Oct. 13, 1953 R. C. STENGER 2,654,981

MACHINE FOR CONVEYING AND CLOSING CARTONS

Filed Sept. 2, 1949 2 Sheets-Sheet 1

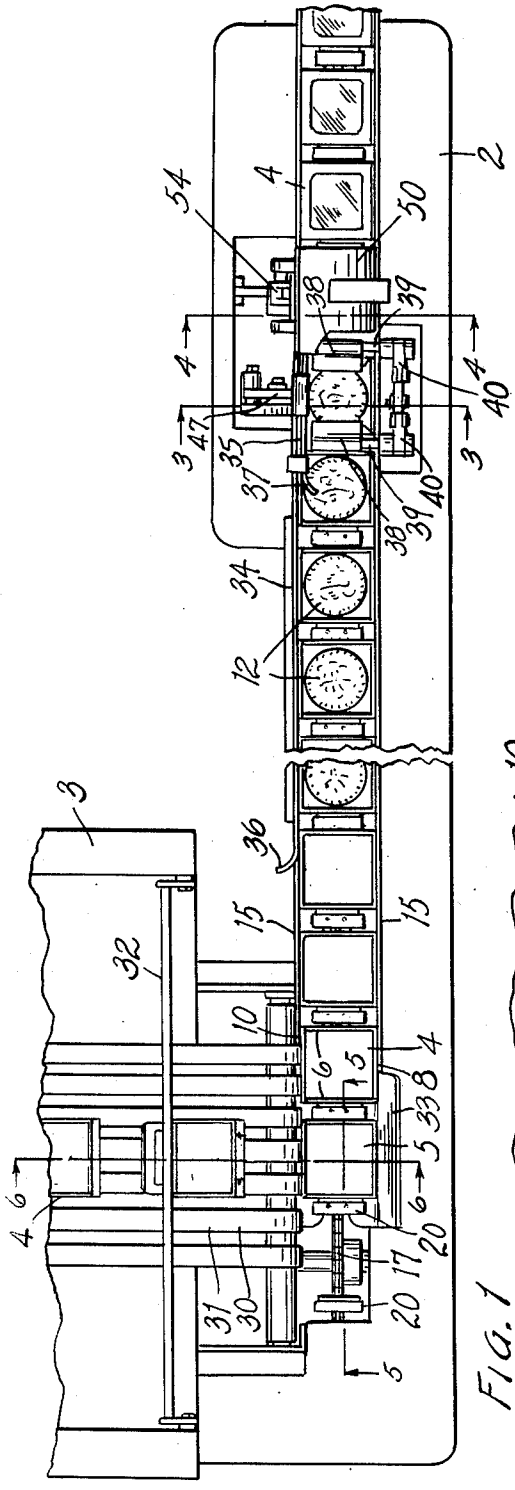

FIG. 1

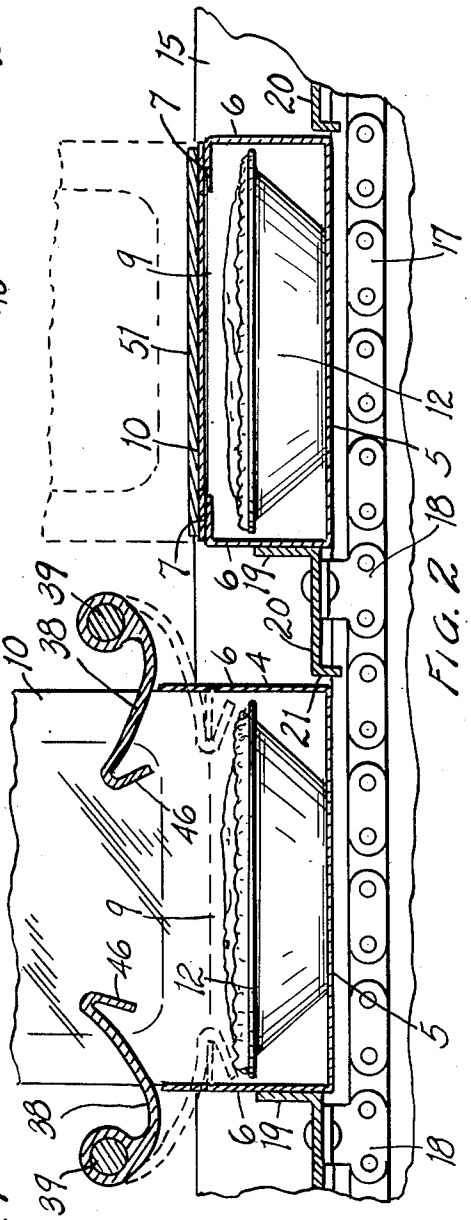

FIG. 2

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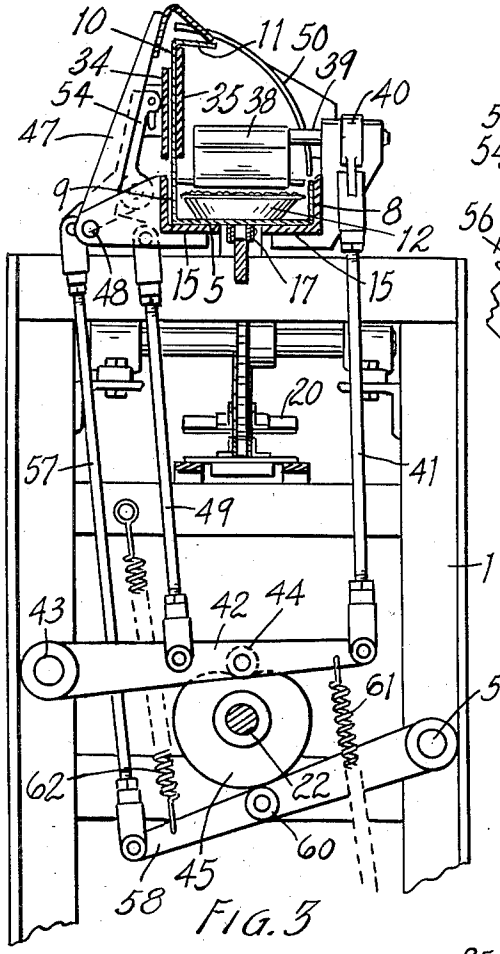

FIG. 3

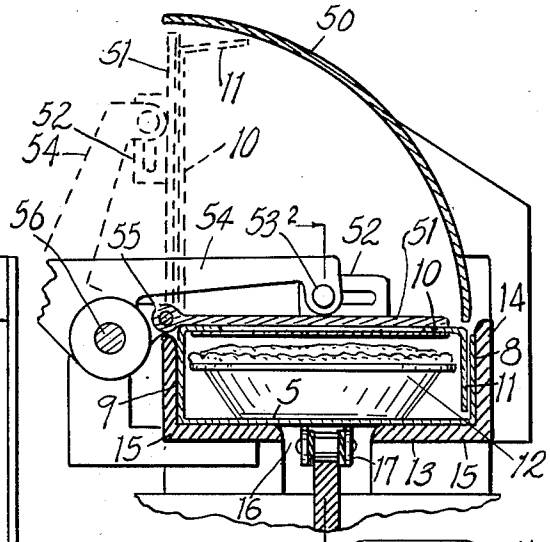

FIG. 4

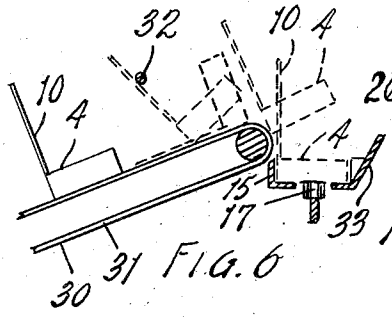

FIG. 6

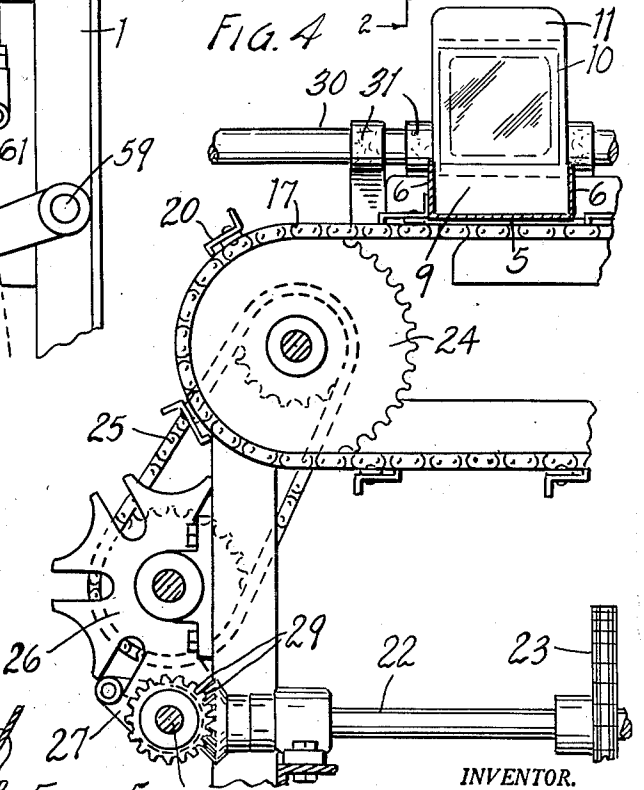

FIG. 5

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MACHINE FOR CONVEYING AND CLOSING CARTONS

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8 Claims. (Cl. 53—145)

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This invention relates to improvements in a machine for conveying and closing cartons.

The main objects of this invention are:

First, to provide a machine for closing cartons, the contents of which are of a fragile or delicate nature, without injury to the contents.

Second, to provide a machine for closing cartons having top flaps on their end walls and covers hingedly connected to the rear walls and provided with tucking flaps which is efficient and of large capacity.

Third, to provide a machine having these advantages with a conveyer adapted to positively position the cartons and convey them with a step by step movement, holding the covers open to facilitate the placing of merchandise such as pies, cakes or the like in the cartons.

Fourth, to provide a machine of this character which may be associated with a carton erecting machine to receive the erected cartons therefrom.

Objects relating to details and economies of the invention will appear from the description to follow. The invention is defined and pointed out in the claims.

A preferred embodiment of the invention is illustrated in the accompanying drawing, in which:

Fig. 1 is a fragmentary plan view of a machine embodying my invention, parts being broken away for convenience in illustration, and only such portions of a carton erecting machine being illustrated as deemed necessary to show the operative structure of my invention.

Fig. 2 is an enlarged fragmentary view mainly in longitudinal section on a line corresponding to line 2—2 of Fig. 4, the top flap folders being shown in retracted position by full lines and in fully actuated position by dotted lines, a cover being shown in its relation to the top flap folders by full lines and in its relation to the cover closing member in closed position by full lines and in open position by dotted lines.

Fig. 3 is an enlarged fragmentary view mainly in vertical section on a line corresponding to line 3—3 of Fig. 1.

Fig. 4 is an enlarged fragmentary view mainly in section on a line corresponding to line 4—4 of Fig. 1 with the cover closing member shown in fully actuated position by full lines and in retracted position by dotted lines.

Fig. 5 is an enlarged fragmentary view partially in section on a line corresponding to line 5—5 of Fig. 1 showing details of the main conveyer.

Fig. 6 is a fragmentary view mainly in section

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on a line corresponding to line 6—6 of Fig. 1 showing details of the carton feed conveyer.

The embodiment of my invention illustrated comprises a suitable frame, designated generally by the numeral 1, and provided with a table or top 2. 3 represents a carton erecting machine for the cartons designated generally by the numeral 4, and comprising a bottom 5, end walls 6 provided with top flaps 7, front wall 8, and a rear wall 9 having a cover 10 hingedly connected to its rear wall, the cover being provided with a tucking flap 11. The cover illustrated is of the window type.

My invention may be readily embodied in machines for closing covered cartons having other structural features or differing in structure from that described. The main conveyer is adapted to receive cartons from a feed conveyor or auxiliary conveyer and translate them with a step by step or intermittent movement through the closing mechanism which is entirely automatic in its operation. The cartons illustrated are designed to receive pies 12 which are placed in the open cartons in advance of the cover closing mechanism. The main conveyer comprises a slide way 13 provided with side bars 14. In the structure illustrated, the way is formed of angle iron elements 15 disposed in upward and inwardly facing relation and spaced to provide a longitudinal slot 16. The conveyer chain 17 is provided with flight carrying links 18 which project through the slot. The flights 19 have rearwardly projecting base portions 20 secured to the links 18, these base portions being provided with downturned lugs 21 projecting into the slot, as is best shown in Fig. 2. The rear ends of the flight base members are spaced from the flights 19 to receive a carton between them, as is clearly shown in Fig. 2.

The driving shaft 22 is disposed horizontally below the conveyer, its connection to a suitable source of power being shown at 23. The conveyer chain is provided with a driven sprocket 24 which is connected by the sprocket chain 25 and suitable coacting sprockets to the Geneva gear 26. The Geneva gear is actuated by the coacting arm 27 on the shaft 28 connected to the driving shaft by the coacting beveled gears 29.

The cartons are delivered from the feed conveyer, designated generally by the numeral 30, operatively associated with the carton erecting machine 3 to receive the cartons therefrom. The feed conveyer comprises belts 31 which are positioned at the side of the main conveyer and in a plane above the main conveyer to discharge

the cartons on to the main conveyer. The cartons, as they are translated by the belts 31 with their covers at the rear, are tilted upon the rear walls and covers, as shown in Fig. 6, by the covers coming in contact with the tipping bar 32 which is spaced above the feed conveyer belts. However, when the cartons drop off the feed conveyer belts 30 on to the main conveyer, they swing to an upright position. The inwardly inclined guide plate 33 insures the cartons being aligned to pass between the side bars of the main conveyer.

To facilitate the correct positioning of the cartons, the flight bases are provided, and in the event a carton falls from the feed conveyer upon these bases it is jogged into correct position between the rear ends of the bases and the flight trailing the same by the step by step movement of the main conveyer. As the cartons are carried rearwardly they are engaged by the plate-like cover supporting members 34 and 35 which are spaced to receive the covers between them, the member 34 having a rearwardly turned front end 36 and the member 35 a forwardly turned front end 37. The contents, as the pies 12, are placed in the cartons desirably while the covers are supported by the rear member 34 which projects beyond the front member.

The top flap folders 38 are disposed at the rear of the filling station. These top flap folders act to turn the top flaps inwardly while the cover is positively supported in upright position so that the top flaps cannot engage its edges. The top flap folders are mounted on the rock shafts 39 disposed transversely above the way, the rock shafts being provided with arms 40 suitably connected to the link 41 which is in turn connected to the rocker arm 42 pivoted at 43 and provided with a cam follower 44 coacting with the cam 45 on the shaft 22. By this arrangement the folder members 38 are simultaneously actuated. These folder members 38 are, in this preferred embodiment, plate-like and upwardly curved, their axes being positioned so that the curved portions of the folders engage the top flaps with a wiping action. The folders are provided with downturned hook-like tip portions 46 which engage the edges of the top flaps, as shown by dotted lines in Fig. 2, preventing their being swung down into engagement with the contents of the carton.

While the top flaps are slightly lifted on the return stroke of the folders this is not objectionable as they are positioned so that the cover forces them down to position and this is further desirable in that they are left in close engagement with the cover when the cover is closed. At this top flap folding station or position the cover tucking flap is turned to the position shown in Fig. 3 by means of the arm 47 which is pivoted at 48 and connected by the link 49 to the rocker arm 42. This synchronizes the movement of the tucking flap turner with the top flap folders.

From this station or from this mechanism, the carton is advanced to the cover closing station, in which position the turned tucking flap lies below the curved tucking flap guide 58. The cover closing member 51 is desirably in the form of a plate having a longitudinally slotted bracket 52 on its rear side receiving the pin 53 on the actuated arm 54. The closure plate is pivotally supported at 55 while the arm is pivoted at 56. This arm is connected by the link 57 to the rocker arm 58 pivotally supported at 59 and having a cam follower 60 coacting with the cam 45. This

further insures the timed or synchronized operation of the folder and flap folder, tucking flap turner, cover closure member in synchronized relation to the intermittent movement of the conveyer.

The spring 61 urges the follower 44 of the rocker arm 42 against the cam while a spring 62 urges the follower 60 of the rocker arm 58 against the cam. With this arrangement of parts the several steps are performed entirely automatically with the exception of the placing of the cartoned product in the cartons. While I contemplate that this might be done automatically, such means would constitute no part of my present invention and are not illustrated.

I have illustrated and described my invention in a highly practical commercial embodiment thereof. I have not attempted to illustrate or describe other embodiments or adaptations which I contemplate and which might be desirable for the cartoning of certain products as I believe that this disclosure will enable those skilled in the art to embody or adapt my invention as may be desired.

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

1. A machine for closing cartons having top flaps on their end walls and covers hinged to their rear walls and provided with tucking flaps on their swinging edges comprising a conveyor including a way provided with side members and conveyer flights operatively associated with the way for pushing cartons therealong with a step by step movement, the adjacent flights coacting to provide spaced carton pockets, transversely spaced cover supporting members disposed longitudinally of the way to receive the open covers between them as the cartons are translated, top flap folders comprising rock shafts disposed transversely above the conveyer, oppositely disposed downwardly convex top flap folder plates mounted on said rock shafts and having downturned hook-like portions at their swinging ends extending transversely of said way and engageable with the edges of the top flaps during the latter portion of the folding stroke, said top flap folder plates and their hook portions in their retracted positions being located closely above and extending inwardly across the top flaps of a carton located at a top flap folding station of said conveyor, the curvature of the folders and the position of their axes being such that their convex under surfaces engage the edges of the open top flaps with a wiping folding action, said top flap folders acting on the top flaps while the cover is supported in upright position by said cover supporting members, a tucking flap turning member acting to turn the tucking flap forwardly while the cover is supported by said supporting members, a forwardly curved tucking flap guide disposed at the rear of said tucking flap turning member and said top flap folders to overhang the conveyer, a cover closing member disposed in opposition to said guide member and acting to swing the cover to closed position, and means for actuating said conveyer, top flap folders, tucking flap turner member and cover closing member in synchronized relation.

2. A machine for closing cartons having top flaps on their end walls and covers hinged to their rear walls and provided with tucking flaps on their swinging edges comprising a conveyer including a way provided with side members and conveyer flights operatively associated with

the way for pushing cartons therealong with a step by step movement, the adjacent flights coacting to provide spaced carton pockets, transversely spaced cover supporting members disposed longitudinally of the way to receive the open covers between them as the cartons are translated, top flap folders comprising rock shafts disposed transversely above the conveyer, oppositely disposed top flap folder plates having downwardly and longitudinally convex under sides mounted on said rock shafts, the curvature of the folders and the position of their axes being such that their convex under surfaces engage the edges of the open top flaps with a wiping folding action and move into tangential relationship to the folded top flaps, said top flap folders acting on the top flaps while the cover is supported in upright position by said cover supporting members, a tucking flap turning member acting to turn the tucking flap forwardly while the cover is supported by said supporting members, a tucking flap guide member disposed at the rear of said tucking flap turning member and said top flap folders to overhang the conveyer, a cover closing member disposed in opposition to said guide member and acting to swing the cover to closed position, and means for actuating said conveyer, top flap folders, tucking flap turner member and cover closing member in synchronized relation.

3. A machine for closing cartons having top flaps on their end walls and covers hinged to their rear walls and provided with tucking flaps on their swinging edges comprising a conveyer for translating the cartons with a step by step movement, transversely spaced vertical cover supporting members disposed longitudinally of the conveyer to receive the open covers between them as the cartons are translated, pivotally mounted oppositely disposed top flap folders having downwardly and longitudinally convex undersides and downturned hook-like portions at their swinging ends engageable with the edges of the top flaps during the latter portion of their folding stroke, the pivot axes of said top flap folders extending transversely of said conveyor and being positioned materially upwardly and longitudinaly outwardly of a top flap of a carton located at a folding station on said conveyor, the curvature of the folders and the position of their axes being such that they engage the edges of the open top flaps with a wiping folding action, a tucking flap turning member acting to turn the tucking flap forwardly while the cover is supported by said supporting members, a tucking flap guide member disposed at the rear of said tucking flap turning member and said end flap folders, a cover closing member disposed in opposition to said guide member and acting to swing the cover to closed position, and means for actuating said conveyer, top flap folders, tucking flap turner and cover closing member in synchronized relation.

4. A machine for closing cartons having top flaps on their end walls and covers hinged to their rear walls and provided with tucking flaps on their swinging edges comprising a conveyer for translating the cartons with a step by step movement, transversely spaced upright cover supporting members fixedly disposed longitudinally of the conveyer to receive the open covers between them as the cartons are translated, pivotally mounted oppositely disposed top flap folders, the pivot axes of said top flap folders extending transversely of said conveyor and being positioned materially upwardly and longitudinally outwardly of a top flap of a carton located at a folding station on said conveyor, a tucking flap turning member acting to turn the tucking flap forwardly while the cover is supported by said supporting members, a tucking flap guide member disposed at the rear of said tucking flap turning member and said end flap folders, a cover closing member disposed in opposition to said guide member and acting to swing the cover to closed position, said cover closing member having a plane cover engaging surface extending generally radially of its pivot to its swinging edge whereby the tucking flap is guided solely by said tucking flap guide member, and means for actuating said conveyer, top flap folders, tucking flap turner and cover closing member in synchronized relation.

5. A machine for closing cartons having top flaps on their end walls and covers hinged to their rear walls, comprising a conveyer for translating the cartons with a step by step movement, swingably mounted oppositely disposed top flap folders having downturned hook-like portions at their swinging ends engageable with the edges of the top flaps during the latter portion of their folding stroke, said folders extending transversely over said conveyor and being disposed in opposingly inwardly extending relation from their pivots longitudinally of said conveyor, means connected to said folders and operative to swing the same simultaneously downwardly and longitudinally outwardly of top flaps of a carton located therebeneath, and a cover closing member disposed at the rear of the top flap folders.

6. A machine for closing cartons having top flaps on their end walls and covers on their rear walls provided with tucking flaps, comprising a conveyer for translating the cartons with a step by step movement, means for supporting the cover in open position during one period of rest, swingably mounted oppositely disposed top flap folders having downwardly and longitudinally convex undersides and downturned hook-like portions at their swinging ends engageable with the edges of the top flaps during the latter portion of their folding strokes, the pivot axes of said top flap folders extending transversely of said conveyor and being positioned materially upwardly and longitudinally outwardly of a top flap of a carton located at a folding station on said conveyor, the folders being adapted to engage the open top flaps with a wiping folding action, the hook-like portions acting to partially lift the flaps on the return stroke of the folders, a tucking flap turning member acting to turn the tucking flap forwardly while the cover is supported by said cover supporting means and while the carton is acted upon by the said top flap folders, a tucking flap guide disposed at the rear of said top flap folders and adapted to receive the turned tucking flap, and a cover closing member disposed in opposition to said guide member to act on the cover after it has cleared said cover supporting means.

7. A machine for closing cartons having top flaps on their end walls and covers on their rear walls, comprising a conveyer for translating the cartons with a step by step movement, swingably mounted oppositely disposed top flap folders having downwardly and longitudinally convex undersides and downturned hook-like portions at their swinging ends engageable with the edges of the top flaps during the latter por-

tion of their folding stroke, the pivot axes of said top flap folders extending transversely of said conveyor and being positioned materially upwardly and longitudinally outwardly of a top flap of a carton located at a folding station on said conveyor, the folders being adapted to engage the open top flaps with a wiping folding action, the hook-like portions acting to partially lift the flaps on the return stroke of the folders, and a cover closing member disposed at the rear of said top flap folders.

8. A machine for closing cartons having top flaps on their end walls and covers on their rear walls, comprising a conveyer for translating the cartons with a step by step movement, swingably mounted oppositely disposed top flap folders having downwardly and longitudinally convex undersides and downturned hook-like portions at their swinging ends engageable with the edges of the top flaps during the latter portion of their folding stroke, said folders extending transversely over said conveyor and being disposed in oppos-

ingly inwardly extending relation from their pivots longitudinally of said conveyor, means connected to said folders and operative to swing the same simultaneously downwardly and longitudinally outwardly of top flaps of a carton located therebeneath, the folders being adapted to engage the open top flaps with a wiping folding action, the hook-like portions acting to partially lift the flaps on the return stroke of the folders.

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