June 18, 1940. J. C. PATERSON 2,205,106

MACHINE FOR ARRANGING AND STACKING BISCUITS OR THE LIKE

Filed July 24, 1937 4 Sheets-Sheet 1

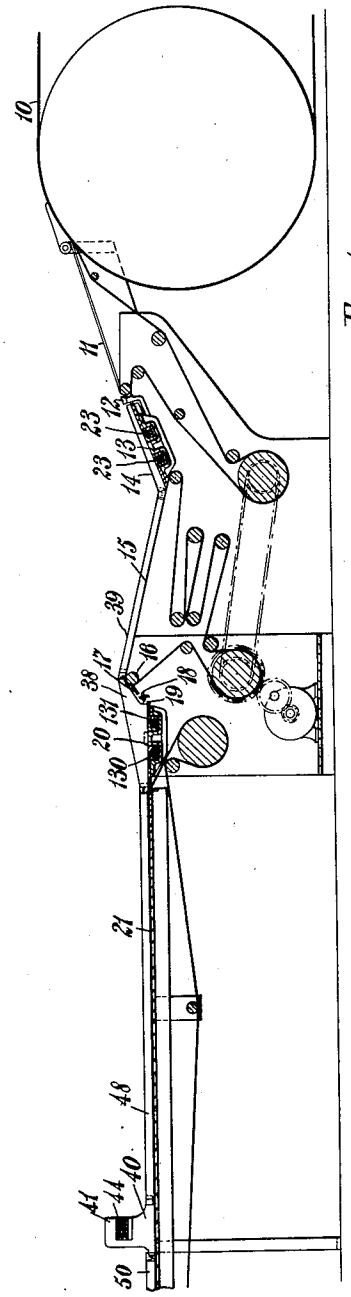


Fig. 1.

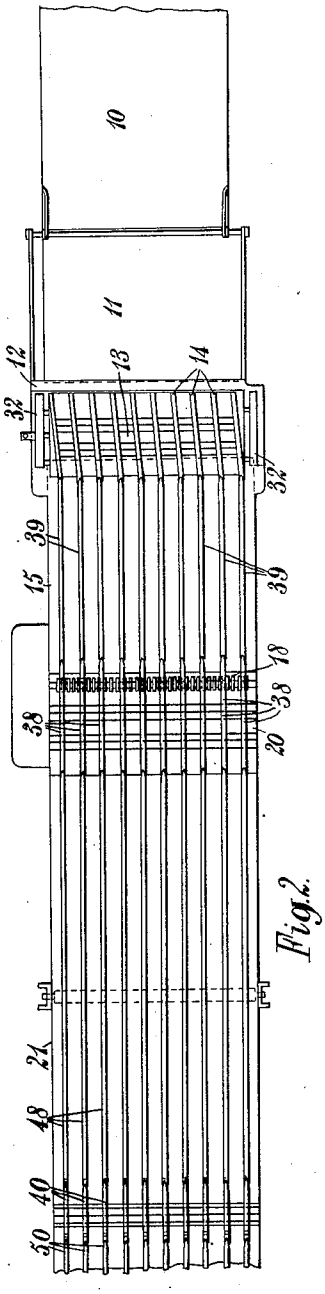


Fig. 2.

J. C. Paterson
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MACHINE FOR ARRANGING AND STACKING BISCUITS OR THE LIKE

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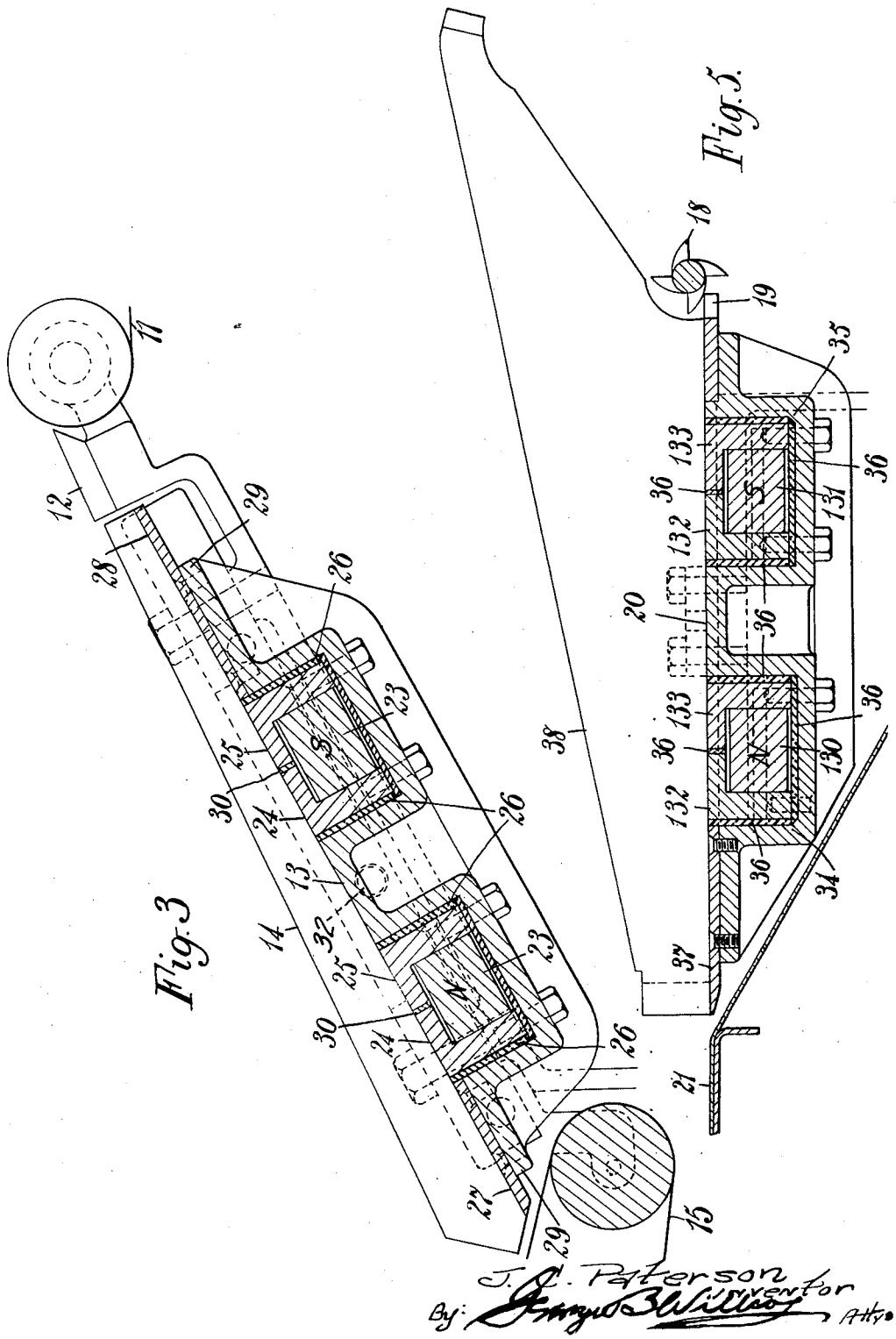


Fig. 3

Fig. 5.

J. C. Paterson Inventor

By: Harry B. Williams Atty.

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MACHINE FOR ARRANGING AND STACKING BISCUITS OR THE LIKE

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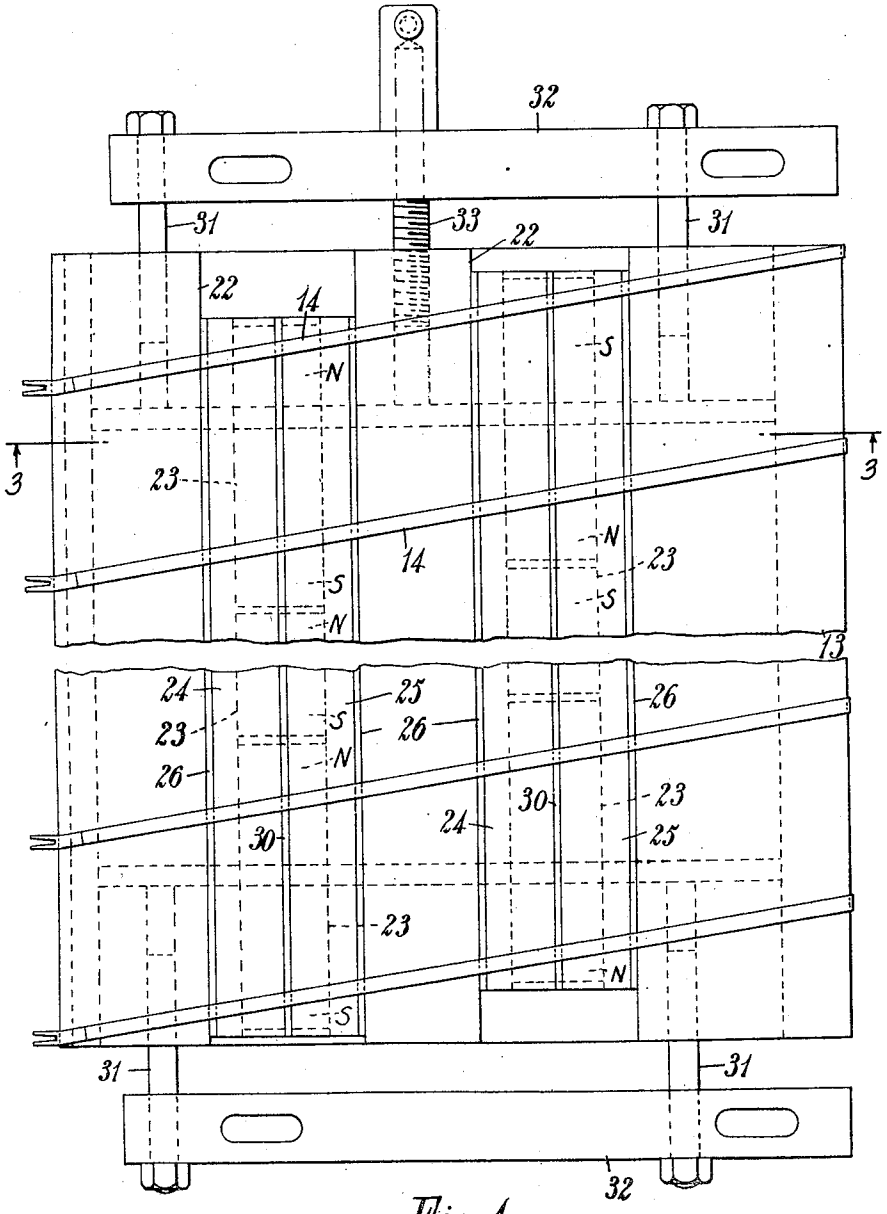


Fig. 4.

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MACHINE FOR ARRANGING AND STACKING BISCUITS OR THE LIKE

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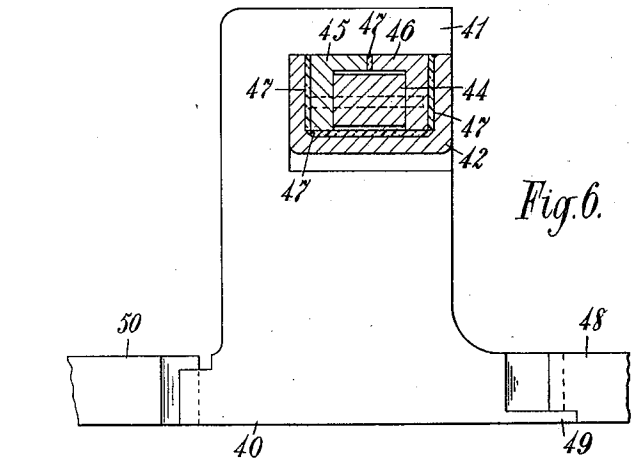


Fig. 6.

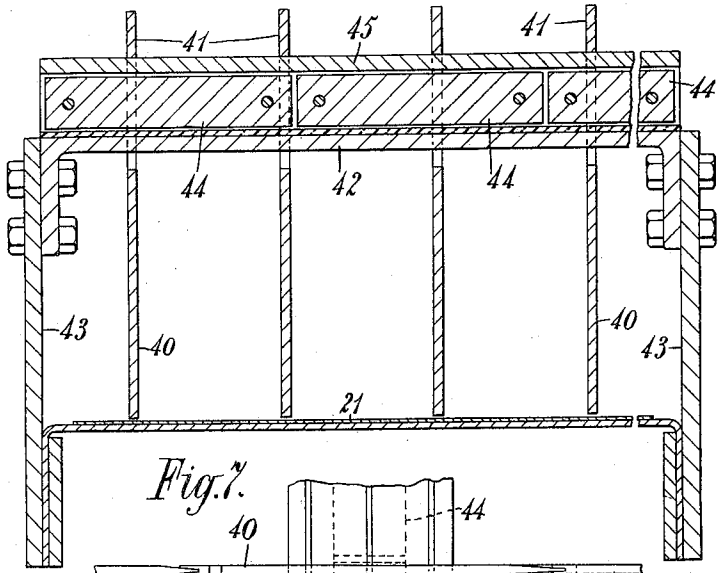


Fig. 7.

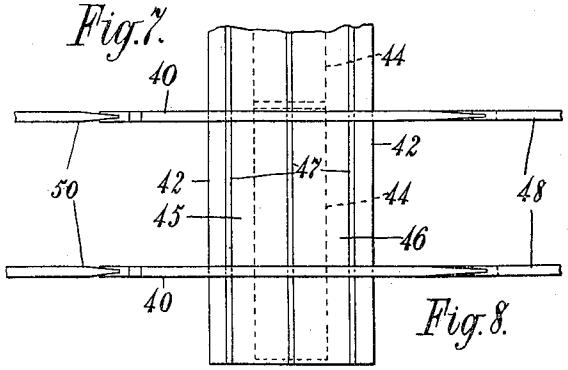


Fig. 8.

J. C. Paterson
INVENTOR

By: George B. Willcox
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Patented June 18, 1940 2,205,106

UNITED STATES PATENT OFFICE

2,205,106

MACHINE FOR ARRANGING AND STACKING BISCUITS OR THE LIKE

John Currie Paterson, Peterborough, England, assignor to Baker Perkins Company, Inc., Saginaw, Mich.

Application July 24, 1937, Serial No. 155,541
In Great Britain August 4, 1936

6 Claims. (Cl. 198—30)

This invention relates to machines for arranging (or aligning) and stacking biscuits or like shaped articles wherein the biscuits or the like are adapted to travel along passageways formed between partitions or fences arranged in spaced relation and located parallel to the directionof travel.

Such machines may be located in endwise relation with the delivery conveyor of a biscuit plant from which the biscuits are delivered in a more or less haphazard manner whereby the biscuits are arranged in defined rows to facilitate the picking up of the biscuits by hand for packing.

According to the size and shape of biscuit being dealt with it is necessary to adjust the width of the channels or passageways and it is an object of the present invention to provide an improved method of and means whereby the fences are mounted so that they may be readily adjusted to any desired position without the necessity of overhead mountings for the fences or the provision of apertures in the table upon which the fences are mounted.

A further object is to provide an improved arrangement of adjustably mounting the fences which may be carried out without the necessity of complicated mechanism.

According to the invention in a machine for aligning or stacking biscuits or like shaped articles having a series of partitioned ways, the partitions are retained in position by the aid of magnetic means.

The invention also comprises a biscuit arranging (aligning) or stacking machine having adjustable channel forming fences retained in position by the aid of magnetic means.

In the accompanying drawings which diagrammatically illustrate the invention as applied to a biscuit arranging and stacking machine of the character described in United States Patent No. 1,921,580, granted to George Ralph Baker and myself, issued August 8, 1933:

Figure 1 is a sectional side elevation;

Figure 2 is a plan corresponding thereto;

Figure 3 is a vertical longitudinal section, to a larger scale of the biscuit aligning section of the machine, taken along line 3—3 in Fig. 4;

Figure 4 is a plan corresponding to Figure 3;

Figure 5 is a sectional side elevation of the biscuit stacking section of the machine;

Figure 6 is an enlarged view partly in section taken from the side of the machine as in Fig. 1 showing a guide plate associated with the delivery conveyor of the machine;

Figure 7 is a vertical cross section of the apparatus of Fig. 6.

Figure 8 is a partial plan.

With the improved arrangement according to the invention it will be appreciated that the fences may be adjusted to any desired position and will be retained in such position by means of the magnetic attraction as the force of the oncoming biscuits will be insufficient to dislodge the fences. Thus an infinitely adjustable dimension of passageways will be provided by a method which avoids the use of complicated adjusting mechanisms.

The magnets may be so arranged that the magnetic field acting on the fences is weakened or cut off entirely while adjustment of the spacing of the fences is carried out and when the fences have been set in their correct positions the full magnetic field is applied to hold them there.

If permanent magnets are used this may be done by moving the magnets away from the fence supporting plate and when the correct adjustment of the fences has been made the magnets are moved up to the supporting plate.

If electromagnets are used the intensity of the field can be altered by switching off or varying the intensity of the electric current.

Referring now to Figures 1 and 2, 10 is the oven band or biscuit cooling conveyor from which the biscuits are delivered to the feeding conveyor 11 of the biscuit stacking machine. The conveyor 11 conveys the biscuits downwardly over a bar 12 to a biscuit arranging or aligning plate 13, the partitions 14 of which present passageways for the biscuits which are inclined to the direction of travel of the biscuits.

The rows of biscuits from the aligning plate are received by an intermediate conveyor 15 which conveys the rows of biscuits upwards and over a terminal roller 16 whence the biscuits slide down a plate 17 on to a rotary stacker wheel 18 co-operating with a comb 19 whereby the biscuits are caused to stand on edge in the manner described in the United States Patent referred to.

The stacker wheel causes the biscuits thus stacked to advance across a plate 20 from which they are delivered to the delivery conveyor 21 for removal by the packing operatives.

Turning to Figures 3 and 4, the aligning plate 13 is provided with a pair of parallel transverse recesses 22 adapted to accommodate a series of permanent magnets 23 which are arranged end to end therein as seen in Figure 4. The magnets

are located within L-shaped pole pieces 24, 25 and are insulated from the walls of the plate recesses by insulating non-magnetic strips 26. The pole pieces 24, 25 lie flush with the form part of the upper surface of the aligning plate. The lower end upper edges of the aligning plate comprise plates 27, 28 secured to the flanges 29, so that the extent of the aligning plate may be varied by providing plates 27 and 28 of the desired dimension. Non-magnetic strips 30 are also provided between the pole pieces so that an uninterrupted surface is provided for the biscuits.

The magnets 23 are magnetised so that their sides as seen in Figure 3 and which are in contact with the pole pieces 24, 25 are of opposite polarity so that one pole piece of each pair will be N and the other S.

The guide bars or partitions 14 forming the passageways for the biscuits are mounted in spaced relation and by the arrangements of the magnets as specified above each bar will be magnetically held at spaced points in its length.

The aligning plate together with the magnets is mounted upon guide pins 31 carried by bars 32 so that the plate may be adjusted transversely of the path of the biscuits, for which purpose an adjusting screw 33 is provided.

A similar mounting is provided for the magnets associated with the stacker plate 20 (see Figure 5) except that in this case the plate is fixed. Thus the magnets 130, 131 with their pole pieces 132, 133 are located in recesses 34, 35, insulating strips 36 being provided. The magnets are of bar form extending end to end transversely of the direction of feed. At the forward end of the plate 20 a plate 37 is provided, while at the rear end the surface is provided by the comb plate 19.

The partition members or fences 38 are seated on the plate 20 and are held in their adjusted positions thereon by the magnetic attraction of the magnets 30, 31 which provide magnetic fields at spaced points in the length of each partition.

Between the partitions 14 and 38 fences 39 are provided which are held in their positions by their ends interengaging with the adjacent ends of the partitions 14 and 38 as by loose tenon joints shown in Figs. 2, 4, and 8, and in Patent No. 1,921,580 referred to. These fences seat upon the intermediate conveyor 15.

From the stacker plate 20 the biscuits in stacked formation are led to the delivery conveyor 21 which at a point intermediate its ends is provided with adjustable guide plates 40. These plates (see Figures 6, 7 and 8) are located in their adjusted positions by magnetic attraction in the following manner: The plates 40 are provided with an upward extension forming a hook member 41 adapted to fit around a mounting 42 extending transversely across the conveyor 21. The mounting is carried by end supports 43 and is grooved to accommodate permanent magnets 44 which are in bar form and arranged end to end (see Figure 8). The magnets are located within L-shaped pole pieces 45, 46 with suitable insulating strips 47, the pole pieces being respectively N and S as in the previously described magnets for the aligning and stacker plates 13 and 20.

The guide plates 40 are held to the mounting 42 by the magnetic field and are dimensioned such that their lower faces are clear of the conveyor 21.

Between the corresponding ends of the guide plates 40 and the stacker plates 20 fences 48 are provided, which have interengaging ends of loose tenon formation, the fences resting on the conveyor 21. Preferably however, these fences are held clear of the conveyor by supporting them at one end upon ledges 49 on the guides 40 (see Fig. 6) and utilising the plate 37 to support their opposite ends.

Further fences 50 are provided forwardly of the guide plates 40, between such guides and a similar set spaced therefrom adjacent their outer ends.

I claim:

1. A machine for aligning or stacking biscuits or like shaped articles comprising a plate, a plurality of spaced partitions defining guideways over the surface of said plate, and co-operative magnetic means in said plate and partitions for holding the partitions in place.

2. A machine for aligning or stacking biscuits or like shaped articles comprising a plate having a surface over which the biscuits travel, a plurality of partitions supported upon the surface and forming a series of guideways, and magnetic means in said plate operative to retain said partitions in place.

3. A machine for aligning or stacking biscuits or like shaped articles, comprising a plate having a conveying surface, a series of partitions located above the surface and forming guideways for the biscuits, a support arranged transversely above the conveyor and spaced therefrom, magnetic means carried by said support by the aid of which the partitions are held to form the guideways.

4. A partitioned guideway element for a biscuit aligning or stacking machine, comprising a plate over which the biscuits travel, said plate having a spaced pair of transverse recesses, a series of bar magnets arranged end to end in each recess, a pair of L-shaped pole pieces in each recess and common to the magnets therein, and a plurality of partitions supported by the plate and retained by the aid of the magnets to form a series of guideways for the biscuits.

5. A partitioned guideway element for a biscuit aligning or stacking machine comprising a plate having a conveying surface for the biscuits, a support arranged above the conveying surface and transversely thereto, said support having a recess in its upper surface, a series of bar magnets located end to end in the recess, a pair of L-shaped pole pieces common to all the magnets positioned in said recess, and a plurality of plate partitions retained by the aid of said magnets, said partitions having a hook formation and depending from said support.

6. A machine for aligning or stacking biscuits or like shaped articles, comprising a plate having a conveying surface, guideway elements spaced apart longitudinally of said conveying surface, said guideway elements each comprising a series of partitions, supports for said partitions extending transversely of said conveying surface, magnetic means in said partitions and supports co-operatively arranged to hold said partitions in place on said supports, and loose fences positioned along said conveying surface between said partitions and detachably connected at their ends to said partitions by interengaging loose joints.

JOHN CURRIE PATERSON.