United States Patent

Parker

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[45] **Oct. 31, 1972**

[54] **ARTICLE INSERTION DEVICES**

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[30] **Foreign Application Priority Data**

May 7, 1970 Great Britain.....22161/70

[52] **U.S. Cl.** **53/187,** 53/386, 93/28

[51] **Int. Cl.**.....**B65b 5/04,** B65b 43/30

[58] **Field of Search**.....53/187, 386, 186, 384, 188; 93/28, 8 R; 198/131, 38

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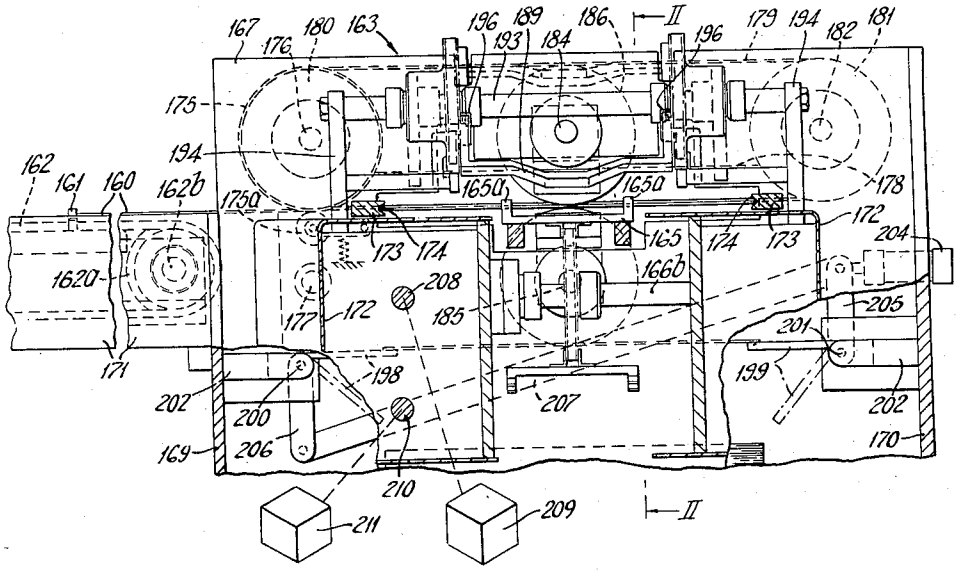
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[57] **ABSTRACT**

A record and an open ended bag are conveyed along different paths at right angles to each other, but in the same plane, insertion of the record into the bag taking place at the intersection of the paths. As the bag is being conveyed it passes between a pair of rotatable eccentric suction rollers which grip the front and back faces of the bag respectively and cause the bag to be opened as the surfaces of the rollers move apart, due to the rotation of the rollers.

8 Claims, 6 Drawing Figures



PATENTED OCT 31 1972

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SHEET 1 OF 3

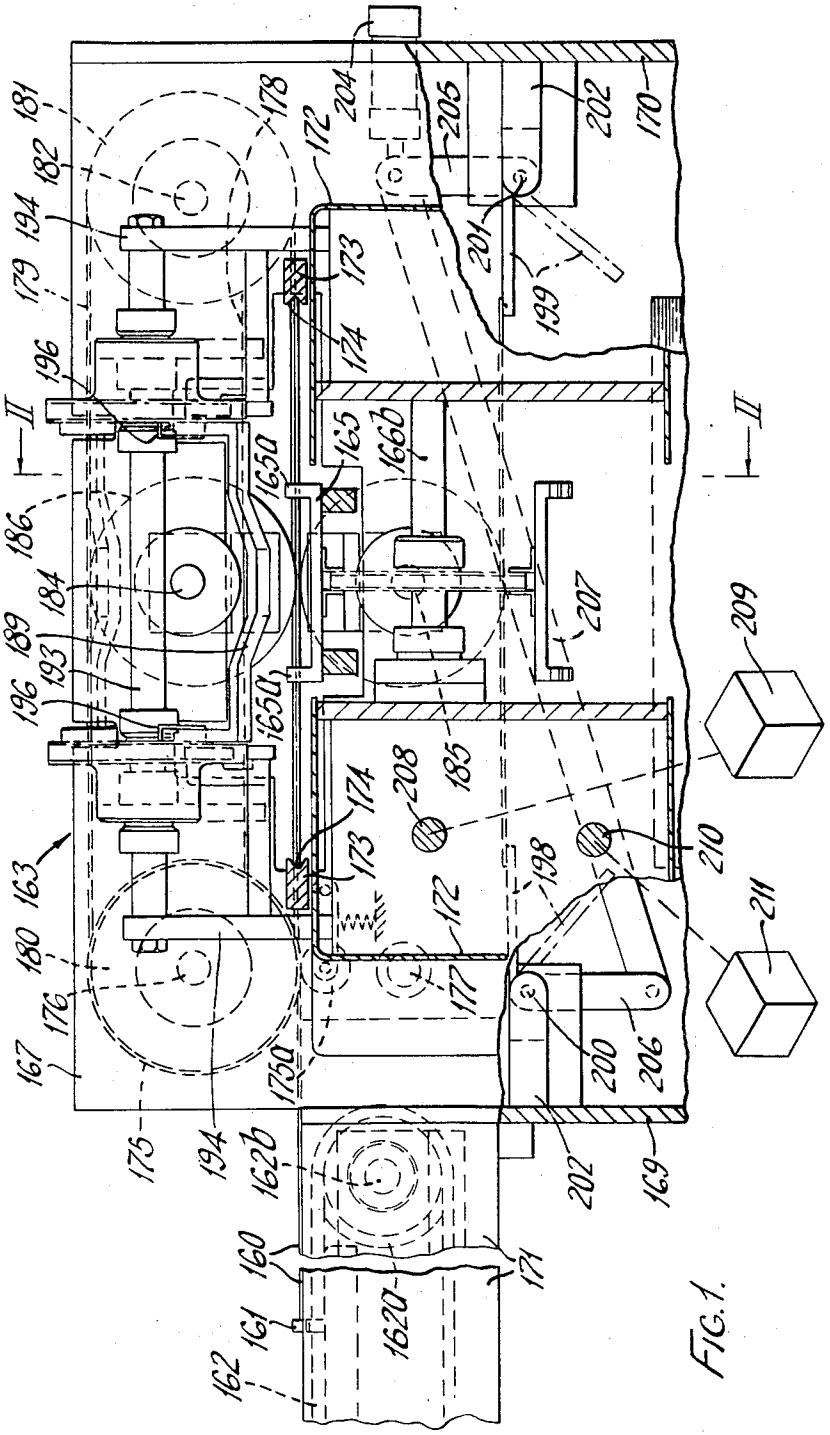


FIG. 1.

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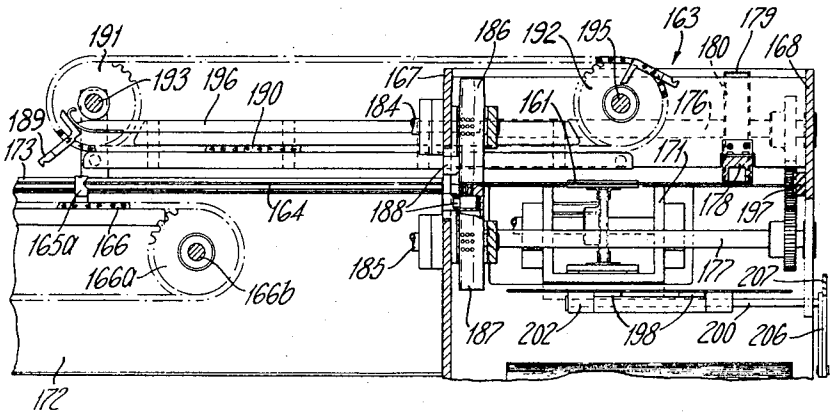


FIG. 2.

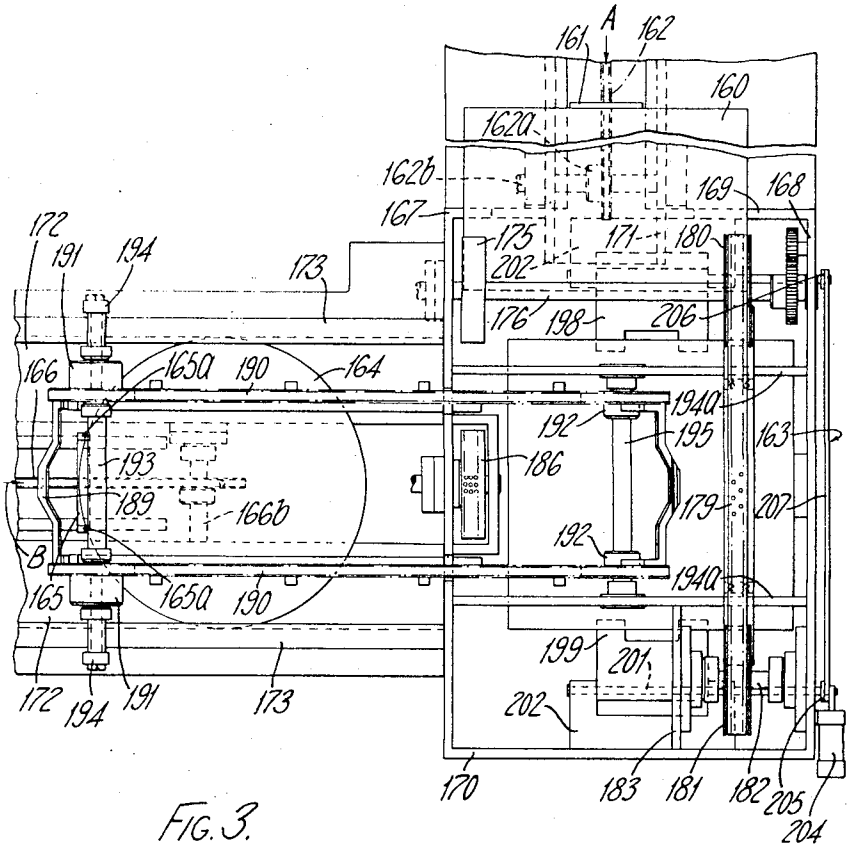


FIG. 3.

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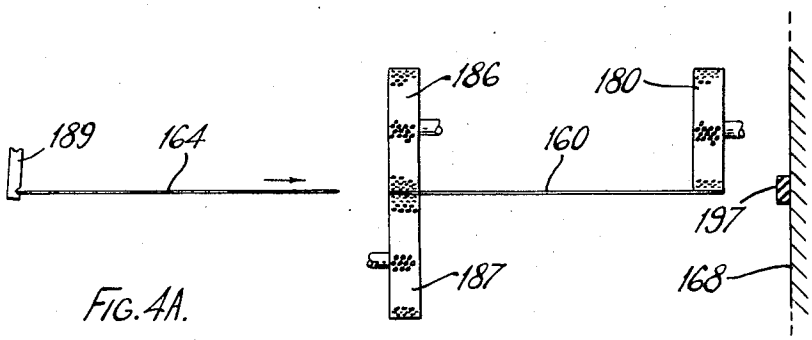


FIG. 4A.

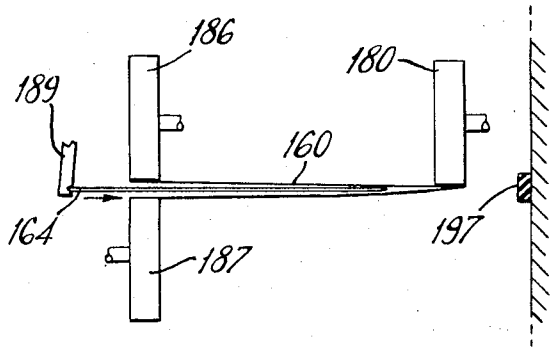


FIG. 4B.

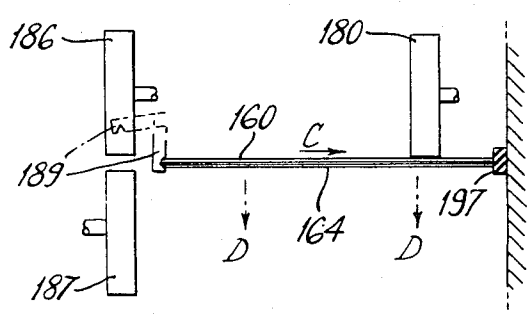


FIG. 4C.

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ARTICLE INSERTION DEVICES

This invention relates to devices for inserting gramophone records, or like articles into a bag. The present invention may with advantage be employed in a record packing machine as disclosed in U.S. Pat. application, Ser. No. 36,261 filed Nov. 5, 1970.

According to the invention, we provide a device for inserting a record or like article in a bag, comprising means for opening said bag and means for feeding the record or like article into the open bag, in which said opening means comprises a pair of eccentric rollers, means for driving said rollers in phase, means for feeding a bag between said rollers with its open end adjacent to one end of said rollers, the bag feeding means and the roller driving means being so synchronized that as the bag enters between the rollers the surfaces of the latter are at their position of closest approach, while as the bag passes on between the rollers their surfaces separate, and suction means associated with said rollers so that front and back faces on the bag are held against the surfaces of the rollers as said surfaces separate.

In a preferred construction the bag feeding means comprises a driven roller and a further roller resiliently urged towards said driven roller, and a perforated conveyor having suction applied thereto, said driven and said further roller being so positioned as to grip said bag therebetween adjacent to its open end, said perforated conveyor being adapted and positioned so as to suctionally support the closed end of said bag opposite said open end, said driven roller, further roller, and perforated conveyor being adapted to feed the said bag along a first path to said station. The bag feeding means and the roller driving means are so synchronized that the surfaces of said eccentric rollers are at their greatest distance apart when the bag is at said station.

The means for feeding the record or like article preferably comprises a chain conveyor provided with pusher means which engage said record or like article to feed it along a second path in the same plane as said first path, but at an angle thereto so as to insert said record or like article in said bag whilst said bag is at said station.

The pusher means may conveniently be arranged to continue to feed said record or like article along said second path after said record has been completely inserted in said bag so as to move the bag away from the said eccentric rollers and bring the closed end of said bag into contact with a resilient pad, means being provided to disengage said pusher means from said record or like article and to cut off suction from said perforated conveyor simultaneously so as to release said record and said bag after said bag contacts said resilient pad.

Apparatus embodying the invention may also include a variety of other features, as will be seen from the following description of one preferred form of such apparatus.

Reference will be made to the accompanying drawings in which:

FIG. 1 is a front elevation of apparatus for inserting a record into a bag;

FIG. 2 is a section on the line II—II of FIG. 1;

FIG. 3 is a plan view of FIG. 2;

FIGS. 4A, 4B and 4C are diagrammatic views showing successive positions of certain parts during insertion of a record into a bag.

In the drawings a paper bag **160** is fed, in the direction of arrow A FIG. 3), by a finger **161**, mounted on a chain conveyor **162** carried by a sprocket wheel **162*a*** fixed to and continuously driven by shaft **162*b***, towards a record insertion device !63. At the same time a record **164** is fed, in the direction of arrow B (FIG. 3), towards the device **163**, by a pusher **165** mounted on a further chain conveyor **166** carried by a sprocket wheel **166*a*** fixed to and driven continuously by shaft **166*b***. The shafts **162*a***, **166*b*** are both driven by suitable gearing (not shown) from an input shaft **208** (FIG. 1) which in turn is driven from a continuous drive unit diagrammatically shown at **209**. The conveyors **162**, **166** are arranged so that the bag and the record are moved towards the device **163** in the same plane, but at right angles to one another, as shown in FIG. 3. The bag **160** is oriented so that its open edge is parallel to its direction of movement and is facing in a direction towards the record, so that the latter may be inserted into the bag as will be explained later.

The device **163** consists of a box like structure, open at the top and bottom, and having a front wall **167**, a rear wall **168** and two side walls **169**, **170**. The side wall **169** is shaped to receive and support the right hand end (as viewed in FIG. 1) of a housing **171** along the top surface of which the bag **160** is fed by the finger **161**, and the front wall **167** is shaped to receive and support the right hand end (as viewed in FIG. 2) of a pair of side frames **172** on which are mounted guides **173** which support and guide the record **164** as the latter is pushed by pusher **165**.

The guides **173** are arranged parallel to each other and are spaced apart a distance such that the record **164** is supported at diametrically opposite points in vee shaped grooves **174** (see FIG. 1) provided along the mutually facing surfaces of the guides **173**. The pusher **165** is formed with two upwardly extending projections **165*a*** which are also formed with vee shaped grooves, as shown in FIG. 2. The record is thus supported at four points round its periphery, which ensures that it does not tilt while being moved. The guides **173** extend in the direction of arrow B to a position level with the front wall **167**.

The finger **161** feeds the bag **160** until the leading edge thereof is gripped between a driven roller **175** and a further roller **175*a*** resiliently urged against the roller **175**. The roller **175** is mounted on a shaft **176**, supported in bearings mounted on the front and rear walls **167**, **168** respectively. The rollers **175**, **175*a*** are positioned close to the front wall **167** (see FIG. 3) so that they grip the bag adjacent the open edge thereof. At the same time as the rollers **175**, **175*a*** grip the open edge of the bag, the edge opposite that edge is suctionally gripped from above by suction applied to a suction box **178** along the underneath of which runs a continuous perforated belt **179** carried between a pair of pulleys **180**, **181**. The pulley **180** is fixed to the shaft **176** and the pulley **181** is mounted on a further shaft **182** carried between the rear wall **168** and a partition **183** (FIG. 3).

Mounted respectively on stub shafts **184**, **185** are two suction wheels **186**, **187** arranged vertically above one another, the wheel **186** being positioned above the plane along which the bag **160** is fed, and the wheel **187** being positioned below said plane (see FIG. 1). Suction, from a source (not shown), is applied to the wheels **186**, **187** through two chambers **188**.

The wheels **186, 187** are eccentrically mounted on their respective shafts **184, 185** in symmetrical opposition so that during each revolution of the wheels their peripheries move, for the first half revolution, away from each other, and, for the second half revolution, towards each other. The roller **175**, the perforated belt **179**, and the wheels **186, 187** are all driven intermittently through suitable gearing (not shown) from an input shaft **210** FIG. **1**) which in turn is driven intermittently by a drive unit, diagrammatically shown at **211**.

On continued movement in the direction of arrow A, (FIG. **1**), of the bag, the leading edge thereof passes between the peripheries of the suction wheels **186, 187** which at this moment are almost touching, (as viewed in FIG. **1**), so that suction will be applied to the two faces of the bag to hold the upper and lower faces thereof to the wheels **186, 187** respectively. As the bag is moved further the two faces of the bag are pulled apart, due, as explained above, to the peripheries of the suction wheels **186, 187** moving away from each other, until, after half a revolution of the wheels **186, 187** the mouth of the bag is held open by an amount sufficient to permit entry of the record **164**.

The record **164** is fed by pusher **165** to a position such that a further pusher **189**, having a V-shaped groove formed in its leading face (see FIG. **2**) and travelling at a higher speed than the pusher **165**, engages the record and accelerates it away from the pusher **165**. The pusher **189** is carried by two chain conveyors **190** and the leading face of the pusher **189** is arranged to engage the record between the projections **165***a* of the pusher **165** (FIG. **1**). The chain conveyors **190** are carried by two pairs of sprockets **191, 192**, the sprockets **191** being freely rotatable on a shaft **193** carried between brackets **194**, and the sprockets **192** being fixed to a driven shaft **195** carried between two fixed walls **194***a* which extend between the walls **167, 168**. The shaft **195** is driven through suitable gearing (not shown) from the continuously driven input shaft **208**. The pusher **189** is pivotally mounted on the chains **190** and is urged in a clockwise direction (as seen in FIG. **2**) by a torsion spring mounted on its pivot, the pusher being kept in the correct orientation for engaging the record **164** by two rails **196**, which extend to a position just beyond the suction wheels **186, 187** (considered in the direction of movement of the pusher **189**).

FIG. **4A** shows the record **164** being pushed by the pusher **189** and also the bag **160** which has just passed into contact with the suction wheels **186, 187**, the closed edge of the bag being supported by the perforated belt **179**.

In FIG. **4B** the bag has been opened, as explained above, and the record is being pushed into the bag **160** by the pusher **189**. When the record is completely inside the bag, i.e., the edge of the record is in contact with the sealed edge of the bag opposite the open edge, it also pushes the bag, which slides across the perforated belt **179** while still being supported by it. The pusher **189** continues pushing the record, and thus the bag, until the now leading edge of the bag (considered in its direction of movement which is now that shown by arrow C) touches a rubber pad **197** mounted on the rear wall **168**, this position being illustrated in FIG. **4C**. As the bag touches the pad **197** the pusher **189** runs off the rail **196** and pivots in a clockwise direction away from the record as shown in chain-dot line in FIG. **4C**. Also at this moment the suction to the perforated belt is cut off and the bagged record is allowed to drop downwards as shown by arrows D in FIG. **4C**. The bagged record drops on to the upper face of a pair of support bars **198, 199** which are respectively fixed to pivot pins **200, 201** carried in brackets **202** fixed to the inside faces of the side walls **169, 170**. The bars **198, 199** are arranged, to be moved to the position shown in chain-dot lines in FIG. **1**, this movement being controlled by a pneumatic cylinder **204** the piston of which is fixed to one end of a lever **205**, the other end of which is fixed to the pivot pin **201** of bar **199**. A further lever **206** is fixed at one end to the pivot pin **200** of bar **198** and the two levers **205, 206** are connected by a link **207** so that the bars **198, 199** are moved in unison by the cylinder **204**. When moved as just described the bagged record is allowed to drop further, in the direction of arrows D in FIG. **4C**, on to the top of a stack of bagged records, the stack forming a hopper from which bagged records are fed to further devices (not shown) which form no part of the present invention.

What I claim as my invention and desire to secure by Letters Patent is:

1. A device for inserting a record or like article in a bag, comprising an insertion station, means for opening said bag and means for feeding the record or like article into the open bag at said insertion station, in which said opening means comprises a pair of eccentric rollers, means for driving said rollers in phase, means for feeding a bag between said rollers with its open end adjacent to one end of said rollers, the bag feeding means and the roller driving means being so synchronized that as the bag enters between the rollers the surfaces of the latter are at their position of closest approach, while as the bag passes on, towards said station between the rollers their surfaces separate, and suction means associated with said rollers so that front and back faces of the bag are held against the surfaces of the rollers as the surfaces separate.

2. A device as claimed in claim **1** in which the bag feeding means and the roller driving means are so synchronized that the surfaces of said eccentric rollers are at their greatest distance apart when the bag is at said station.

3. A device as claimed in claim **2** in which said bag feeding means comprises a driven roller and a further roller resiliently urged towards said driven roller, and a perforated conveyor having suction applied thereto, said driven and said further roller being so positioned as to grip said bag therebetween adjacent to its open end, said perforated conveyor being adapted and positioned so as to suctionally support the closed end of said bag opposite said open end, said driven roller, further roller, and perforated conveyor being adapted to feed the said bag along a first path to said station.

4. A device as claimed in claim **3** in which said record or like article feeding means comprises a chain conveyor provided with pusher means which engage said record or like article to feed it along a second path in the same plane as said first path, but at an angle thereto so as to insert said record or like article in said bag while said bag is at said station.

5. A device as claimed in claim **4** in which said second path is at right angles to said first path.

6. A device as claimed in claim 4 in which said second path is defined by guide means comprising a pair of parallel bars, the mutually facing sides of which are each formed with a V-shaped groove extending along its length, said bars being so positioned as to permit each record or like article to be supported in said grooves at diametrically opposite points on its periphery.

7. A device as claimed in claim 6 in which said pusher means comprises two lugs, each having a face formed with a V-shaped groove for engagement with each record or like article, said grooves coacting with the grooves in said parallel bars to prevent said record or like article from tipping while it is being fed along said second path and into said bag.

8. A device as claimed in claim 4 in which said pusher means is arranged to continue to feed said record or like article along said second path after said record has been completely inserted in said bag so as to move the bag away from the said eccentric rollers and bring the closed end of said bag into contact with a resilient pad, and means being provided to disengage said pusher means from said record or like article after said bag contacts said resilient pad.

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