

Sept. 16, 1930.

E. H. BINNS

1,776,142

FLEXIBLE CLOSURE

Filed March 30, 1929

Fig. 1.

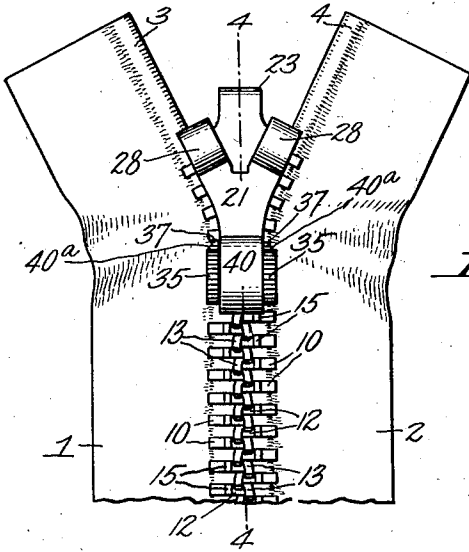


Fig. 2.

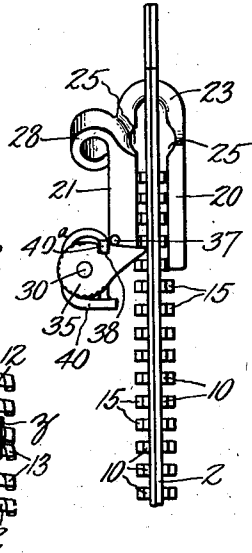


Fig. 9.

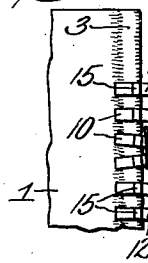


Fig. 3.

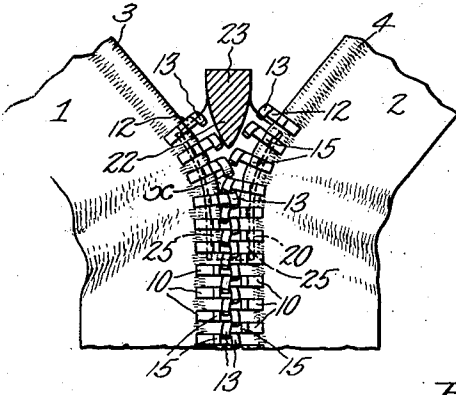


Fig. 5.

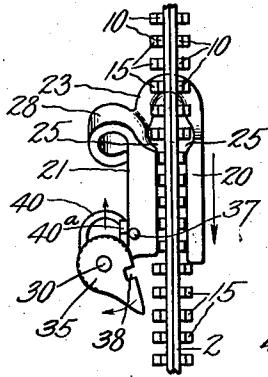


Fig. 4.

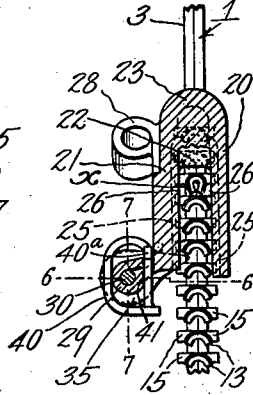
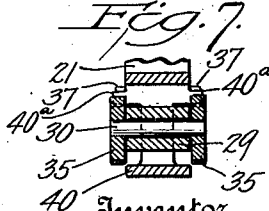
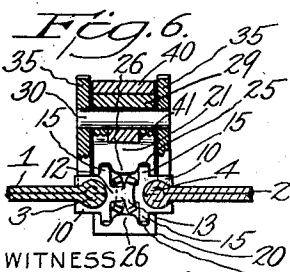
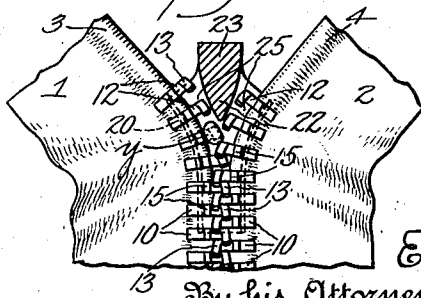


Fig. 8.



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FLEXIBLE CLOSURE

Application filed March 30, 1929. Serial No. 351,202.

The present invention relates generally to improvements in the type of flexible closures comprising two flexible strips or stringers carrying spaced interlocking fastening devices, and a cam slider operating upon said fastening devices for moving them into and out of interlocking engagement. More specifically, the present invention is particularly adaptable to the form of such flexible closures in which the cam slider operates solely upon the metal of the fastening devices (out of contact with the material of the stringers) in engagement with intermediate lugs or shoulders thereon, exposing outside of the slider side walls the heels or yoke ends of the fastening devices that are clamped upon the folded bead or thickened edge portions of the strips or stringers. This form of flexible closure is illustrated in a number of recent patents issued to Edward H. Binns, and Ralph H. Binns, such, for example, as Patent No. 1,553,499 dated September 15, 1925, and Patent No. 1,701,555 dated February 12, 1929.

The cam slider of the present invention comprises the suitably connected fore-plate and back-plate, spaced to provide the fastener-receiving channels, and having upon the fore-plate outwardly presented projections, preferably in the form of small scrolls at the opposite upper corners and the lower end of the fore-plate, made integral with the fore-plate by bending over projecting parts of the prepared blank from which the slider fore-plate is made. The resultant slider has spaced scroll projections angularly presented at its upper corners and providing a convenient up-pull with which the operator's thumb or finger can readily and comfortably engage for causing the fastener-locking movement of the slider; and a single scroll projection at its lower end providing a convenient and comfortable down-push for causing the fastener-unlocking movement of the slider.

A further feature of the present invention resides in a novel and simple form of slider latch for securing the slider against movement at any desired point upon the stringers. This improved slider latch may be

mounted upon any suitable projection upon the fore-plate of the slider, but it is preferably mounted upon the bottom scroll or down-push member, by which it is effectively supported without interference with the function of said scroll as a down-push member. The latch is in the form of a sector-shaped dog mounted upon the end of a short shaft which is journaled in the bottom scroll and extends transversely of the slider fore-plate to present the latching dog vertically alongside of the slider at its lower end with the apex or pointed end of the dog extending eccentrically from the journal shaft to effectively engage between the heels or yoke ends of adjacent fastening devices.

It is preferred to provide two segment-shaped latching dogs, one rigidly attached to each end of the short journal shaft to present the dogs upon opposite sides of the slider to simultaneously latch between the yoke ends of fastening devices upon both stringers. The coupled dogs act in unison, and to facilitate moving them into and out of engagement with the heels of the fastening devices, one or both dogs is knurled or roughened part way round the hub concentric with the journal shaft. A stop pin projects laterally from the slider top plate in position to be engaged by one of the latching dogs and limit the latching movement of said dogs upon the slider when they are in engagement with the fastening devices. An auxiliary latch or keeper movably mounted upon the slider is adapted to engage one or both of the latching-dogs to prevent their releasing movement upon the slider. In this way the slider is effectively latched against movement in either direction upon the stringers.

To prevent accidental displacement of the slider entirely off the stringers by moving it beyond the upper ends of the stringers, a slider stop of suitable form should be provided. The present invention includes a simple and effective device for limiting the displacement of the slider beyond the ends of the stringers, consisting in an interlocking fastening device or devices modified in shape or in position upon the stringer to cause such changed fastening device or de-

vices to block the interengagement and passage of fastening devices in the slider. The stop-forming modification of the fastening devices can be accomplished in several ways.

5 With the preferred bifurcated hook form of fastening device shown in the present case, the desired result can be effectively accomplished by slightly bending together the prongs of one or two bifurcated hook fasteners within a few fasteners of the top of the stringers; or two of the fastening devices may be rigidly coupled together and strained slightly out of normal position by means of fine wire, or by solder or equivalent material; or the shape of one or two of the fastening devices may be modified with a wrapping of wire or a drop of solder or equivalent material. In any such arrangement the modified fastening devices cannot interlock with the fastening devices in normal form and position, and therefore they will jam and prevent the alternate engagement of fastening devices in the slider which blocks the passage of the fastening devices and arrests the movement of the slider thereon.

10 In order that the invention may be fully understood it will first be described with reference to the accompanying drawings and the novelty afterwards particularly pointed out in the annexed claims.

15 In said drawings

Figure 1 is a front elevation of a part of a flexible closure embodying the present invention;

20 Figure 2 is a side elevation of the same showing the sector-shaped dog in slider latching position;

Figure 3 is a view similar to Figure 1 with the fore-plate and attached parts of the slider removed;

Figure 4 is a vertical longitudinal sectional view taken on the line 4—4 of Figure 1;

Figure 5 is a detail side elevation similar to Figure 2 showing the slider latching dog in released position;

Figures 6 and 7 are respectively vertical and horizontal sectional views taken on the lines 6—6 and 7—7 of Figure 4;

Figure 8 is a view similar to Figure 3 showing a slight modification of the device for limiting the movement of the slider upon the closure; and

Figure 9 is a detail plan view of part of a closure stringer showing a further modified arrangement for limiting the movement of the slider upon the stringers.

In constructing the flexible closure of the type to which the present invention relates, two flexible strips or stringers, such as indicated at 1 and 2, are formed at their inner edges with beads or thickened portions 3 and 4 for the attachment of the interlocking fastening devices.

Each of the stringers 1 and 2 is provided

on its inner thickened edge with a series of fastening devices which are adapted to interengage for the purpose of locking together the two stringers. The interlocking fastening devices, all of which are of the same construction, are preferably made of sheet metal blanks with U-shaped yokes 10 that embrace and are firmly compressed upon the beaded or thickened edge of the flexible tape or stringer, a narrow neck 12 having a rounded upper face, and a bifurcated or forked hook 13 projecting downwardly from the upper unobstructed face of the fastening devices. Each fastening device is provided between its yoke 10 and forked hook 13 with lugs or shoulders 15 projecting oppositely from the body adjacent to the narrow neck and located when fastened upon the stringer in alignment with the beaded edge of the stringer. The fastening devices are mounted upon the stringers in suitable spaced relation so as to present the fastening devices alternately in the two series to permit them to alternately interlock within the channeled and grooved controlling slider.

The operating cam slider is made up of a back-plate 20 and a fore-plate 21 rigidly united by a bridge 23. A spacing binding post 22 is mounted between the fore-plate and the back-plate for ensuring their spaced relation which provides the fastener receiving channels of the controlling slider. The inner faces of the back-plate and fore-plate (constituting the walls of the slider channels) are formed with controlling grooves 25 which run parallel in the lower portion of each plate and diverge or spread apart toward their upper ends. The channel face of each of these plate portions of the slider between the controlling grooves constitutes a center rib 26, forming guide faces for the engagement and guiding of the side prongs of the forked hooks 13 of the fastening devices. The slider channels are open at the side edges from end to end to permit the passage of the fastening devices attached to the stringers.

The fore-plate 21 is provided at its upper opposite corners with outwardly presented projections, preferably in the form of spaced small scrolls 28, preferably made integral with the fore-plate by starting with a properly shaped blank. The fore-plate is also formed at its lower end with a single scroll-shaped projection 29 also preferably formed integral with the fore-plate. The projections at the upper corners of the fore-plate are spaced and at a slight angle to the longitudinal axis of the slider to afford a convenient up-pull with which an operator's thumb and finger can readily and quite comfortably engage to induce the fastener locking movement of the slider. The scroll 29 at the bottom of the slider fore-plate affords a convenient down-push device for in-

ducing the closure opening movement of the slider. This lower down-push scroll 29 affords a bearing for the slider latch, presently to be described, but the parts of the slider latch that are presented outwardly do not interfere with the function of the scroll as a down-push member.

Freely journaled in the scroll member 29 is a short shaft 30 having rigidly attached to its projecting opposite ends the segment-shaped latching dogs 35 which are thereby presented upon opposite sides of the slider in planes intersecting the mounted ends of the fastening devices. The heel or hub portions of these dogs 35 are semi-circular in shape and knurled or roughened to facilitate turning the dogs into and out of active position. The pointed ends of these dogs 35 project eccentrically from their hub portion and are designed to engage between the yoke ends or heels of two adjacent fastening members of the closure stringers, the described engagement being effected by rotation of the coupled dogs by pressure of the thumb or finger upon the knurled or roughened hub portions and when the engagement is almost complete by a slight downward movement of the slider upon the stringers. Stop pins 37 project laterally from the sides of the slider in the path of the latching dogs 35 to limit the latching movement of the dogs upon the slider as indicated in Figure 2 of the drawings.

The latching dogs 35 are also formed with notches or recesses at 38 with which engage the lateral projections 40^a of the auxiliary latching device or "keeper" for the purpose of preventing the accidental unlatching movement of the dogs. The "keeper" or auxiliary latching plate 40 passes through a slot or opening 41 cut in the lower scroll 29 just above the top surface of the fore-plate. The portion of the latching plate 40 that passes through the slot 41 is relatively narrow as indicated in Figures 6 and 7, while the plate is broadened out to the full width of the space between the dogs 35 and curves up and over the scroll 29 and is attached at the rear to the end of the narrow portion of the plate. This loop formation of the auxiliary latching plate 40 is the means for mounting it in operative relation to the latching dogs in a simple manner. The latching plate snugly fits upon the scroll bearing 29 so that it will have a natural tendency to remain in the position in which it is placed by pressure of the thumb or finger of the user. It will be understood that the latching position indicated in Figures 2 and 4 involves not only the engagement of the latching dogs with the yoke portions of the fastening devices, but also the auxiliary latch or "keeper" engagement with the dogs. In this position of the parts the cam slider is securely held against movement either upwardly or downwardly upon the closure stringers. This latching of

the slider can be effected in any position upon the closure. When it is desired to release the slider for movement upon the stringers, a slight upward pressure upon the latch or "keeper" 40 releases the "keeper" from the dogs, and the pressure of the thumb or finger upon the knurled or roughened hubs or heels of dogs tends to rotate the dogs out of engagement with the mounted ends of the fastening devices upon the stringers, a succeeding slight upward movement of the slider upon the stringers, induced by pressure in the same direction, quickly releasing the dogs and freeing the slider for movement either upwardly or downwardly.

The final feature of the present invention comprises novel means for preventing the accidental movement of the slider beyond the upper ends of the stringers of interlocked fastening devices. This feature of the invention involves the arrest of the slider in a position which will conceal the final fastening devices within the slider, a feature of some importance in connection with the artistic appearance of the closure. In accomplishing the desired result one or more of the interlocking fastening devices is deformed or modified as to shape or position to such an extent that under action of the slider, the changed fastening devices will not interlock but will jam upon the oppositely presented normal fastening devices and prevent further movement of the slider over the obstructing jammed members of the stringers.

The simplest method of accomplishing this desired result as applied to the preferred form of interlocking members of Patent No. 1,553,499 is to compress the jaws of one or more of the bifurcated hook ends of said locking devices as indicated in Figures 3 and 4 of the drawings at the point marked α . Placing a hook-shaped fastening device up-side down at the desired point on one of the stringers will also produce the desired stop for the slider. The effect of this deformation in shape or position of one or two of these fastening devices is to so lengthen or modify the shape of the interlocking ends at the effected point that the two series of interlocking members cannot interengage and therefore become jammed. This is especially effective in connection with the interlocking fastening devices of the form in which said devices have riding lugs engaged by controlling grooves in the slider which positively control said devices in both the locking and unlocking operations.

A similar effect for preventing the slider moving off the stringers can be produced by placing a drop of solder upon one or more of the fastening devices as indicated at γ in Figure 8 of the drawing and while a cruder form of construction, the result can with more or less satisfaction be accomplished by wrapping a piece of wire upon the fork of one of the in-

terlocking fastening devices, or by binding two adjacent fastening devices together with a wire indicated at *z* as shown in Figure 9 of the drawings. In all of these several forms of slider limiting stops it will be observed that the same principle is involved, namely, of deforming or modifying the shape or normal position of one or more fastening devices to cause a jamming between opposite fastening devices to prevent the slider passing over the affected parts.

I claim:—

1. In a flexible closure or fastener, the combination of flexible strips, two series of interlocking fastening devices rigidly mounted upon said strips, said fastening devices being formed with shoulders between their ends, and an operating member sliding upon said shouldered fastening devices and exposing their mounted ends, with a latching detent eccentrically pivoted upon said operating member in position to rotate into engagement with the exposed rigidly mounted ends of adjacent fastening devices alongside of said operating member, and a stop limiting the latching movement of said detent.

2. In a flexible closure or fastener, the combination of flexible strips, two series of interlocking fastening devices rigidly mounted upon said strips, said fastening devices being formed with shoulders between their ends, and an operating slider engaging and sliding upon said shouldered fastening devices, and exposing their mounted ends, with a latching detent eccentrically pivoted upon said operating slider in position to be rotated into engagement with the exposed rigidly mounted ends of adjacent ends of adjacent fastening devices alongside of said operating slider.

3. In a flexible closure or fastener, the combination of flexible strips, two series of interlocking fastening devices rigidly mounted upon said strips, said fastening devices being formed with shoulders between their ends, and an operating slider engaging and sliding upon said shouldered fastening devices and exposing their mounted ends, with a latching detent eccentrically pivoted upon said operating slider in position to engage the exposed rigidly mounted ends of adjacent fastening devices alongside of said operating slider, and means engaging said latching detent for holding it in slider securing position.

4. In a flexible closure or fastener, the combination of flexible strips, two series of interlocking shouldered fastening devices rigidly mounted upon said strips, and an operating slider engaging and sliding upon said fastening devices and exposing their mounted ends with a latching detent eccentrically pivoted upon said operating slider in position to rotate into engagement with

the exposed rigidly mounted ends of fastening devices alongside of said operating slider, a stop pin projecting from the slider for limiting the latching movement of said detent into latching position, and a keeper engaging said detent for holding it in latched position.

5. In a flexible closure or fastener, the combination of flexible strips, two series of interlocking fastening devices rigidly mounted at one end upon said strips, and an operating slider engaging and sliding upon said fastening devices, between their ends and exposing said mounted ends, with a sector-shaped latching detent eccentrically pivoted upon said operating slider in position to be rotated into engagement with the exposed rigidly mounted ends of fastening devices alongside of said operating slider.

6. In a flexible closure or fastener, the combination of flexible strips, two series of interlocking fastening devices rigidly mounted upon said strips, said fastening devices being formed with shoulders between their ends, and an operating slider engaging and sliding upon said shouldered fastening devices, and exposing their mounted ends, with a sector-shaped latching detent eccentrically pivoted upon said operating slider in position to rotate into engagement with the exposed rigidly mounted ends of adjacent fastening devices alongside of said operating slider, said detent having a keeper receiving notch or recess, and a keeper upon said slider adapted to engage said notch or recess.

7. In a flexible closure or fastener, the combination of flexible strips, two series of interlocking fastening devices rigidly mounted at one end upon said strips, and an operating slider sliding upon said fastening devices between their ends and exposing said mounted ends, with a shaft mounted transversely on said slider, and a latching detent mounted upon said shaft and presented thereby at one side edge of the slider in position to engage the exposed rigidly mounted ends of adjacent fastening devices of one of said series.

8. In a flexible closure or fastener, the combination of flexible strips, two series of interlocking fastening devices rigidly mounted at one end upon said strips, and an operating slider sliding upon said fastening devices between their ends and exposing said mounted ends, with a shaft mounted transversely on said slider, two latching detents mounted upon said shaft and presented thereby upon opposite side edges of the slider in position to engage the exposed rigidly mounted ends of adjacent fastening devices of both series.

9. In a flexible closure or fastener, the combination of flexible strips, two series of interlocking fastening devices rigidly mounted at one end upon said strips, and an operating

slider sliding upon said fastening devices between their ends and exposing said mounted ends, with a shaft mounted transversely on said slider, two sector-shaped latching detents mounted upon said shaft upon opposite side edges of the slider in position to engage the exposed rigidly mounted ends of adjacent fastening devices of both series, and a keeper holding said detents against movement.

10. In a flexible closure or fastener, the combination of flexible strips, two series of interlocking fastening devices rigidly mounted at one end upon said strips, and an operating slider sliding upon said fastening devices between their ends and exposing said mounted ends, with a shaft mounted transversely on said slider, two sector-shaped latching detents mounted upon said shaft upon opposite side edges of the slider in position to engage the exposed rigidly mounted ends of adjacent fastening devices of both series, said detents having milled or roughened hub portions to facilitate manipulation.

11. In a flexible closure or fastener, the combination of flexible strips, two series of interlocking fastening devices rigidly mounted at one end upon said strips, and an operating slider sliding upon said fastening devices between their ends and exposing said mounted ends, with a shaft mounted transversely on said slider, two sector-shaped latching detents mounted upon said shaft upon opposite side edges of the slider in position to engage the exposed rigidly mounted ends of adjacent fastening devices of both series, said detents having keeper receiving notches, a yoke embracing said shaft mounting and movable thereon, and keeper fingers upon said yoke adapted to engage said notches and hold said detents against movement.

12. In flexible closure or fastener, the combination of flexible stringers, and spaced interlocking fastening devices mounted upon said stringers, with an operating slider engaging and sliding upon said fastening devices for interlocking and unlocking them, said slider having spaced laterally outwardly presented scroll-like projections to form slider-manipulating members.

13. In a flexible closure or fastener the combination of flexible stringers, and spaced interlocking fastening devices mounted upon said stringers, with an operating slider engaging and sliding upon said fastening devices for interlocking and unlocking them, said slider having upon the upper end of its fore-plate angularly arranged spaced scroll-like projections constituting an up-pull, and upon the lower end of its fore-plate a single transverse scroll-like projection constituting a down-push.

14. In a flexible closure or fastener the combination of flexible stringers, and spaced

interlocking fastening devices mounted upon said stringers, with an operating slider engaging and sliding upon said fastening devices for interlocking and unlocking them, said slider comprising the rigidly connected spaced back-plate and fore-plate, and the fore-plate having at its upper opposite sides and its lower end integral outwardly presented scroll-like projections forming slider-manipulating members.

15. In a flexible closure or fastener, the combination of flexible stringers, and two series of spaced interlocking fastening devices rigidly mounted upon said stringers, with an operating slider engaging and sliding upon said fastening devices for interlocking and unlocking them, said slider comprising the rigidly connected spaced back-plate and fore-plate, the fore-plate of which has at its lower end an integral outwardly presented scroll-like projection forming a slider-manipulating member, a transverse shaft mounted in said scroll-like projection, and two latching detents mounted upon said shaft at opposite sides of the slider in position to engage the secured ends of adjacent fastening devices of both series.

16. In a flexible closure or fastener, the combination of flexible stringers, and two series of spaced interlocking fastening devices rigidly mounted upon said stringers, with an operating slider engaging and sliding upon said fastening devices for interlocking and unlocking them, said slider comprising the rigidly connected spaced back-plate and fore-plate, the fore-plate of which has at its lower end an integral outwardly presented scroll-like projection forming a slider-manipulating member, a transverse shaft mounted in the scroll-like projection at the lower end of the fore-plate, two latching detents mounted upon said shaft upon opposite side edges of the slider in position to engage the secured ends of the fastening devices, said detents having keeper-receiving notches or recesses, a keeper-yoke movably mounted upon said shaft-carrying scroll, and fingers upon said keeper-yoke adapted to engage said detent notches or recesses and hold said detents against movement.

17. In a flexible closure or fastener the combination of flexible stringers carrying spaced interlocking fastening devices formed with riding lugs or shoulders and two-pronged hooks, and a channelled operating slider formed with controlling grooves engaging said riding lugs or shoulders and positively controlling the movements of the fastening devices in both the interlocking and unlocking operations, with a stop for limiting the interlocking action of the slider, said stop comprising a fastening device with abnormally presented prongs arranged adjacent to one end of one of the stringers in position to jam with other fastening devices

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within the slider and thereby limit the movement of the slider in one direction upon the stringers.

18. In a flexible closure or fastener, the combination of flexible strips, two series of interlocking fastening devices rigidly mounted at one end upon said strips, and an operating slider engaging and sliding upon said fastening devices between their ends and exposing said mounted ends, with a sector-shaped latching detent mounted eccentrically upon said slider, said detent having a milled or roughened operating portion and a projection which is adapted to be rotated into engagement with the exposed rigidly mounted ends of fastening devices alongside of said slider.

19. In a flexible closure or fastener, the combination of flexible strips, two series of interlocking fastening devices rigidly mounted at one end upon said strips, and an operating slider engaging and sliding upon said fastening devices between their ends and exposing said mounted ends, with a latching detent having a fastener-engaging projection and pivoted transversely upon said slider, said projection operating alongside of said slider in position to engage the exposed rigidly mounted ends of the fastening devices, a stop pin projecting laterally from said slider into the path of said detent, and means engaging said detent for holding it in latched position.

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