This invention relates to the manufacture of sliders for slide fasteners and more specifically to means for bending preformed sliders to the final shape required for the proper operation of the sliders in the fasteners.

It is well known that the sliders, usually produced from sheet metal, are formed with two wing sections having side flanges and interconnected by a web portion or neck of the slider. In the final form of the slider, the wing sections are in spaced parallel relationship to one another and the side flanges thereof cooperate to form channels adapted to guide and displace the interlocking elements or loops of the fastener to close or open in the same movement of the slider.

According to a common method of manufacturing sliders, the material is first suitably treated to produce a flat structure defining the wings and the neck of the slider, that is, to form an open or distended slider; the distended slider is then subjected to a bending or folding operation to displace the wings relative to the neck to their final position, after which the neck portion is usually provided with a V-shaped reinforcement, or, if the like, to stiffen the slider against compression or expansion forces tending to displace the wings when the slider is in use. Alternatively, the neck reinforcement may be directly formed in the blank metal prior to the production of the distended slider therefrom. In another method of manufacture, the material is subjected to operations that result in the formation of a reinforced and already partially folded slider, wherein the wings extend at an angle of less than 90° to one another, after which the formation of the slider is completed by means of a final bending operation whereby the wings of the sliders are brought to their final parallel position in predetermined spaced relation.

It is the general object of the invention to provide a novel and improved mechanism for performing the final bending operation aforesaid on preformed, partially folded sliders, which is of simple and compact construction as compared with analogous devices of the prior art, reliable in operation, and capable of functioning satisfactorily over a prolonged period of time. Particularly, an object is to provide novel and simplified means for controlling the deformation of the sliders during the bending operation.

More specifically, it is an object of the invention to provide novel and improved mechanism for traversing the partially folded sliders from a point of feeding to a point at which the final bending operation takes place, and for positively controlling the amount of deformation of the sliders under the action of a suitable punch at the point of bending, to insure that the correct final shape of the slider is obtained.

Another object is to provide a rotary assembly incorporating means for transporting the sliders to the point of bending and an element for each slider movable, during the travel of the slider to the point of bending, to a final position relative to the slider in which the element functions both as a slider-holding element and as an anvil cooperating with the bending punch in the slider bending operation.

Further, it is an object to provide elements functioning as aforesaid, which are adapted to extend into the partially folded sliders at the point of bending and are shaped to provide therein surfaces limiting the deformation of the sliders to the amount required to define the correct final relative position of the slider wings.

These and other objects will become apparent in the following description of the invention illustrated in the drawings, wherein:

Fig. 1 is a front elevational view of a slider bending machine according to the invention.

Fig. 2 is a top plan view of the machine of Fig. 1 with the upper structure thereof removed and parts of the remaining structure broken off to show underlying elements.

Figs. 3A-3B are parts of an enlarged vertical sectional view through the machine on line 3-3 of Fig. 2, interrupted along the match line M-M, illustrating the slider bending means.

Fig. 4 is a perspective view of a preformed partially folded slider in condition for feeding to the machine.

Fig. 5 is a perspective view of the same slider after the final bending operation.

Fig. 6 is a fragmentary vertical sectional view, similar to Fig. 3 and showing part of the structure illustrated in the latter figure, with slider bending means in operative position.

Fig. 7 is a similar fragmentary vertical sectional view, showing slider bending means in inoperative position.

Fig. 8 is an elevational view, partly in vertical section, of a rotatable member forming part of the means for transporting the sliders from a point of feeding to a point of bending.

Fig. 9 is a bottom plan view of the member of Fig. 8.

Fig. 10 is a fragmentary enlarged top plan view of a grooved ring forming part of the slider-transporting means.

Fig. 11 is a fragmentary enlarged elevational view, partly in section, illustrating a slider and means cooperating to bend the slider into its final shape at the completion of the bending operation.

Fig. 12 is a top plan view of one of the elements or arbors slidable in the grooves of the ring of Fig. 10, which cooperate in the bending of the sliders.

Another object is to provide a rotary assembly of Fig. 12.
Fig. 14 is a vertical section on line 14—14 of Fig. 11.

Fig. 15 is an end elevational view of the portion of the grooved ring of Fig. 10 with the element of Fig. 11 mounted thereon.

Referring now in detail to the drawings, 10 indicates a stationary table consisting of a plate which is suitably supported in a fixed horizontal position, being secured, for instance, to a standard base. The table is centrally apertured to receive a bushing 12 suitably fixed thereto, wherein there is mounted a spindle 14. Keyed and fastened to the upper end of said spindle above the table 10, as by the nut 15, is a circular member or plate 16 forming part of a rotary slider-transporting assembly hereinafter described. Similarly keyed and fastened to the lower end of the spindle 14, as by means of a nut, 18, underneath the table 10 is a ratchet wheel 20 which is actuated to rotate the spindle 14 and the slider transporting assembly associated therewith, in the manner later described.

Referring now to Figs. 3A—2B and 8—9, it will be seen that the member 16 is provided with a central recessed portion 22, the top wall thereof having an opening 23 to receive the upper end of the spindle 14, to which the member is fastened, said recessed portion defining in the member an annular portion 24 extending to the table 10 when the member is mounted on the spindle 14. The recessed portion 22 receives a stationary cam 25 which consists of a cam element 26, suitably fixed to the upper face of the table and having a peripheral flange 27, and of a smaller cam element 28 superimposed upon the element 26 in spaced relation to the flange 27 thereof to define with this latter a cam groove 30 for the purpose hereinafter described.

The annular portion 24 of the member has its lower face circumferentially recessed, as shown at 32, and is provided with a plurality of uniformly spaced radially arranged grooves or recesses 33, of rectangular cross-section; said recesses define a plurality of guideways for as many elements 35 which fit the recesses and are mounted in the same for sliding movement longitudinally thereof, along the upper surface of the table 10. The element 35 has at its rear an integral extension 36 projecting into the recessed portion 22 of the member 16 on top of the cam 25, this extension has secured thereto a cam follower 37 projecting therefrom into the cam groove 30.

As will be apparent, the elements 35 being in this manner operatively associated with the cam 25 are displaced thereby, during the rotation of the member 16, radially of said member along the guideways 33 between an innermost and an outermost position shown respectively in Figs. 3B and 3A. To insure smooth operation, all the contacting surfaces are accurately machined and suitable lubricating means are provided.

The recess 32 in the lower face of the annular portion 24 of the member 16 is adapted partially to receive a ring 44, which extends outwardly of the periphery of the member 16 as shown in Fig. 2, the ring being secured to and carried by the member 16 flush with the lower face of the latter, by means of a number of screws 45 passing through threaded holes 46 in the annular portion 24 of the member 16. The ring 44 is provided with a plurality of radially extending grooves or guideways 47 spaced from each other by the same angular intervals as the recesses 32.

Said guideways (see Figs. 14, 15) comprise ledge-defining side groove portions 48, and a deeper center groove portion 49 the depth of which is such as to define a bottom wall in the ring of a thickness corresponding to that of a wing 50 of a slider 51 (of the type shown in Figs. 4, 5) and the width whereof is substantially equal to the width of the slider wing measured inwardly of the side flanges 52 thereof. At the outer end of each guideway, for about one-fourth of its length, the bottom wall aforesaid is cut away and the side walls of the guideway are undercut and rounded off to define a recess 54 having a contour corresponding to the outer contour of a wing of a slider, so that a partially folded slider placed on the table 10, with one of the wings 50 entered into said recess in abutment with the end of the bottom wall aforesaid, as indicated in broken lines in Fig. 10, will be held therein in a predetermined position for the purpose hereinafter apparent. In the assembled condition of the ring 44 and member 16 described, the guideways 47 of the ring are coaxial with the recesses 33 of the member and which they correspond in width and into which they partially extend, the aforementioned recesses 54 being then located outwardly of the periphery of the member 16 and freely accessible.

Each element 35 is underwound at the outer portion of its base to provide therein a recess 56 permitting movement of the element to the outermost position thereof (as best shown in Fig. 11) without interference by the ring 44. Said recess 56 is, furthermore, intended to receive portions of an element 58 shown, hereinafter termed an "arbor" which is secured to the elements 35 as by means of a screw 61 passing through the element and insertable through a slot 62 formed at the periphery of the member 16 in the top wall of the recess 33. The arbor 58, which therefore functions as a unit with the element 35, is slidably mounted on the guideway 47 of the ring 44 for longitudinal reciprocation therealong simultaneously with the actuation of the elements 35. The arbor comprises (see Figs. 12—15) an elongated body 63 having at its end an arbor-locating projection 64 and a threaded hole 65 for the screw 61; parallel wings 67 extend along the opposite sides of the body 63. Said wings rest on the edge-defining side groove portions 48 of the guideway 47, while the portion of the body underneath the wings is slidably received in the center groove portion 49.

The body 63 of the arbor 58, which is of substantially rectangular cross-section, precisely fits the groove portion 49 and has therefore a width just slightly less than the width of the portion of the slider measured between the side flanges thereof; the thickness of said body is made substantially equal to the distance between the opposed inner faces of the slider wings required in the finished slider. The wings 67 of the arbor (which have a width corresponding to that of the side groove portions 48), are of a thickness substantially equal to the distance that will exist between the side flanges 52 of the opposed slider wings in the finished slider, and the sloping forward end of the arbor is provided with a slot 68 adapted to accommodate the neck portion 69 of the slider.

As illustrated in Figs. 2, 3A, 3B, the stationary cam 25 on the base plate 18 is profiled to retain the slidable elements 35 and therefore the arbor 58 in an innermost or retracted position in the circular member 16, when said elements and arbors are at the front of the machine as seen
8,453,860 in Fig. 2. In this retracted position, the arbors leave the aforementioned recesses 54 at the outer ends of the guideways 47 entirely exposed, so that the sliders 51 may be entered into said recesses by manual feeding or other suitable means, with one of the 55 resting on the table 10 in horizontal position and the other wing embodying the usual ball-attaching lug 53 extending upwardly at an angle thereto. In the rotation of the member 16 during operation of the machine, the cam 25 gradually causes radial outward movement of the elements 35 and arbors 60 relative to the member 16, while elements and arbors are carried by the member in a circular path, until the arbors are moved to an outermost or operative position in which they overlie the recesses 54 of the guideways 47 with their forward slotted end 69 projecting therefrom.

This outermost position is reached when the arbors arrive at a predetermined point at the back of the machine at which the bending of the sliders takes place, after which the arbors are caused gradually to move again to their retracted position. Actually, the cam 25 is so profiled as to cause the arbors to remain substantially in their retracted position during their travel throughout the half circle defined by the diameter perpendicular to the diameter passing through the bending point, whereby a plurality of recesses 54 will be exposed at the same time for simultaneous feeding of a plurality of sliders, and to cause the sliders to move to their outermost position and return to their retracted position substantially within the half circle inclusive of the point of bending, whereby to permit discharge of the sliders at a point suitably spaced from the feeding point.

The partially folded sliders 51 fed to the recesses 54 of the guideways 47, as aforementioned, are transported thereby along a circular path in a clockwise direction to the point of bending, during which movement they are also guided by plates 72, 73 fixed to the table 10 and extending from the front of the machine to the point of bending, which provide curved edges slightly spaced apart to prevent substantially preventing movement of the sliders on the plate 10 out of the recesses 54.

As the bottom wall of the guideways 47 has a thickness substantially equal to that of a wing of the body 63 of the arbors has a width substantially corresponding to the length of a slider wing measured between the side flanges thereof with suitable tolerances, as aforesaid, it will be evident that the body of each arbor, while being moved to its outermost position, will gradually enter the slider located in the respective recess 54 and extend over the slider wing resting on the horizontal table 10 close to the upper face and between the side flanges thereof; further in its outermost position, the arbor will completely overlie the slider wing and receive the neck 69 of the slider within its slotted end portion 68. Therefore, the slider will be held against vertical displacement by the table 10 and the arbor 69, and against lateral displacement by the peripheral walls of the recess 54 and the arbor. The edge of the plate 73 prevents any objectionable outward movement of the slider resulting from thrusts that might be exerted thereon by the arbor while entering the slider.

The slider thus held by the arbor is subjected at the bending point to the action of a suitable vertically reciprocable punch 76, which engages the upwardly extending free wing of the slider and displaces the same relative to the engaged wing to a position parallel to this latter, thereby deforming the slider to the final shape shown in Figs. 5 and 11. The punch 76 is suitably shaped in relation to the configuration of the slider wing to exert proper pressing action, and specifically is provided with a recess 77 to accommodate the ball-attaching lug 53 and avoid deformation thereof. To prevent outward displacement of the slider relative to the arbor under the action of the punch, there is provided a horizontally reciprocable finger 80 which is actuated simultaneously with the punch 76 into abutment with the end of the arbor and with the neck 69 of the slider, in the manner hereinafter described.

It is apparent from the foregoing that the displacement of the free wing of the slider is positively controlled and limited to the amount required to obtain the described parallel relationship of the wings, by virtue of the described configuration and dimensions of the body of the arbor itself functioning as an anvil; in addition, the wings 67 of the arbor which project laterally of the body thereof and are interposed between the side flanges of the opposite slider wings at the time of bending, provide further means for controlling the displacement of the slider wing, since their thickness corresponds to the final distance between said side flanges.

After the bending operation, the sliders remain on the arbors, which they envelop, within the recesses 54 of the guideways 47, and are carried along the table 10 to the entrance opening 82 of a discharge chute 83 provided in the table and extending underneath the wing 44 (Fig. 2). At this point, the arbors will have substantially completed their return movement to the retracted position, and the sliders will therefore be allowed normally to fall by gravity into the chute.

The member 10 is intermittently rotated to actuate the structure described from the ratchet wheel 20, which in turn is actuated by a pawl 86 fixed to a plate 81 horizontally reciprocated by a feed bar 88 to which the plate is secured as by means of screws 89 (Fig. 2). The bar 88 is slidable mounted in tracks 90 secured to a fixed supporting plate 91, and is actuated by a bell crank 92, which is pivotally mounted on a bracket 93 secured to an extension 94 of the table 10 and engages a stud 95 of the bar with its bifurcated lower end (Fig. 1). The bell crank is rocked to reciprocate the feed bar through suitable conventional connecting means, such as shown at 96 in Fig. 1, from a crank shaft 97 driven in any suitable manner and mounted, for instance, in the head 98 of a standard press, to which press the table 10 may also be secured, as hereinbefore mentioned.

The punch 76 is carried by a horizontal arm 99 which is secured, as by screws 100, to a supporting member 101 vertically reciprocated to actuate the arm and the punch by the ram 102 of the press, within which ram the shank of the member is received and secured as at 103. The arm 99 is curved and carries at its free end an adjustable finger 104 above the opening 82 of the discharged chute 83, which finger is adapted to engage sliders overlying the opening 82 at the end of the downward stroke of the arm 99, to insure discharge of the sliders should these latter fall for any reason to fall by gravity through the opening.

The arm 99 also carries a dependent downwardly extending plunger 106 for actuating the retaining horizontally reciprocable finger 80.
This latter is mounted on the table 10 in a track formed by a grooved member 17 suitably fastened to the table, and is provided at its rear end with a slot 108 shaped as shown in Fig. 3A. The plunger 105 comprises a vertical portion 109 followed by an angularly extending portion 110 defining a cam surface, and by a lower vertical portion 111, offset relative to the portion 109, which extends through an opening 112 in the punch-carrying plate 87 secured to the feed bar 88. In the uppermost portion of the arm 99, in which the bending punch is inactive, the offset lower portion 111 of the plunger 105 extends through the slot 108 of the finger 86 and maintains the same in rearward position away from the adjacent arbor 60; however, during the downward movement of the arm 99, the cam portion 110 of the plunger will enter the slot 108 and displace the finger to a forward position as shown in Fig. 6 into engagement with the arbor 60 and the neck of a slider carried thereby, simultaneously with the descent of the bending punch 76, so that the finger may exert its slider retaining function during the slider bending operation.

The teeth of the ratchet wheel 28 are suitably arranged to cause rotation of the member 16, at each slider-receiving engagement with the pawl 85, by an amount equal to the angular interval between two successive guideways 47 of the ring 44, so that the sliders on the arbor 60 will be successively presented to the punch 16. Further, the means for actuating the feed bar 88 are suitably arranged to cause the said bar to perform its forward feeding stroke to operate the ratchet through the plate 87 and the pawl 88, during the upward movement of the punch-carrying arm 99, and to cause the bar to perform its return stroke (during which the pawl 88 slides along the ratchet wheel without displacing the same) during the downward movement of the arm 99, whereby to maintain the ratchet wheel stationary at the time of the action of the punch. A suitable brake, not shown, is preferably provided on the crankshaft 97 to control the rotation of this latter.

In order to prevent any accidental movement of the member 16 and associated elements during the bending operation, that might result in an unsatisfactory operation and jamming of the machine, a safety locking device 114 is provided (Fig. 2). Said device is fastened to the table 10 and incorporates a slidably mounted element 116 biased by a suitable spring to an outermost position wherein it partially projects from the body of the device into the recess 54 at the end of one of the guideways 47 of the ring 44 to prevent accidental movement of the ring, the device being located immediately after the point of discharge of the sliders, that is at a point where the arbor 60 have already been returned to their retracted position so as to free the recesses 54, but no sliders are contained therein. However, the projecting portion of the element 116 is so shaped in relation to the walls of the recesses 54 and the strength of the biasing spring is such that the element 116 is caused to be axially displaced against the spring to release the ring when the rotary assembly including the ring is positively driven by the ratchet wheel 28.

It is understood that changes and modifications may be made in the structures described and illustrated without departing from the spirit of the invention or exceeding the scope of the claims.

I claim:
1. In a machine for bending preformed partially folded sliders for slide fasteners, rotatable means for transporting sliders in succession from a point of feeding to a point of bending, a reciprocable punch acting on the sliders at the point of bending to deform the same to a predetermined final shape, and anvil members mounted for movement conjointly with and relative to said rotatable means and displaceable from a retracted position at the point of feeding of the sliders to an operative position at the point of bending of the sliders in which latter position said members extend between the wings of the transportable sliders to provide surfaces limiting the deformation of the sliders by the punch to the amount required to define said final shape of the sliders.
2. In a machine for bending preformed partially folded sliders for slide fasteners, rotatable means embodying peripheral portions adapted to receive and retain the sliders, a reciprocable punch acting on the sliders at the point of bending to deform the same to a predetermined final shape, anvil members mounted for movement conjointly with and relative to said rotatable means and displaceable from a retracted position at the point of feeding of the sliders from a retracted position relative to said sliders, said peripheral portions at the point of feeding of the sliders to an operative position at the point of bending in which latter position said members extend between the wings of the transportable sliders retained in the slider-receiving portions to provide surfaces limiting the deformation of the sliders by the punch to the amount required to define said final shape of the sliders, and means for preventing displacement of the sliders relative to the anvil members during the deformation thereof.
3. In a machine for bending preformed partially folded sliders for slide fasteners, a table, a rotatable structure on said table having a plurality of recessed portions, each conform to receive a wing of a slider placed on the table, for retaining and transporting sliders in succession from a point of feeding to a point of bending during rotation of the structure, a plurality of members mounted in the rotatable structure for movement therewith and displacement therein relative to said recessed portions between a retracted position at the point of feeding of the sliders and an operative position at the point of bending in which the members extend between the wings of the sliders retained by the recessed portions, and reciprocable means for engaging the free wings of the sliders at the point of bending to deform the sliders to their predetermined final shape, said members having surfaces adapted to limit the deformation of the sliders to the amount required for the attainment of said final shape thereof.
4. In a machine for bending preformed partially folded sliders for slide fasteners, a table, a rotatable structure on said table having a plurality of recessed portions, each conform to receive a wing of a slider placed on the table, for retaining and transporting sliders in succession from a point of feeding to a point of bending during rotation of the structure, a plurality of members mounted in the rotatable structure for movement therewith and displacement therein relative to said recessed portions between a retracted position at the point of feeding of the sliders and an operative position at the point of bending in which the members extend between the wings of the sliders retained by the recessed portions, and reciprocable means engaging the free wings.
of the sliders at the point of bending to deform the sliders to their predetermined final shape, said members having surfaces adapted to limit the deformation of the sliders to the amount required for the attainment of said final shape thereof, and means for preventing displacement of the sliders relative to the members under the action of said slider deforming means.

5. In a machine for bending preformed partially folded sliders for slide fasteners, a fixed horizontal table, a rotatable structure on said table having a plurality of peripheral recessed portions, each configured to receive a wing of a slider placed on the table, for retaining and transporting sliders in succession from a point of feeding to a point of bending during rotation of the structure, a plurality of members mounted in the rotatable structure for movement therewith and displacement therein relative to said recessed portions between a retracted position at the point of feeding of the sliders and an operative position at the point of bending in which the members extend between the wings of the sliders retained by the recessed portions, a reciprocable punch for engaging the free wings of the sliders at the point of bending to deform the sliders to their predetermined final shape, said members having surfaces adapted to limit the deformation of the sliders to the amount required for the attainment of said final shape thereof, a horizontally reciprocable finger movable to a position for preventing displacement of the sliders relative to the members under the action of said slider deforming punch, and means for actuating the rotatable structure, the punch and said horizontally reciprocable finger in predetermined time relation.

6. In a machine for bending preformed partially folded sliders for slide fasteners, a table, a rotatable structure on said table having a plurality of recessed portions, each configured to receive a wing of a slider placed on the table, for retaining and transporting sliders in succession from a point of feeding to a point of bending during rotation of the structure, a plurality of members mounted in the rotatable structure for movement therewith and displacement therein relative to said recessed portions between a retracted position at the point of feeding of the sliders and an operative position at the point of bending in which the members extend between the wings of the sliders retained by the recessed portions, and a reciprocable punch for engaging the free wings of the sliders at the point of bending to deform the sliders to their predetermined final shape, said members having embossed annular surfaces complementary to inner surfaces of the wings of the sliders defining the relative position of said wings in the finally shaped sliders.

7. A machine for bending preformed partially folded sliders for slide fasteners comprising a fixed table, a rotatable assembly on said table having a plurality of peripheral recessed portions, each configured to receive a wing of a slider placed on the table, for retaining and transporting sliders in succession from a point of feeding to a point of bending during rotation of the assembly, a plurality of members mounted in the rotatable assembly for movement therewith and displacement therein relative to said recessed portions between a retracted position at the point of feeding of the sliders and an operative position at the point of bending in which the members extend between the wings of the sliders retained by the recessed portions, fixed cam means on said table, means operatively connecting said cam means to said members for actuating the same in the rotation of the assembly, and reciprocable means for engaging the free wings of the sliders at the point of bending to deform the sliders to their predetermined final shape, said members having surfaces adapted to limit the deformation of the sliders to the amount required for the attainment of said final shape thereof.

8. A machine for bending preformed partially folded sliders for slide fasteners comprising a fixed table, a rotatable assembly on said table having a plurality of peripheral recessed portions, each configured to receive a wing of a slider placed on the table, for retaining and transporting sliders in succession from a point of feeding to a point of bending during rotation of the assembly, a plurality of members mounted in the rotatable assembly for movement therewith and displacement therein relative to said recessed portions between a retracted position at the point of feeding of the sliders and an operative position at the point of bending in which the members extend between the wings of the sliders retained by the recessed portions, fixed cam means on said table, means operatively connecting said cam means to said members for actuating the same in the rotation of the assembly, a reciprocable punch for engaging the free wings of the sliders at the point of bending to deform the sliders to their predetermined final shape, said members having surfaces adapted to limit the deformation of the sliders to the amount required for the attainment of said final shape thereof, a horizontally reciprocable finger movable to a position for preventing displacement of the sliders relative to the members during deformation thereof, and means for actuating the rotatable assembly, said punch and said finger in predetermined time relation.

9. A machine for bending preformed partially folded sliders for slide fasteners having wings at an angle to one another comprising a fixed horizontal table, a rotatable assembly on said table having a plurality of peripheral recessed portions, each configured to receive a wing of a slider horizontally supported by the table, for retaining and transporting sliders in succession from a point of feeding to a point of bending during rotation of the assembly, a plurality of members mounted in the rotatable assembly for movement therewith and displacement therein relative to said recessed portions between a retracted position at the point of feeding of the sliders and an outermost position at the point of bending in which the members extend between the wings of the sliders in the recessed portions aforesaid in retaining relationship to the wings horizontally supported by the table, and a vertically reciprocable punch for engaging the angularly extending free wings of the sliders at said point of bending and displacing the same into parallel relationship to the wings retained by the members.

10. A machine for bending preformed partially folded sliders for slide fasteners having wings at an angle to one another comprising a fixed horizontal table, a rotatable assembly on said table having a plurality of peripheral recessed portions, each configured to receive a wing of a slider horizontally supported by the table, for retaining and transporting sliders in succession from a point of feeding to a point of bending during rotation of the assembly, a plurality of members mounted in the rotatable assembly for movement therewith and displacement therein...
relative to said recessed portions between a retracted position at the point of feeding of the sliders and an outermost position at the point of bending in which the members extend between the wings of the sliders in the recessed portions aforesaid in retaining relationship to the wings horizontally supported by the table, and a vertically reciprocable punch for engaging the angularly extending free wings of the sliders at the point of bending and displacing the same relative to the wings retained by the members, said members embodying surfaces limiting the displacement of the free wings to a position parallel to the retained wings defining the final desired shape of the sliders.

A machine for bending preformed partially folded sliders for slide fasteners having wings at an angle to one another comprising a fixed horizontal table, a rotatable assembly on said table having a plurality of peripheral recessed portions, each portion configured to receive a wing of a slider horizontally supported by the table, for retaining and transporting sliders in succession from a point of feeding to a point of bending during rotation of the assembly, a plurality of members mounted in the rotatable assembly for movement therewith and displacement therein relative to said recessed portion between a retracted position at the point of feeding of the sliders and an outermost position at the point of bending in which the members extend between the wings of the sliders in the recessed portions aforesaid in retaining relationship to the wings horizontally supported by the table, and a vertically reciprocable punch for engaging the angularly extending free wings of the sliders at the point of bending and displacing the same relative to the wings retained by the members to deform the sliders to their predetermined final shape, and a horizontally reciprocable finger movable into abutment with the members to prevent outward displacement of the sliders relative to the members under the action of the slider-deforming punch.

A machine for bending preformed partially folded sliders for slide fasteners comprising a fixed horizontal table, a circular element rotatably mounted on said table, a ring secured to the periphery of said element in juxtaposition to the table, a plurality of radial guideways extending through said radial guideways into the table, a plurality of anvil members slidable in said guideways, cam means fixed to the table, means operatively connecting said cam means to said anvil members to cause the members to be displaced, during rotation of the structure, between a retracted position relative to said end portions of the guideways at the point of feeding of the sliders and an outermost operative position at the point of bending to deform the sliders to their predetermined final shape, said anvil members embodying surfaces complementary to inner surfaces of the wings of the sliders defining the relative position of said wings in the finally shaped sliders, a horizontally reciprocable finger movable into association with the end portions of the guideways at the point of bending to prevent displacement of the sliders relative to the anvil members under the action of the slider-deforming punch, and means for actuating the rotatable structure, the punch and said finger in predetermined time relation.

A machine for bending preformed partially folded sliders for slide fasteners comprising a fixed horizontal table, a rotatable structure on said table for transporting sliders in succession from a point of feeding to a point of bending, said structure embodying a plurality of radial guideways extending to the periphery of the structure each having an end portion configured to receive and retain a wing of a slider supported by the table, to transport sliders in succession from a point of feeding of the sliders to a point of bending during rotation of the ring, a plurality of anvil members slidable in said guideways, cam means fixed to the table, a central recess in the circular element for accommodating said cam means, radial grooves in the element aligned with the guideways, the ring, means extending through said guideways operatively connecting said cam means to said anvil members to actuate these latter, in the rotation of the circular element and ring, between a retracted position relative to said end portions of the guideways at the point of feeding of the sliders and an outermost operative position at the point of bending in which the members extend between the wings of the sliders retained by said end portions, a reciprocable punch for engaging the free wings of the sliders at the point of bending to deform the sliders to their predetermined final shape, said members having surfaces adapted to limit the deformation of the sliders to the amount required for the attainment of said final shape thereof, and a reciprocable finger movable into association with the end portions of the guideways at the point of bending to prevent displacement of the sliders relative to the members under the action of the slider-deforming punch.