

May 20, 1924.

W. ROSE

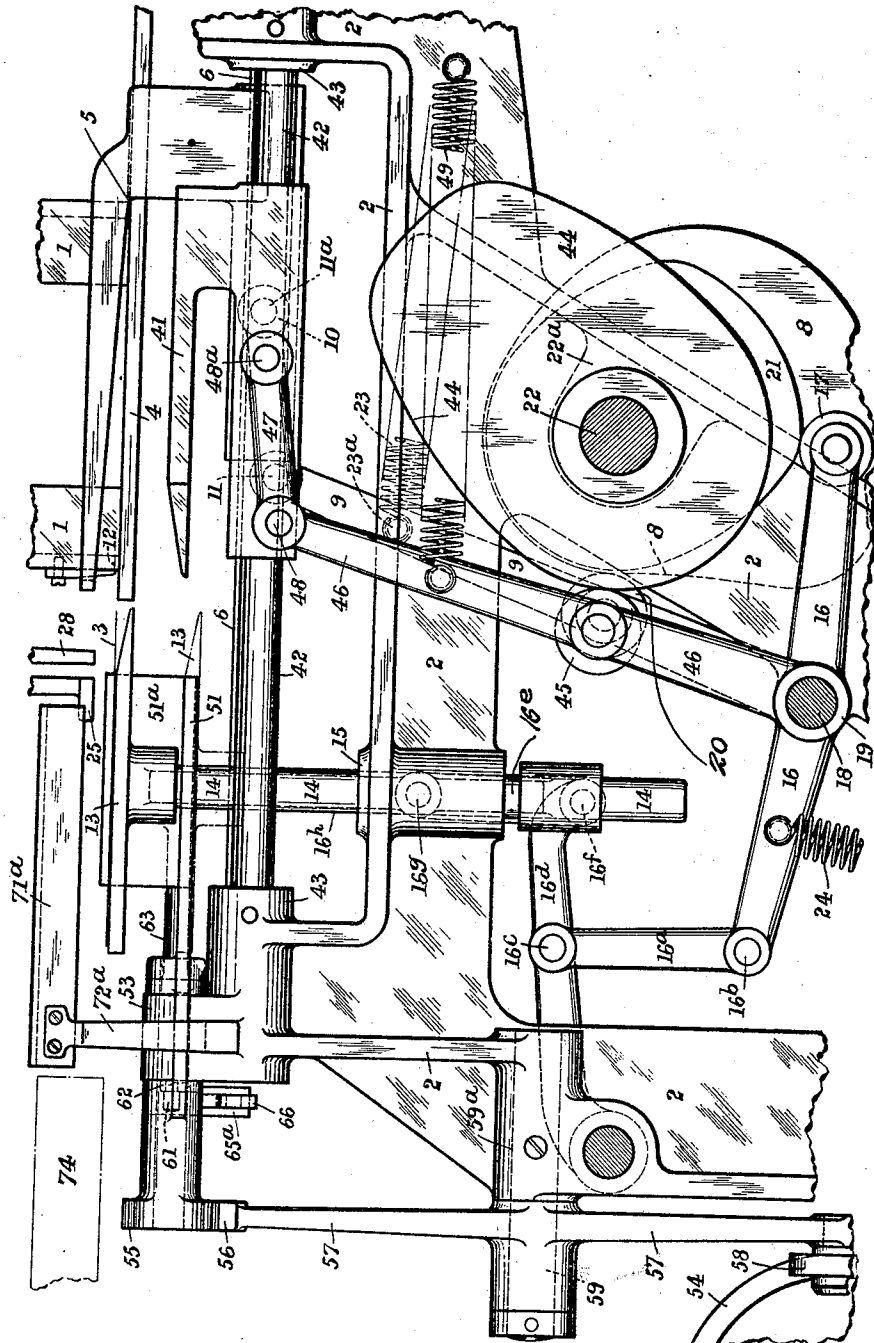
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APPARATUS FOR OPENING OUT CARTONS

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3 Sheets-Sheet 1

Fig. 1.



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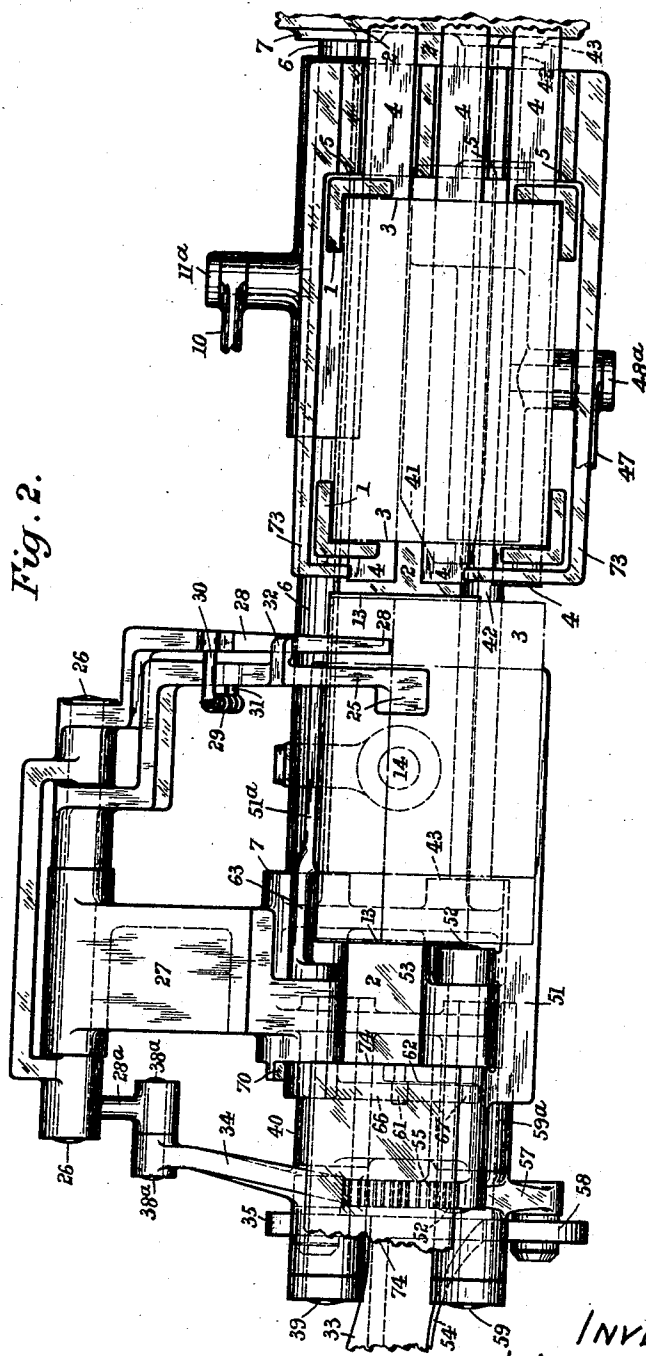
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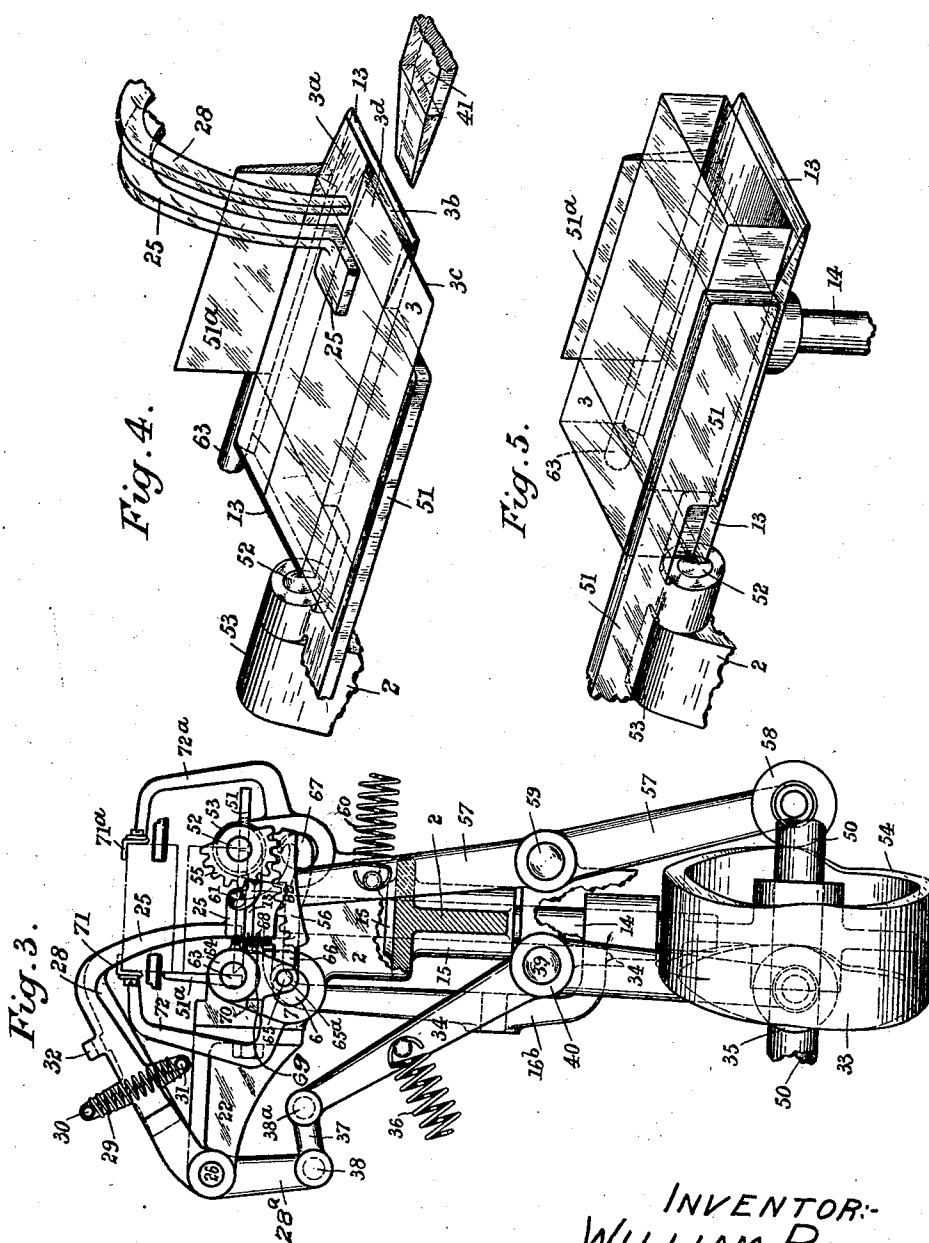
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3 Sheets-Sheet 3



INVENTOR:
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UNITED STATES PATENT OFFICE.

WILLIAM ROSE, OF GAINSBOROUGH, ENGLAND.

APPARATUS FOR OPENING OUT CARTONS.

Application filed June 6, 1923. Serial No. 643,740.

To all whom it may concern:

Be it known that I, WILLIAM ROSE, a subject of the King of Great Britain, residing at Albion Works, Gainsborough, England, have invented new and useful Improvements in Apparatus for Opening Out Cartons, of which the following is a specification.

This invention relates to apparatus for opening-out and feeding, or removing, cartons, or the like, and for analogous purposes, and particularly for opening out and feeding, or removing to any required apparatus, or place, cartons which have been scored and collapsed, or folded flat, and whose end portions have been cut to form turnover flaps (such as, for example, cartons for containing flaked soap, cereals, or the like) but the said invention may be employed for other purposes to which it is, or may be applicable.

In an apparatus according to this invention a magazine is supported in a vertical position (or in a position somewhat inclined from the vertical) on any suitable framework, or support, the said magazine being open at the top, a pile of cartons, in a flat, or collapsed, condition being deposited therein, ridges, or like supports, being provided at the bottom of the magazine to support the cartons.

An ejecting pusher is supported on a reciprocable ejector carrier, and is capable of movement in a guide, to push the lowermost of the cartons through a slot, or opening, at the lower part of the said magazine, and on to a platform, vertically reciprocable in guides or the like means being provided whereby the said platform, with the carton supported thereon, can be lowered, a pivotally supported retaining finger (or several such fingers) being caused to retain the carton in position on the said platform, whilst it is being lowered.

A pivotally supported bending finger (or a number of such fingers) is capable of being operated to bend down one, or more, of the turnover flap portions at the end of the carton nearest to the magazine, whilst the remainder of the turnover flap portions of the said end, are temporarily allowed to remain in their original position and, when the platform, with the carton thereon, has been brought to rest in its lowered position, a reciprocable tapered slicer, or blade, is so operated, as to enter between the upper and lower side portions of the carton, and push

the said portions away from each other and, at, or about, the same time, the retaining finger (or fingers) and the said bending finger (or fingers) will be removed from their bearing on the carton.

Suitably supported flap-pieces, or blades or equivalent members, are partially rotated by toothed gearing, or other suitable means, so as to co-act with the aforesaid slicer, or blade, and turn up the side portions of the carton, from their original collapsed positions, and cause the carton to be expanded and to assume the hollow, or tube-like, form required.

The slicer, or blade, is then caused to retire to a position clear of the expanded carton whilst the aforesaid flap pieces, blades, or the like, retain the sides of the said carton in proper position.

The said platform is then caused to rise and carry the expanded carton between the sides of a guiding element, supported above the platform and when the platform is in its highest position, with the expanded carton between the sides of the said guiding element, a pushing, or delivery, element (or several such elements), preferably carried on the same carrier as the aforesaid ejecting pusher and operated simultaneously therewith, are caused to engage with the end of the expanded carton, which is now in proximity to the magazine, and by forward movement will push the carton off from the said platform and out of engagement with the said guiding element, and onto a case-forming or other machine, or on to a table, conveyor-belt, or other receptacle, or place and, at the same time, the aforesaid ejecting pusher acts to deliver another flattened, or collapsed, carton from the magazine, and on to the platform, to be in turn dealt with as desired.

I will describe with reference to the accompanying drawings how this invention can be performed, premising that I do not limit myself to the precise details illustrated.

Figure 1 is a side elevation, Figure 2 a plan, and Figure 3 an end elevation of an apparatus constructed in accordance with this invention. Figure 3 is drawn to a scale somewhat smaller than that to which Figures 1 and 2 are drawn.

Figures 4 and 5 shew, in perspective, details as hereinafter explained.

A vertical magazine (indicated at 1) is

supported by any suitable means from the framework 2 which may, for example, constitute part of a case-forming machine.

A pile of collapsed, or flattened out cartons 3 is placed in the said magazine they being supported on ridges, or bars, 4, carried at the lower end of the magazine 1, by any suitable support.

An ejecting pusher 5 is carried by, and can slide upon the bar 6, carried in bosses 7 on the framework 2, the said pusher 5 being operated by the cam 8, acting upon the pivoted arm 9, connected by the link 10, and pins 11, and 11^a, to the said pusher 5, so that it pushes the lowermost carton from the magazine through the slot 12, beneath the forward side of the magazine and on to the platform 13, which is secured to the upper end of a spindle 14, vertically reciprocable in the guide 15, on the framework.

An arm 16 is provided with a roller 17, (bearing against the cam 21 under the action of the spring 24) and is carried by and can be oscillated on a spindle 18, supported by the framework in bearings, one of which, 19, is seen in Figure 1. The pivoted arm 9, is also carried on the spindle 18, the roller 20 on the said arm bearing against the periphery of the cam 8, under the action of the spring 23 connected to studs (one of which is seen at 23^a) respectively on the arm 9 and the framework. Motion is communicated from the roller-arm 16 to the platform 13 through the link 16^a, joint pins 16^b, and 16^c, motion arm 16^d, link 16^e, pins 16^f, and 16^g, and yoke 16^h.

The cams 21, and 8, are secured to the shaft 22 carried in a boss 22^a and rotated by any suitable means, such for instance as a sprocket wheel and chain driven by the main shaft of the case forming machine.

A retaining finger 25, is pivotally supported on a spindle 26, carried by a bracket 27, and a bending finger 28, also pivotally supported on the said spindle 26, is resiliently connected to the retaining finger 25, by means of a spring 29, connected at one end with the stud 30, on the finger 28, and at the other end, with the stud 31, on the finger 25.

A stop 32 on the finger 25 limits the extent of movement between the fingers 25 and 28.

The bending finger 28, is actuated by a cam 33, through the medium of an arm 34 carrying a roller 35, kept to its bearing on the cam by the spring 36, the link 37 and joint pins 38, and 38^a connecting the arm 34 to the arm of the piece 28^a connected to the finger 28.

The arm 34 is oscillatably supported on a spindle 39, carried in a boss 40, on the framework 2.

The slicer, or blade 41, is reciprocally supported on a rod 42, carried in bosses 43,

on the framework 2 and the requisite movements are imparted to the said slicer, or blade, from a cam 44, against which (under the pressure of the spring 49) bears the roller 45 the arm 46 being pivotally carried on the spindle 18, and connected by the link 47, and joint pins 48 and 48^a, to the part of the slicer or blade which is carried by the rod 42.

The cam 33 is mounted on a rotatable shaft 50, to which movement can be imparted by any suitable means such, for instance, as a sprocket-wheel and chain from the rotating main shaft of the case forming machine.

A side blade, or flap-piece 51, is capable of partial rotary movement upon a spindle 52, carried in a boss 53. The requisite movements are imparted to the said blade, or flap-piece, from a cam 54, (which may be formed in one with the cam 33 as shewn) against which cam, under the action of a spring 60, bears a roller 58, carried by the arm 57 which can oscillate on a spindle 59, carried in a boss 59^a, on the framework 2. The arm 57 carries, at top, a toothed sector 56, which engages a pinion 55, on the spindle 52.

A hook-pin 61, is carried on the end of an arm 62, formed in one with the boss of the pinion 55.

A corresponding side-blade, or flap-piece 51^a, is capable of partial rotary movement, on a spindle 63, carried in a boss 64.

Pivotally carried, by a pin 65, on a depending lug 65^a (attached to, or integral with, the side-blade 51^a) is a hook-piece 66, the outer end, or hook-proper 67, of which can be engaged by the hook-pin 61, the spring 68, retaining the hook-piece 66, against a stop 69, (formed on the depending lug 59^a) in the normal position relatively thereto as shewn in Figure 3.

A projection 70, on the web connecting the two bosses, 7 and 64, is adapted to engage the side of the depending lug 65^a, and prevent the side-plate, or flap-piece, 51^a, from turning further to the right of the position shewn in Figure 3.

The weight of the hook-piece 66, and contiguous parts, normally retains the side-blade, or flap-piece, 51^a in the vertical position shewn in Figure 3.

The side pieces 71 and 71^a of a guiding device are carried by upstanding supports 72 and 72^a, and the carton which has been expanded is carried, between the said side-pieces when it is pushed from the platform 13.

A delivery pusher 73, is operated by the arm 9, and co-acting parts which, when the platform 13 is in the raised position and when the ejecting-pusher 5 is pushing a collapsed carton from the magazine, the said pusher 73 pushes the expanded carton off

the platform 13 to the required place; for example onto the former (74) of a case-forming machine.

The apparatus is operated as follows:—

5 A pile of collapsed, or flattened out cartons being contained in the magazine 1 and supported therein by the ridges, or bars, 4, the ejecting pusher 5, is operated from the cam 8, and the lowermost carton is pushed
10 thereby through the slot 12 onto the platform 13, which is then lowered by the action of the cam 21, and, at the same time, the bending finger 28, and the retaining finger 25, are operated so that the retaining finger
15 25 comes into contact with, and retains the said carton 3 on the platform 13, whilst the bending finger 28 is actuated to bend down the turnover flap portions 3^a and 3^b of the carton 3, as shewn clearly in Figure 4, the
20 portions 3^c and 3^d of the said carton at this time remaining in their normal, or original, positions.

The slicer, or blade, 41, is now operated from the cam 44, and enters between the
25 upper- and lower-side portions 3^a, and 3^b, of the said carton, as also seen in Figure 4. At, or about, the same time the bending finger 28, is lifted away from the carton 3, and, when the said bending finger has
30 moved upward a sufficient distance it comes against the stop 32, on the retaining finger 25, which is thereby also lifted out of contact with the carton.

The side blade, or flap-piece 51, is now operated from the cam 54, by means of the pinion 55, and toothed sector 56, and, the side
35 of the carton 3 is raised to the position shewn in Figure 5, and the hook-pin 61, at the same time engages the hooked outer end 67, of the hook-piece 66, which is pivotally
40 carried on the lug 65^a of the side blade, or flap-piece, 51^a. The side blade or flap-piece, 51 is preferably caused to move on its axis of rotation through an angle which somewhat exceeds 90°, or a quarter of a circle,
45 and, when the said side-blade, or flap-piece, 51, is in a vertical position, as seen in Figure 5, the hook-pin 61, engages the hooked outer end 67 of the hook-piece so that any continued
50 movement of the side-blade, or flap-piece 51, causes the side-blade, or flap-piece 51^a, to be moved to such position that more perfect bending of the corner portions of the now expanded, and tube-shaped, carton is effected.

The said side-blades, or flap-pieces 51, and 51^a, are now operated to assume approximately vertical positions as shewn in Figure 5, and the slicer, or blade, 41 retires
60 clear of the expanded carton. Whilst the said side-blades or flap-pieces, 51 and 51^a, are temporarily held in their vertical positions, the platform 13, is moved upward and thereby the expanded carton is carried
65 between the guiding side-pieces 71 and 71^a.

Whilst the platform 13 is retained for the requisite time in its raised position, the delivery pusher 73 is operated to push the expanded carton from the platform 13, onto, for example, the former 74 of a case-forming machine, and at, or about, the same time, the ejecting pusher 5, is operated to eject another collapsed or flattened, carton from the magazine 1, onto the platform 13.

As the hereinbefore described sequences
70 of operations of the several portions of the apparatus, are repeated, the collapsed, or flattened, cartons will, in succession, be removed from the magazine; be expanded and caused to assume a hollow, or tube-like, shape, and be pushed from the platform 13, to the required place; such, for instance, as onto a table, or onto a former of a case-forming machine.

I do not limit myself to the precise details hereinbefore described and illustrated
85 as it will be evident that modifications may be made therein without departing from the nature of this invention.

What I claim is:—

90 1. Apparatus for opening out cartons, having a vertically reciprocable platform to receive collapsed cartons, a pivotally supported finger and means for operating said finger to retain a carton on said platform
95 while said platform is moved vertically; substantially as hereinbefore explained.

2. The combination with apparatus in accordance with claim 1, of a second finger, means for operating said second finger to
100 bend down a flap portion of the end of a carton while it is held on the platform, a reciprocable slicer and means for causing said slicer to enter between the upper and lower portions of the carton and to push
105 said portions apart while the finger which retains the carton on the platform and the finger which bends down the said flap portion on the carton are moved away from the carton.

3. The combination with apparatus in accordance with claim 1, of a reciprocable slicer and means for causing said slicer to enter between the upper and lower portions
110 of the carton and to push said portions apart, a pair of blades, means for partially rotating said blades so that the said portions of the cartons will be turned up thereby and the carton caused to assume a tube-like form, and means whereby the slicer is caused to
120 retire to a position clear of the carton; substantially as hereinbefore described.

4. In an apparatus in accordance with claim 1, a guiding element adapted to co-operate with said vertically reciprocable
125 platform when the latter is in its uppermost position, and a reciprocable slicer, in combination with means for operating the vertically reciprocable platform and the slicer so that the carton which has been
130

opened out on the said platform will be carried between the sides of said guiding element; substantially as hereinbefore described.

5 5. The combination with apparatus in accordance with claim 1, of a pushing element, a guiding element adapted to co-operate with said vertically reciprocable platform when in its uppermost position
10 and means for operating said pushing element so that the cartons will be pushed from the platform and from between the sides of said guiding element substantially as hereinbefore described.

15 6. The combination with apparatus in accordance with claim 1, of a pushing element

and means for operating said element so that the cartons will be pushed from the platform, a magazine having a pile of collapsed cartons, and an ejecting device operable to push the lowermost carton from said magazine, said ejecting device being operable by the means which effect the movements of the pushing element. 20

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses. 25

WILLIAM ROSE.

Witnesses:

VICTOR GEORGE DAVIS CHAPMAN,
ERNEST OCTAVIUS GEORGE.