

Dec. 19, 1939.

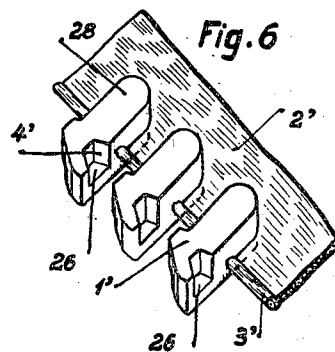
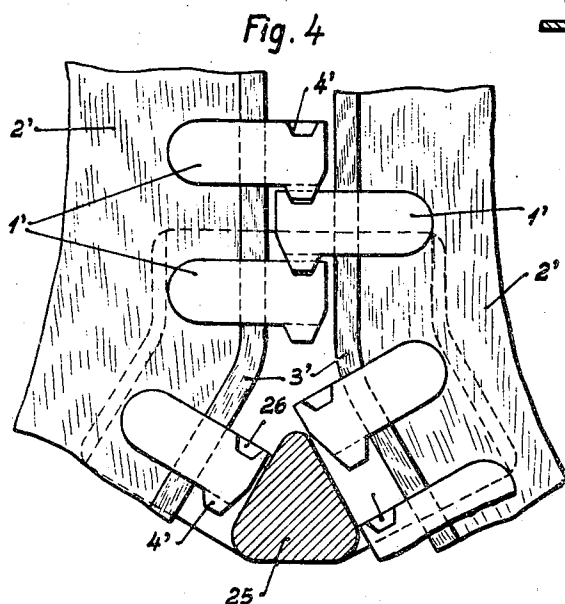
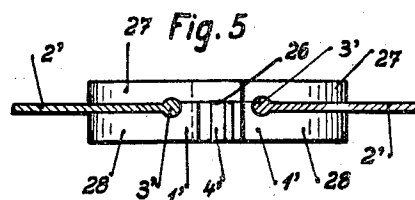
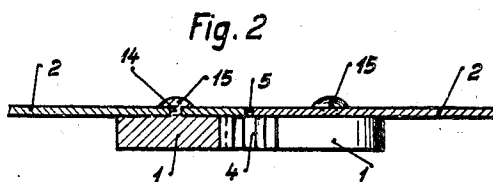
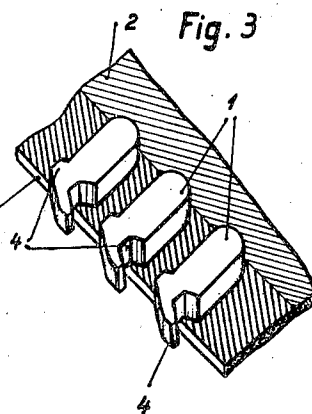
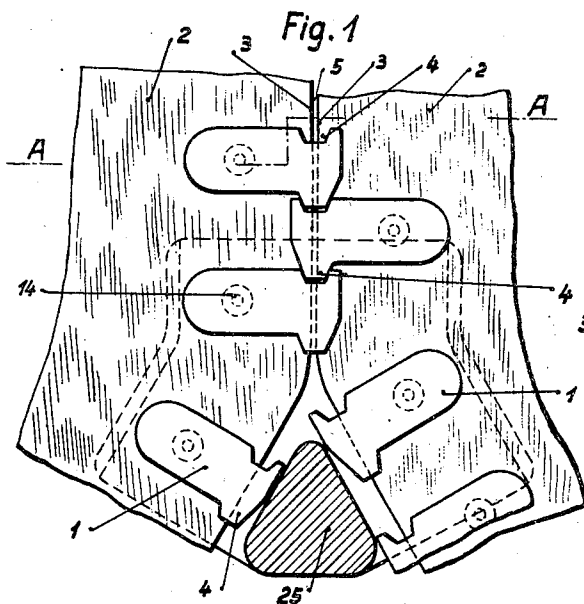
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2,184,265

APPARATUS FOR THE MANUFACTURE OF SLIDING CLASP FASTENERS

Original Filed Aug. 8, 1936

2 Sheets-Sheet 1



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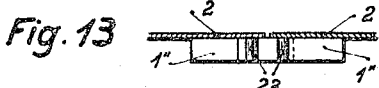
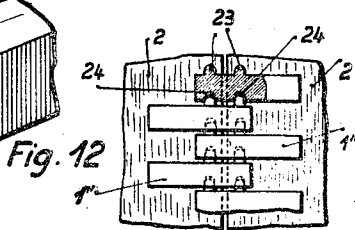
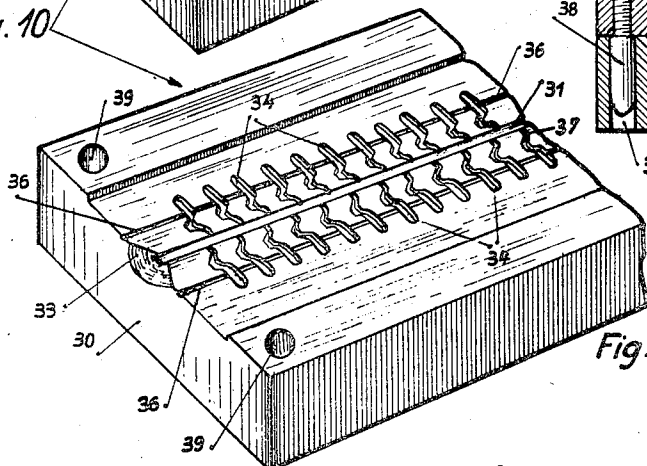
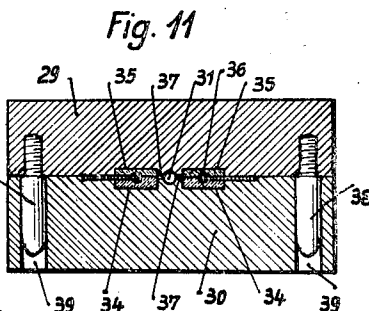
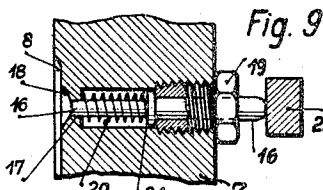
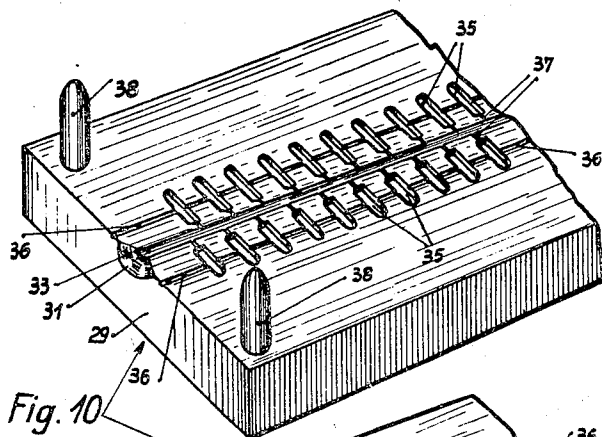
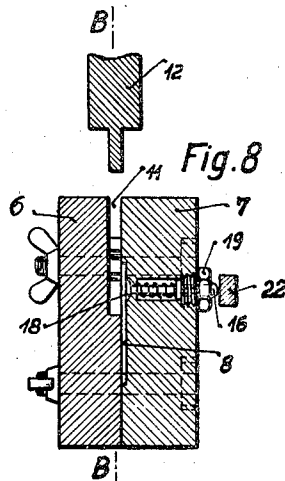
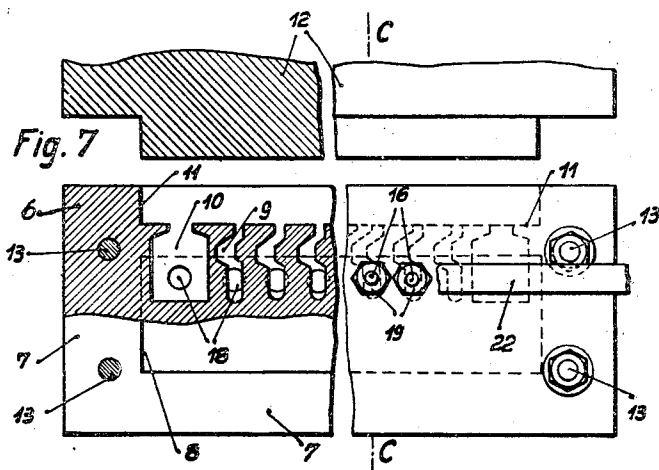
M. WINTERHALTER

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APPARATUS FOR THE MANUFACTURE OF SLIDING CLASP FASTENERS

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2 Sheets-Sheet 2



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## UNITED STATES PATENT OFFICE

2,184,265

APPARATUS FOR THE MANUFACTURE OF  
SLIDING CLASP FASTENERSMartin Winterhalter, Mercote-Castello, near  
Lugano, SwitzerlandOriginal application August 8, 1936, Serial No.  
98,308. Divided and this application June 9,  
1937, Serial No. 147,314. In Switzerland Sep-  
tember 19, 1935

## 8 Claims. (Cl. 18—42)

This is a division of my co-pending applica-  
tion No. 98,308.

This invention relates to a sliding clasp fastener and a process and apparatus for the manufacture thereof.

The interlocking members of sliding clasp fasteners are either fastened as ready formed parts individually to the stringer or, however, are cast directly in suitable rows on the stringer. In the first case, the interlocking members are fastened on the stringer in the case of interlocking members made of metal, by clamping together, and in the case of members formed of non-metallic material, by glueing or sticking the shank of the interlocking member. The glueing of the members is extremely difficult and less reliable. In the second case, casting, injection or chill casting and casting under pressure are employed for moulding the interlocking members, in which must be used, according to the particular process desired to be used, various different mould boxes. These have the disadvantage that they are complicated and too delicate, firstly, in that the form of the interlocking member necessitates a mould box having more than two parts and secondly, in that, for example, by neglect of sludge defective articles are produced.

The object of this invention is to overcome these faults present in sliding clasp fasteners having interlocking members moulded directly to the stringer.

In my co-pending application No. 98,308 from which this application has been divided, the interlocking members are provided with coupling parts proper which are cast as a whole in a two-part mould, the coupling parts extending in one direction only to the casting seam and at least the coupling recesses extend in the other direction as far as the edge of the members.

In this way, the coupling parts can be moulded on the interlocking members on one side and as a whole, as they exhibit no parts crossing the casting seam. The coupling parts do not project above the casting seam and thus not above the dividing joint of the mould serving for the manufacture of the sliding clasp fastener, so that the latter need have no projections extending into the other mould part and can thus have a completely smooth dividing joint, which is easy to grind and guarantees a secure tightening of the mould. Further, there is the advantage that the casting seam in spite of the only simply divided mould does not cross the coupling parts, so that the members exhibit at

the coupling parts no burr and an objection-free operation of the sliding clasp fastener is ensured.

Preferably the claw-like coupling parts have the form of ridges and grooves extending transversely to the stringer which do not project at one end above the plane of the stringer and at the other end at least as regards the coupling recess run right to the edge of the members.

The object of this invention is to provide a mould for manufacture of such interlocking members and accordingly in accordance with this invention I provide a two-part casting or press mould, the mould parts of which serving for the production of the coupling parts, particularly the coupling recesses on the interlocking members, are each arranged solely in one mould part, so that in the range of the moulding positions there are no parts projecting above the superimposed surfaces of the two moulding parts when the mould is closed.

With coupling parts arranged only on one side the mould parts serving for their production are arranged solely in one part of the mould, whilst the other part serves merely as a closing cover or for the moulding of such parts of the members which lie outside of the range of the coupling parts. Such moulds serving for the direct moulding of the members to the stringer are not only simple and cheap to manufacture but guarantee also a long length of service.

The interlocking members can thus engage the edge of the stringer or be arranged on one side of the stringer. In the first case each of the coupling parts extends only over a part of the breadth of the member and the coupling recesses have at their inner end a rigid shoulder which, with the fastener closed, prevents lateral separation or sliding apart of the interlocking members. In the second case the coupling parts extend over the whole breadth of the members and a lateral sliding apart of the members with the fastener closed is prevented by arranging the coupling parts laterally adjacent the stringer so that the edges thereof extend into the range of the interengaging coupling parts, preferably to the middle thereof, so that the interlocking members are completely covered on one side by the stringer.

In order that the invention may be fully understood, I will now describe some embodiments thereof by way of example by reference to the accompanying drawings, in which:

Fig. 1 is an elevation of a part of a complete sliding clasp fastener,

Fig. 2 is a section on line A—A of Fig. 1,

Fig. 3 is a perspective view of a part of the sliding clasp fastener.

Fig. 4 is a similar view to Fig. 1, but showing a modified construction of fastener,

5 Fig. 5 is a plan view of Fig. 4,

Fig. 6 is a perspective view of a part of the sliding clasp fastener shown in Fig. 4,

Fig. 7 shows apparatus for producing the sliding clasp fastener according to Figs. 1 to 3, in elevation and section on the line E—B of Fig. 8,

10 Fig. 8 is a section on the line C—C of Fig. 7,

Fig. 9 is a view to a larger scale of a detail of Fig. 5,

Fig. 10 is a perspective view of the upper and lower portions of a mould for producing the sliding clasp fastener according to Figs. 4-6,

Fig. 11 is a cross section of the mould in the closed position, and

20 Figs. 12 and 13 are a front elevation and plan respectively of a modified form of the sliding clasp fastener shown in Fig. 1.

The sliding clasp fastener illustrated consists, in a known manner, of two stringers 2, on the opposed longitudinal edges 3 of which are arranged the mutually engaging interlocking members 1 having claw-like projections and depressions 4 which members can be brought into and out of engagement with one another by means of a slider 25. The interlocking members are made in a simple two-part casting or pressure mould without a burr which would injuriously affect the engagement being formed within the range or area of the coupling positions of the members.

35 For this purpose, in the sliding clasp fastener according to Figs. 1 to 3, the interlocking members are arranged laterally on the stringers 2 and their coupling parts proper 4 formed of a trapezoidal rib and corresponding groove extend over the whole thickness of the interlocking members. In this way, it is possible to mould the coupling parts proper in a mould directly to the stringers so that the division of the mould lies outside the range of the coupling positions of the members. In order to prevent the members from sliding apart transversely to the plane of the stringers, the stringers 2 extend into the range of the coupling parts 4, a small space 5 being left. The edges 3 of the stringers can also extend right to the middle of the coupling parts so that they secure the interlocking members not only against sliding apart but, at the same time, completely cover them on one side. For increasing the secure connection of the interlocking members with the stringers, the latter are provided, see Fig. 2, with holes through which the members 1 engage with a suitable pin 14, the free end of which is broadened out to form a rivet-like head 15 lying on the other side of the stringer.

60 For producing the sliding clasp fastener according to Figs. 1 to 3, the apparatus shown in Figs. 7 to 9 can be used. It consists of a two-part press mould 6 and 7. The mould box part 6 is provided with a recess or cut out portion 8 which serves to receive the stringer 2 during the moulding of the interlocking members. This cut out portion for taking the stringer could also be arranged in the box part 6 instead of in the box part 7. The box part 6 is provided with recesses 9 and 10 which are covered by the box part 7 lying on the box part 6 and which form the individual moulds for the interlocking members and the end members of the clasp fastener.

75 As will be seen, the interlocking members 9,

as well as the end members 10, are moulded in the box part 6 whilst in the mould part 7 are formed only the parts passing through the stringer, namely, the fastening rivets 14, 15. Above the moulds for the interlocking members, the box parts 6 and 7 form a groove 11 which is connected with the mould parts 9 and 10 and is intended for receiving the material and the press ram 12 necessary for forming the interlocking members. The box parts 6 and 7 are connected releasably with one another by means of wing screws 13 or the like. A particularly accurate centering of the two parts of the box is not necessary because the cut out portions serving for forming the interlocking members are arranged only in one part of the box.

The production of the sliding clasp fastener having interlocking members moulded in rows directly to the stringer can advantageously be so carried out that, after placing the stringer 4 in the cut out portion of the box part 7, the box parts 6 and 7 are closed together by the wing screws 13 thus securely clamping the stringer. The moulding material introduced into the groove 11 is forced, by means of the press ram 12, into the parts of the mould 9, 10, the latter being heated according to the type of material to be used, the material and the degree of heating thereof being, however, so chosen that there is no likelihood of a burning of the material or of the stringer.

During the pressing operation, a portion of the material penetrates into the stringer if the latter consists of a porous material, for example, cloth. In this way, the interlocking members are fastened in the stringer. In order now, however, to be able to use non-porous stringers for the sliding clasp fastener, as well as also in order to attain absolute safety as regards the securing of the interlocking members in connecting them to porous stringers, there is provision during the pressing operation of producing rivet-like securing means which, as already mentioned, consist of the heads 15 penetrating the stringers. For this purpose needle-like rams 16 are arranged in the box part 7 corresponding to the individual mould portions 9, 10, which rams are movable vertically to the cut-out portion 8. They are displaceable with respect to the latter in a guide 17 which opens into a, for example, semi-spherical recess 18 leading to the recess 8, and which, for its part, serves for forming the rivet head 15. At the other end the rams 16 are guided in a screw 19 the end of which, lying in the box part 7, serves as a stop for the ram 16, a spring 20 being provided which has the purpose of forcing the ram 16 with its stop 21 towards the screw 19. The rams 16 are connected by a pressure rod 22 at their ends projecting out of the screws 19.

The moulding of the rivet-like securing means 14, 15 is effected during the moulding of the interlocking members in that, on pressing of the material into the parts 9, 10 of the mould, the rams 16 are forced by means of the press rod 22 under the tension of the carrier 20 through the stringer 2 and are advantageously held in this position until the press moulds are completely filled with the material. Then, that is to say still during the action of the press ram 12, the rams 16 are freed for returning to their original position and they move back under the action of the springs 20. In this way, material, under the action of the press ram 12, follows the moving ram and fills the hole formed in the stringer

and the recess portion 18 lying therebehind, the rivet-like fastenings of the interlocking members being thereby moulded. According to the drawings, one side rivet is provided for each interlocking member. If desired, however, a plurality of such rivet-like securing means may be arranged at each interlocking member.

In the second embodiment of the sliding clasp fastener according to the invention, according to Figs. 4 to 6, the securing of the members 1' against separation transversely to the plane of the stringers 2' is not effected, as in the embodiment according to Figs. 1 to 3, by the stringers, but by the coupling parts proper themselves. These latter are extended in the embodiment according to Figs. 4 to 6, only with one end as far as the edge of the interlocking members, so that the coupling recess 4' is formed at one end with a rigid shoulder 26. Consequently, on the setting up of forces in the direction of separation of the interlocking members 1' transversely to the plane of the stringers, the interlocking member arranged on one stringer is always supported with its coupling projection on the front wall 26 of the recess of the member arranged on the other stringer, whilst the latter again lies with the front wall of its recess on the projection of a member present on the other stringer. In consequence of the securing exclusively by the coupling parts, the interlocking members in this way also need not any more be arranged on one side of the stringer, but the edges of the stringers 2', as is usual with the known clasp fasteners, can engage in a forked-like manner with two shanks 27 and 28 the stringers being thickened at their stringer edges 3' into the form of a roller to increase the security of the members 1' against drawing off of the stringers 2'.

To produce these members the mould illustrated in Figs. 10 and 11 can be employed, which mould consists of an upper part 29 and a lower part 30. The upper part and lower part have a trough 31 which is formed at one end with a widened portion 33 forming, when the mould is put together, a casting gutter. Depressions or recesses 34, 35 are arranged in both mould halves on both sides of the channels 31 which are connected by small channels 37 with the channels 31 and form the individual moulds for the interlocking members 1' according to Figs. 4 to 6. In this way, the individual moulds are the same distance from one another as are the members in the finished clasp fastener. Moreover, suitable recesses 36 are provided for the stringers 2'. The form of the members and the division of the mould are so chosen that the coupling parts proper of the members are moulded exclusively in one of the mould parts and indeed, for example, the lower part 30, whilst in the upper parts of the mould are formed only the one fastening shank 27 and the front wall 26 of the members serving for the one-sided closing of the coupling recess 4'. With this arrangement, during the moulding of the members, the formation of burrs crossing the coupling parts is prevented in that the division of the mould lies on one side at the end of the coupling parts. As in the modified arrangement the upper and lower parts of the mould must register accurately when in position, the upper part is provided with pins 38 and the lower part with corresponding holes 39.

The manufacture of the sliding clasp fastener according to Figs. 4 to 6 is effected with the aid of the moulds (Figs. 9-11) in a simple manner

in that firstly, the two stringers 2' are laid in the corresponding recesses 36 of the lower part 30 of the mould, the upper part is then laid on the lower part, the pins 38 of the upper part penetrating into the holes 39 of the lower part. The moulds are then securely clamped together by means of clamps or between dies. Then, the heated material serving for the formation of the members is forced in through the casting gutter 33 into the longitudinal channel 31 from which the material flows through the small branch channel 37 into the individual moulds of the members, fills the latter and according to the permeability of the stringer also penetrates the latter between the shanks 27, 28. After the pressing of the mould has been completed and after the setting of the material, the upper part of the mould is removed, the stringers with the finished members and the dead or waste ends are taken out of the lower part, whereupon by slight agitation, the dead or waste ends can be broken away from the members. The stringers, after arranging the slider, are then connected together at one of their ends by special members and are provided at their other ends with end members which prevent the sliding off of the slider. Naturally, in this case also, the end members can be produced with the other members in the mould.

In the embodiment according to Figs. 12 and 13, the coupling parts proper of the members 1'' consist of two parallel ridges 23 and recesses 24. Moreover, the interlocking members 1'' are arranged in the same manner on their stringers as in the embodiment according to Figs. 1-3, and can therefore be made in a corresponding manner.

As already mentioned, the illustrated embodiments are by way of example only, and the invention is not limited thereto. Moreover, many modifications and other embodiments are also possible, for it is essential only that the interlocking members be so moulded on their stringers in a simple manner such that a burr formation at the coupling positions of the members is avoided, the coupling part not crossing the joint of the mould.

I claim:

1. Apparatus for the manufacture of sliding clasp fasteners having interlocking members moulded directly to the stringers, including a two-part mould-box, said mould-box having therein a recess for the reception of a stringer, a casting channel for the moulding material, and a plurality of moulds corresponding to the dimensions of the interlocking members to be produced; a plurality of projections carried by said mould-box and serving for the production of the coupling recesses, said moulds and projections being arranged exclusively in one part only of said mould-box and said stringer-recess extending into the range of said projections; and means for forming a rivet-like connection between the moulded interlocking members and the stringers.

2. Apparatus for the manufacture of sliding clasp fasteners having interlocking members moulded directly to the stringers, including a two-part mould-box, said mould-box having therein a recess for the reception of a stringer, a casting channel for the moulding material, and a plurality of moulds corresponding to the dimensions of the interlocking members to be produced; a plurality of projections carried by said mould-box and serving for the production of the coupling recesses, said moulds and projections

- being arranged exclusively in one part only of said mould-box and said stringer-recess extending into the range of said projections; and means for forming a rivet-like connection between the
- 5 moulded interlocking members and the stringers, said means comprising rams associated with the individual moulds for said interlocking members and a spring-loaded pressure rod engaging said rams.
- 10 3. Apparatus for the manufacture of sliding clasp fasteners having interlocking members each having a projection and a recess forming the coupling portion thereof, and said members being moulded directly to the stringers, including a two-
- 15 part mould-box, said mould-box having therein a central casting channel for the moulding material; a groove for the reception of a stringer disposed on each side of said central channel and a plurality of rows of moulds for forming
- 20 said interlocking members communicating with said central channel; and each of said moulds including a recess for forming a coupling projection and a projection for forming a coupling recess, said recesses and projections being arranged
- 25 exclusively in one of said mould parts and said projections lying entirely within the area of said mould part and thus extending at the most only as far as the dividing joint of the mould, whereby the latter can be ground smooth to ensure an
- 30 accurate fit of said other mould part.
4. Apparatus for the manufacture of sliding clasp fasteners having interlocking members, each having a projection and a recess forming the coupling portion thereof and said members
- 35 being moulded directly to the stringers, including a two-part mould-box, said mould-box having therein a central casting channel for the moulding material; a recess for the reception of a stringer, and a row of moulds for forming said
- 40 interlocking members, disposed on each side of said channel, said moulds communicating with said central channel and the moulds of one row being disposed in staggered relation to those in the opposite row; and each of said moulds including
- 45 a recess for forming a coupling projection and a projection for forming a coupling recess, said recesses and projections being arranged exclusively in one mould part only and said projections lying entirely within the area of said mould part
- 50 and thus extending only at most as far as the dividing joint of the mould, whereby the latter may be ground smooth for the purpose specified.
5. Apparatus for the manufacture of sliding clasp fasteners having interlocking members
- 55 moulded directly to the stringers, including a two-part mould-box, said mould-box having therein a recess for the reception of a stringer, a casting channel for the moulding material, and a plurality of moulds corresponding to the dimensions
- 60 of the interlocking members to be produced, each of said moulds including a recess for forming a coupling projection and a projection for forming

a coupling recess, said recesses and projections being arranged exclusively in one of said mould-parts for the purpose specified.

6. Apparatus for the manufacture of sliding clasp fasteners having interlocking members each having a projection and a recess forming the coupling portion thereof and said members being moulded directly to the stringers, including a two-part mould-box; said mould-box having therein a recess for the reception of a stringer, a casting channel for the moulding material, and one of said mould parts having therein a plurality of moulds for forming entire interlocking members, said moulds each including a recess for forming a coupling projection and a projection for forming a coupling recess, said projections each lying entirely within the area of said mould part and thus extending at the most as far as the dividing joint of the mould, whereby said mould part can be ground smooth to secure an accurate fitting of said other mould part which forms a closing cover therefor.

7. Apparatus for the manufacture of sliding clasp fasteners having interlocking members each having a projection and a recess forming the coupling portion thereof and said members being moulded directly to the stringers, including a two-part mould-box; said mould-box having therein a recess for the reception of a stringer, a casting channel for the moulding material, and one of said mould parts having therein a plurality of moulds for forming entire interlocking members, said moulds each including a recess for forming a coupling projection and a projection for forming a coupling recess, said projections each lying entirely within the area of said mould part and thus extending at the most as far as the dividing joint of the mould, whereby said mould part can be ground smooth to secure an accurate fitting of said other mould part, which forms a closing cover therefor, and said stringer-recess extending into the range of said projections.

8. Apparatus for the manufacture of sliding clasp fasteners having interlocking members formed with a forked end and each having a projection and recess forming the coupling portion thereof, and said members being moulded directly to the stringers, including a two-part mould box, said mould-box having therein a recess for the reception of a stringer and a casting channel for the interlocking member-moulding material and a plurality of moulds for forming the interlocking members, each of said moulds including a recess for forming the coupling projection and a projection for forming the coupling recess, said recesses and projections being arranged exclusively in one of the said mould parts, and the other mould part having therein recesses for forming rigid closing walls for the coupling recesses and a groove for forming one shank of said forked end of said interlocking members.

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