Aug. 22, 1933. W. A. MARCY 1,923,447

CONVEYER MECHANISM

Filed March 18, 1930 2 Sheets-Sheet 1

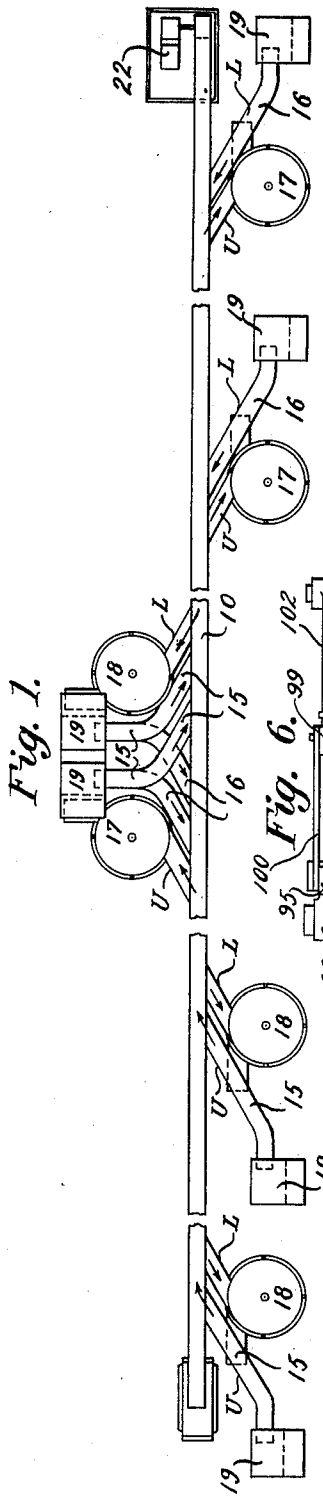


Fig. 1.

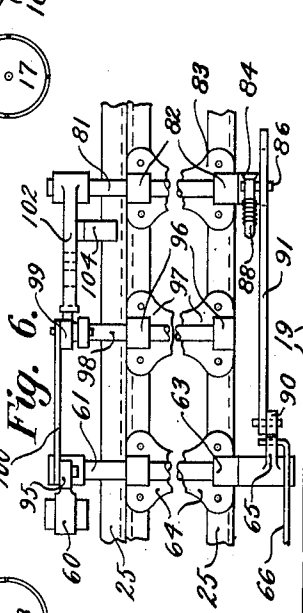


Fig. 6.

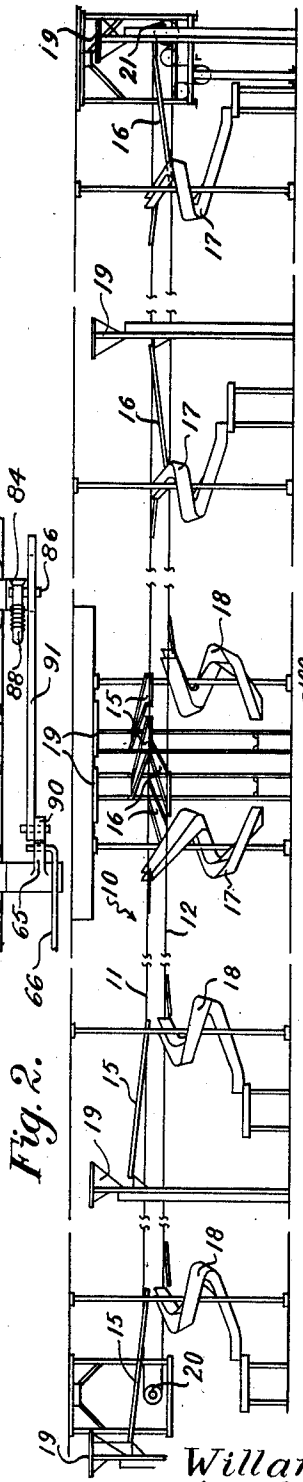


Fig. 2.

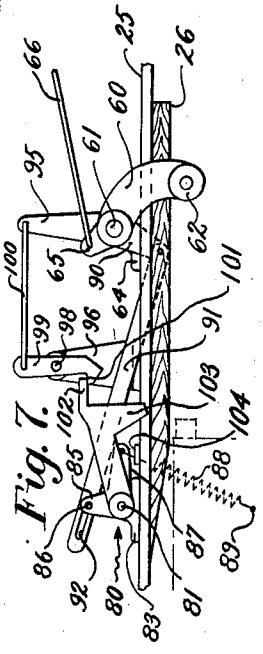


Fig. 7.

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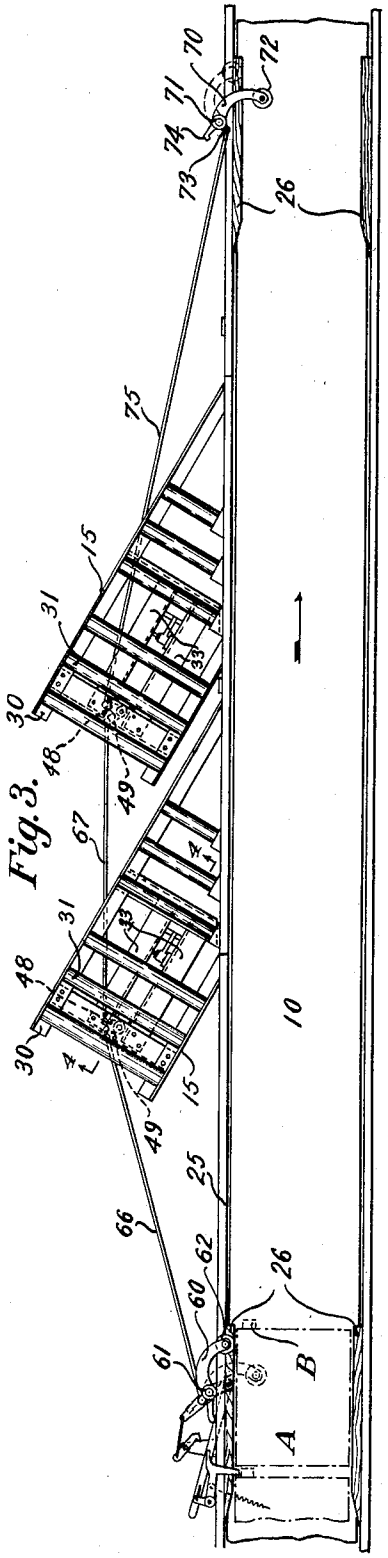


Fig. 3.

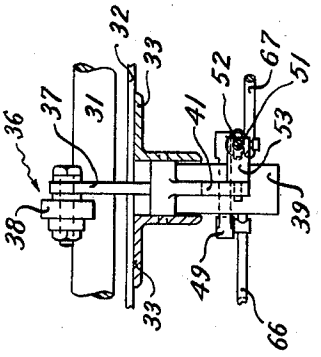


Fig. 5.

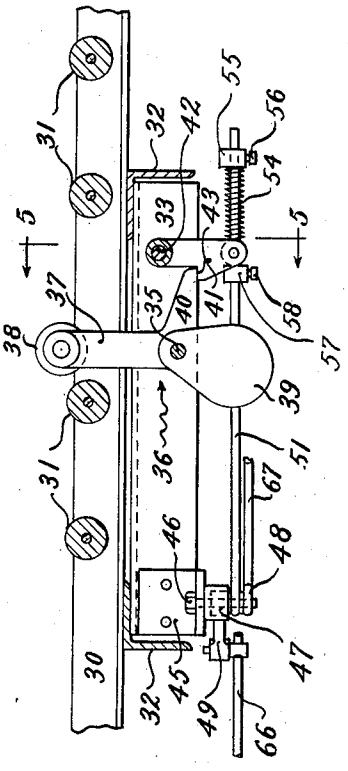


Fig. 4.

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UNITED STATES PATENT OFFICE

1,923,447

CONVEYER MECHANISM

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Application March 18, 1930. Serial No. 436,740

13 Claims. (Cl. 198—21)

This invention relates to an improvement in conveyer mechanism comprising a main conveyer along which trays or other articles are transported and branch conveyers by which trays are introduced onto the main conveyer, and has for its primary object to provide means for preventing collisions between trays traveling on the main conveyer and trays which are introduced from the branch conveyers.

One embodiment of this invention is illustrated in the following drawings wherein,

Fig. 1 is a plan view of an installation embodying this invention;

Fig. 2 is a side elevation thereof;

Fig. 3 is an enlarged plan view of the central station of that installation associated with the upper run of the conveyer illustrating the non-interference device there employed;

Fig. 4 is an enlarged sectional view taken along the line 4—4 of Fig. 3;

Fig. 5 is a sectional view taken along the line 5—5 of Fig. 4; and

Figs. 6 and 7 are side elevation and plan views respectively of the spacing mechanism on an enlarged scale.

The embodiment here illustrated includes a main conveyer 10 having an upper run 11 and a lower run 12 to which lead a plurality of branch conveyers 15, 16 preferably of the gravity roller type. The branch conveyers 15 lead to the upper run 11 of the main conveyer while the branch conveyers 16 lead to the bottom run 12 thereof. Associated with the upper and lower runs of the main conveyer are take-off chutes 17, 18 to which the articles transported by the conveyer 10 are delivered. The chutes 17 are connected to the upper run 11 while the chutes 18 are connected to the lower run 12. The reference characters U and L are applied in Fig. 1 to designate the runs with whch the various branch conveyers are associated. The articles, in the present instance, trays, are fed to the branch conveyers 15 and 16 by means of lifts or elevators 19 which may be of any desired construction, such, for example, as that shown in my copending application Serial No. 436,741 filed March 18, 1930.

The conveyer 10 is preferably of the belt type having end rollers 20 and 21, the latter being driven positively by a motor 22 or similar source of power.

The particular purpose of this invention is to provide means for preventing a collision between a tray traveling along the upper or the lower run of the conveyer 10 and a tray which is fed onto that conveyer by a branch conveyer 15 or 16. The tray traveling along the main conveyer 10 is considered to have the right of way and the tray fed from the branch conveyer is positively prevented from being delivered to the main conveyer if any danger of collision exists. One way of preventing such collision is to provide positive means actuated by each tray as it passes along the main conveyer which would prevent the feeding of trays from the branch conveyers at a time when there is danger of collision, and which would permit such feeding after the danger had past.

Figs. 3, 4 and 5 illustrate such means employed at the central station of the selected embodiment whereby the feeding of trays by the branch conveyers 15 is prevented whenever a tray A is travelling on the portion of the upper run to which the conveyers feed. The side rails 25, between which the conveyer 10 travels, are provided at either side of the branch conveyers 15 with buffing plates 26 so arranged as to locate the tray A at substantially the center of the conveyer. Each branch conveyer comprises suitably supported angle bars 30 which carry cross rollers 31. Connecting the angle bars 30 are crossbars 32 which in turn support bars 33 parallel to the angle bars 30 as shown in Figs. 4 and 5.

Pivotally mounted upon a stationary shaft 35 supported by the bars 33 is a stop 36 having an arm 37 provided with a roller 38 which normally projects above the level of the rollers 31 so that it is contacted by each tray being fed over the branch conveyer. The stop also includes a counterweight 39 by which the arm 37 is normally held in its upright position. A second arm 40 preferably integral with the arm 37, extends outwardly and is adapted to be engaged at the proper time by a latch 41 pivotally mounted at its upper end upon a shaft 42 carried by the plates 33. The latch 41 includes a shoulder 43 which may rest under the arm 40 and thus prevent the arm 37 from swinging forward under the impact of a traveling tray.

Mounted on one of the plates 33 is an angle bracket 45 carrying a bolt 46 on which is pivotally supported a bell crank lever 47 having arms 48 and 49. To the arm 48 is secured one end of a rod 51 which passes through an opening 52 in a block 53 carried by the latch 41. Surrounding the rod 51 beyond the latch 41 is a light spring 54, the tension of which is adjusted by means of a collar 55 secured in the desired position by a set screw 56. Fixed upon the rod 51 is a second collar 57 having a securing set screw 58. The

block 53 normally rests against the collar 57 being held in that position by a spring 54.

Supported upon one side rail 25 adjacent the buffing plates 26, in advance of the branch conveyers 15, at the left in Fig. 3, is a trip in the form of an arm 60 secured to one end of a shaft 61 and carrying at the free end freely rotatable rollers 62. The arm 60 in one position shown in dotted lines in Fig. 3 extends over the conveyer 10 so that the rollers 62 will be engaged by a tray passing between the plates 26 and swung thereby into the position indicated in full lines in Fig. 3. The shaft 61 is supported in journals 63 of brackets 64 carried by the side rails 25 (see Fig. 6). Fixed upon the other end of the shaft 61 is an arm 65 connected by a rod 66 to the arm 49 of the bell crank lever 47 of the left conveyer 15. The arm 48 of this lever is connected by a rod 67 to the arm 49 of the bell crank lever 47 of the right conveyer 15, so that the stop mechanisms of both conveyers operate simultaneously.

A second trip in the form of an arm 70 is supported upon a side rail 25 adjacent the buffing plates 26 beyond the conveyers 15 at the right in Fig. 3. One end of the arm 70 is mounted upon a shaft 71 while the other end carries a freely rotatable roller 72. Also mounted on the shaft 71 is an arm 73 and a limit stop 74 which engages the side rail 25 when the trip arm is in the position shown in dotted lines in Fig. 3. A rod 75 connects the arm 73 to the arm 48 of the bell crank lever 47 of the right conveyer. It will thus be noted that the stops of both conveyers not only operate simultaneously but are controlled by the trip arms 60 and 70.

The normal position of the trip arms 60 and 70 is indicated in dotted lines on Fig. 3. When a tray A is carried by the conveyer 10 into contact with the arm 60 the latter is swung into the full line position.

The movement of the arm 60 acting through the rods 66 and 67 swings the bell crank levers 47 of the conveyers 15 in a counterclockwise direction (see Fig. 3). The arm 48 thereupon retracts the rod 51 and by the spring 54 yieldably holds the latch 41 in the position shown in Fig. 4 with the shoulder 43 below the arm 40 so that if a tray should advance on either conveyer 15 it will be held stationary by the stop 36 until the stop is released by the latch 41.

When the tray A engages the trip 70, which is in the full line position and swings it into the dotted line position, the bell crank levers 47 are swung clockwise by the rods 75 and 67. The rods 51 are thereupon advanced and the latches 41 retracted by the collars 57. The trips 36 are thus released and trays on the conveyers 15 may advance swinging the arms 37 until the rollers 38 are depressed below the rollers 31. At the same time the trip 60 is swung by the rod 66 into the dotted line position and held there until another tray A on the conveyer 10 arrives.

Should one of the stops 36 be depressed when the latch 41 is swung into the locking position the latch being held only by the spring 54 will yield allowing the stop to return to its normal position in which it will be secured by the latch.

As a precaution against the passage of the trip 60 by a second tray before the first tray has passed the trip 70 a spacing device is provided which prevents such passage. This device may be of any desired type and the one shown in the drawings and about to be described has been selected as an illustrative embodiment.

The spacing device 80 is associated with the trip arm 60 and is brought into play when the arm has been swung into the full line position as shown in Fig. 3. Mounted upon the side rails 25 and parallel to the shaft 61 is a shaft 81 carried by journals 82 upon brackets 83 supported by the side rails. Fixed upon one end of the shaft 81 is a right angled lever 84 one arm 85 of which carries a pin 86, while to the other arm 87 is secured one end of a coil spring 88 the other end of which is fixed to a stationary pin 89. Fixed to the end of the shaft 61 carrying the arm 65 is an arm 90 both arms which may be, as here shown, integral. A link 91 is pivoted at one end to the arm 90 and is provided adjacent the other end with a slot 92 which receives the pin 86 on the arm 85. The spring 88 thus acts at all times to raise the trip arm 60 out of the path of travel of the trays. This movement however is normally prevented by the latch mechanism about to be described.

Carried by the end of the shaft 61 adjacent the arm 60 and, if desired, integral therewith is an arm 95. Supported in journals 96 carried by brackets 97 fixed upon the side rails 25 is a shaft 98 parallel to the shafts 61 and 81. Fixed upon one end of the shaft 98 is a latch 99 one end of which is connected by a link 100 with the arm 95. The latch 99 is formed into a shoulder 101 upon which normally rests a trigger 102 carried by the shaft 81. The trigger 102 is also provided with a tongue 103 which when the parts are in the position shown in Fig. 3 extends into the path of travel of the trays A and acts as a barrier to prevent their passage. A stop plate 104 carried by a side rail 25 limits this movement of the trigger.

The operation of the spacing device will now be described briefly with reference to Figs. 3, 6 and 7. The trays A are provided with blocks B so that the adjacent faces do not abut. The normal position is that shown in Fig. 7 with the arm 60 in the path of travel of the tray A. The swinging of the arm into the full line position acts through arm 95, and link 100 to swing latch 99 counterclockwise releasing the trigger 102. The link 91 is, at the same time, advanced and thus acts with the spring 88 to swing the tongue 103 into the path of the following trays. The parts maintain this position until the first tray actuates the trip arm 70 and the trip arm 60 is restored to its former position by the means previously described. This movement of the arm 60 causes the parts of the latch mechanism to return to the positions shown in Fig. 7 and releases the tray A stopped by the tongue 103.

The non-interference mechanism and spacing devices have been shown and described in connection with the two conveyers 15 at the central station. It will be understood, of course, that such mechanism is used in connection with the two conveyers 16 at that station as well as in connection with each of the single conveyers 15 and 16 located along the upper and lower runs of the conveyer 10.

The trays A delivered to the belt conveyer 10 at the various stations are deflected therefrom to the chutes 17 and 18 by suitable deflectors (not shown).

While one embodiment of this invention has been shown and described it will be understood that I am not limited thereto and that other embodiments of the invention may be made without departing from the spirit and scope thereof as set forth in the following claims.

1. The combination with a main conveyer and a branch conveyer by which articles are fed to the main conveyer, of mechanism to prevent feeding of articles by the branch conveyer to the main conveyer whenever articles traveling on the

main conveyer are adjacent the outlet of the branch conveyer which mechanism includes means actuated by each article on the main conveyer as it approaches the outlet of the branch conveyor for preventing the feed of articles from the branch conveyer to the main conveyer, and means actuated by each article on the main conveyer after passing the outlet for permitting such feed.

2. The combination with a main conveyer and a branch conveyer by which articles are fed to the main conveyer, of mechanism to prevent feeding of articles by the branch conveyer to the main conveyer whenever articles traveling on the main conveyer are adjacent the outlet of the branch conveyer which mechanism includes a stop adapted to engage each article advancing over the branch conveyer; means normally ineffective for causing said stop to prevent the feed of articles over the branch conveyer and trips engaged by each article passing over the main conveyer by which trips said means are controlled whereby the stop is rendered operative to prevent such feed when an article on the main conveyer approaches the outlet and is rendered inoperative to permit such feed after the article has passed such outlet.

3. The combination with a main conveyer and a branch conveyer by which articles are fed to the main conveyer, of mechanism to prevent feeding of articles by the branch conveyer to the main conveyer whenever articles traveling on the main conveyer are adjacent the outlet of the branch conveyer which mechanism includes a stop adapted to engage each article advancing over the branch conveyer and normally moved thereby out of the path of travel of the article thereon, means normally ineffective, for locking the stop against such movement, and a trip actuated by each article on the main conveyer before reaching the outlet for rendering said means effective to lock the stop and cause it to prevent travel of articles over the branch conveyer.

4. The combination with a main conveyer and a branch conveyer by which articles are fed to the main conveyer, of mechanism to prevent feeding of articles by the branch conveyer to the main conveyer whenever articles traveling on the main conveyer are adjacent the outlet of the branch conveyer which mechanism includes a stop normally in the path of travel of articles over the branch conveyer and movable out of such path by impact of each article, trips actuated by each article traveling over the main conveyer, and connections between the stop and the trips whereby the stop is held against such movement at certain periods and allowed to move at other periods as the articles pass along the main conveyer.

5. The combination with a main conveyer and a branch conveyer by which articles are fed to the main conveyer of mechanism to prevent feeding of articles by the branch conveyer to the main conveyer whenever articles travelling on the main conveyer are adjacent the outlet of the branch conveyer, which mechanism includes a stop associated with the branch conveyer and normally yieldable under the contact of the articles fed thereby, a trip arm actuated by each article on the main conveyer as it approaches the outlet of the branch conveyer, a second trip arm actuated by each article on the main conveyer as it leaves the outlet of the branch conveyer and connections between said stop and said trip arms whereby the stop is held against yielding upon the actuation of the first arm to permit feeding and the stop is allowed to yield upon the actuation of the second trip arm to permit such feeding.

6. The combination with a main conveyer and a branch conveyer by which articles are fed to the main conveyer of mechanism to prevent feeding of articles by the branch conveyer to the main conveyer whenever articles travelling on the main conveyer are adjacent the outlet of the branch conveyer, which mechanism includes a stop comprising a pivotally mounted arm adapted to project into the path of travel of articles over the branch conveyer and means normally holding the arm in such position and permitting the arm to yield under contact with each article being fed, a trip actuated by the articles upon the main conveyer, and a latch controlled by the trip and acting to hold the arm fixed in its normal position.

7. The combination with a main conveyer and a branch conveyer by which articles are fed to the main conveyer of mechanism to prevent feeding of articles by the branch conveyer to the main conveyer whenever articles travelling on the main conveyer are adjacent the outlet of the branch conveyer, which mechanism includes a stop comprising a pivotally mounted arm adapted to project into the path of travel of articles over the branch conveyer, means normally holding the arm in such position and permitting the arm to yield under contact with each article being fed and a second arm rigid relative to said first arm, a trip actuated by the articles upon the main conveyer, and a latch controlled by the trip and acting to engage the second arm of the stop and hold the first arm fixed in its normal position.

8. The combination with a main conveyer and a branch conveyer by which articles are fed to the main conveyer of mechanism to prevent feeding of articles by the branch conveyer to the main conveyer whenever articles travelling on the main conveyer are adjacent the outlet of the branch conveyer, which mechanism includes a stop comprising a pivotally mounted arm adapted to project into the path of travel of articles over the branch conveyer, and means normally holding the arm projecting into the path of travel and permitting the arm to yield under contact with each article being fed, a movable latch which in one position holds the arm fixed in the path of travel of the articles, thus stopping their movement, and in another position releases the arm and permits it to yield under the contact of the articles and trips actuated by the articles on the main conveyer for determining the position the latch will assume.

9. The combination with a main conveyer and a branch conveyer by which articles are fed to the main conveyer of mechanism to prevent feeding of articles by the branch conveyer to the main conveyer whenever articles travelling on the main conveyer are adjacent the outlet of the branch conveyer, which mechanism includes a stop comprising a pivotally mounted arm adapted to project into the path of travel of articles over the branch conveyer, a counterweight normally holding the arm projecting into the path of travel and a second arm rigid relative to the first, a movable latch which in one position, engages the second arm and holds the first arm fixed in the path of travel and, in another position, releases the second arm and permits the first arm to yield under contact of the articles, a trip arm associated with the main conveyer and actuated by the articles approaching the

branch conveyer, a second trip arm associated with the main conveyer and actuated by the articles leaving the branch conveyer and connections between the latch and the trip arms whereby tripping of the first arm moves the latch into engagement with the stop and tripping of the second arm moves the latch out of engagement with the stop.

10. The combination with a main conveyer and a branch conveyer by which articles are fed to the main conveyer of mechanism to prevent feeding of articles by the branch conveyer to the main conveyer whenever articles travelling on the main conveyer are adjacent the outlet of the branch conveyer, and means associated with such mechanism for separating the articles on the main conveyer.

11. The combination with a main conveyer and a branch conveyer by which articles are fed to the main conveyer of mechanism to prevent feeding of articles by the branch conveyer to the main conveyer whenever articles travelling on the main conveyer are adjacent the outlet of the branch conveyer, which mechanism includes a stop associated with the branch conveyer and at least two trips associated with the main conveyer and actuated by the articles travelling thereover and means set by one of said trips upon its actuation by an article for preventing the travel of another article upon the main conveyer until the preceding article has actuated the second trip.

12. The combination with a conveyer of two trip arms associated therewith and adapted to be actuated by the articles travelling thereover, and movable means controlled by said trip arms independently which in one position prevent travel of articles over the conveyer and in another position permit such travel.

13. The combination with a conveyer of two trip arms associated therewith and adapted to be actuated by the articles travelling thereover, and movable means controlled by one of said trip arms when actuated by an article to prevent the travel of other articles over said conveyer and by the other of said trip arms when actuated by an article to release such articles.

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