a good mechanical and electrical connection may be established between the clamp 1 and the bus 2 by tightening of the bolts 10.

The pipe clamp has a number of flat topped outwardly extending projections 15 which extend approximately half of the length of the pipe clamp and are drilled part way through and are tapped for receiving bolts 16. These bolts clamp terminals 17 at the end of flexible braided conductors 18, against the projections 15. Each terminal 17 consists generally of a conducting tube into which the end of a flexible threaded conductor 18 is inserted and which is then flattened upon the conductor.

The stud connector 3 is also made of metal of high electrical conductivity and is drilled and tapped, as indicated at 20. The stud has a hollow shank 21 extending therefrom and terminating in an enlarged circular head 22. A slot 24 is milled through the stud after the threads 20 have been formed, the slot extending the full length of the stud. The stud 3 has two pairs of lugs 25—25 and 26—26 extending therefrom, which lugs are provided with aligned bolt receiving openings through which the shanks of the

bolts 27 extend, the heads of the bolts being held against rotation by the short projections 11. The stud is threaded on the threaded end of the conductor 4, and thereafter is clamped in place by tightening nuts 28 on the bolts 27. The stud is provided with flat topped outwardly extending projections 29, similar to the projections 15, for receiving the opposite terminal 30 at the end of each braided conductor 18. Bolts 31 extend into tapped holes in the extensions 29 for firmly clamping the terminals 30 to the extensions.

The head 22 and shank 21 of the stud connector clamp extend into the bore 6 of the pipe connector clamp 1. The head 22 is free to slide in the bore 6 upon relative expansion of the bus 2 with repect to the terminal 4, or vice versa, the flexible conductors 18 shunting the sliding connection.

Reference may now be had more particularly to Figures 5 and 6 wherein there is shown a different type of stud. In this construction, as previously, the stud is provided with a shank 21 and an enlarged head 22 which cooperates with a pipe clamp such as the clamp 1 of Figure 1. The mounting portion of this connector clamp is provided with a bore 20', which corresponds to the bore 20, but is at right angles to the shank 21 rather than in alignment therewith. The shank 21 therefore need not be slotted lengthwise thereof since the milled slot 24 is sufficient to enable clamping of the stud connector to the threaded or unthreaded end of a bushing or other conductor. The stem 21 is an integral part of the rest of this stud connector clamp. Insofar as the connector clamp of Figures 5 and 6 is similar to that of Figures 1 and 2, similar reference numerals are used, and a further description thereof is not necessary at this time.

From the above description it is apparent that the two connector clamp members of the present invention comprise simple male and female members of which one is adapted to be secured to one of the conductors that are to be joined electrically and the other is adapted to be secured to the other conductor. The two members are maintained in alignment by the engagement of the enlarged head 22 of the male member within the bore of the female member, which head slides within the bore as the two members expand or contract relatively to one another.

In compliance with the requirements of the patent statutes I have here shown and described a few preferred embodiments of my invention. It is, however, to be understood that the invention is not limited to the precise constructions here shown, the same being merely illustrative of the principles of the invention. What I consider new and desire to secure by Letters Patent is:

1. A slide joint for maintaining comparatively rigid electric conductors in proper relative alignment while permitting relative longitudinal and angular movement of the conductors, said joint comprising slidably interfitting male and female members clamped to the two conductors respectively, each of said members including means at one end for firmly securing it to a conductor and said male member including an enlarged curved head for slidably engaging the female member, and flexible conductors on the outside of the members maintaining electrical continuity between the first mentioned conductors and shunting the sliding joint.

2. A slide joint for maintaining comparatively rigid electric conductors in proper relative alignment while permitting relative longitudinal movement of the conductors, said joint comprising slidably interfitting male and female members clamped to the two conductors respectively, each of said members including means at one end for firmly securing it to a conductor and means at an opposite end for slidably engaging the opposite member, and flexible conductors on the outside of the members maintaining electrical continuity between the first mentioned conductors and shunting the sliding joint, said male member comprising a mounting portion having a shank extending therefrom and provided with an enlarged curved head portion at its end, said female member having a bore in which said head slides and against which it bears.

3. A slide joint for maintaining comparatively rigid electric conductors in proper relative alignment while permitting relative movement of the conductors, said joint comprising slidably interfitting male and female members clamped to the two conductors respectively, each of said members including means at one end for firmly securing it to a conductor and means at an opposite end for slidably engaging the opposite member, and flexible conductors on the outside of the members maintaining electrical continuity between the first mentioned conductors and shunting the sliding joint, said male member comprising a mounting portion having a shank extending therefrom and provided with an enlarged head portion at its end, said female member having a bore in which said head slides and against which it bears, the female member also having a mounting portion, at least one of the two mounting portions comprising a split clamp adapted to be adjustably moved in place and clamped in position.

4. A slide joint for electrical conductors, said joint comprising a pipe member of uniform internal diameter and a stud member, said pipe member having a slot extending longitudinally therethrough, means at one end of the pipe member for drawing the opposite surfaces of the slot towards one another to clamp the pipe member to a conductor, the opposite end of the pipe member comprising means for receiving the stud, the stud having means at one end slidably engaging the pipe member, and flexible conducting means electrically shunting the sliding connection.

5. A slide joint for maintaining comparatively rigid electric conductors in proper relative alignment while permitting relative movement of the conductors, said joint comprising a split clamp having a longitudinal bore therethrough of substantially the same internal diameter throughout its length whereby the clamp may be slid on the end of a conductor and extend beyond the end of the conductor a variable amount to compensate for variations in spacing between the conductors to be interconnected, one end of said clamp being adapted to be clamped onto a conductor, a stud adapted to be secured to another conductor and having an enlarged head at the end thereof slidable within the bore of the split clamp, the head making a snug fit within the bore and being rounded to permit angular tilting of the stud and the split clamp with respect to one another while maintaining the sliding fit, and flexible electric conductors connecting the stud and the clamp and shunting the sliding connection.

CYRIL H. THOMAS.