

[54] **APPARATUS FOR DIVIDING A PILE OF
NEWSPAPERS INTO SEPARATE PORTIONS**

[76] Inventors: **Leonid Pavlovich Grachev**, ulitsa Serafimovicha, 2, kv. 181; **Nikolai Ivanovich Anikanov**, ulitsa Bolshaya Bronnaya, 2/6, kv. 6, both of Moscow; **Grigory Iosifovich Zax**, ulitsa Mechnikova, 14a, kv. 24, Kiev; **Grigory Avramovich Radutsky**, 16 Parkovaya ulitsa, 49, korpus 2, kv. 68, Moscow; **Rafail Efimovich Kheifets**, Brest-Litovskiy prospekt, 162, kv. 30, Kiev; **Samuil Aronovich Goltzman**, Borschagovskaya ulitsa, 8, kv. 12, Kiev; **Alexandr Ivanovich Oleinik**, ulitsa Mechnikova, 11, kv. 14, Kiev; **Mikhail Evseevich Frumkin**, Naberezhnaya Novikova-Priboya, 9, kv. 34, Moscow, all of U.S.S.R.

[22] Filed: **Dec. 29, 1972**

[21] Appl. No.: **319,384**

[30] **Foreign Application Priority Data**

Feb. 11, 1972 U.S.S.R. 1742655

[52] U.S. Cl. **214/8.5 D, 93/93 C, 93/93 DP, 214/8.5 H, 271/95**

[51] Int. Cl. **B65g 59/06**

[58] **Field of Search** 214/8.5 D, 8.5 H; 271/95, 271/DIG. 1; 93/93 C, 93 DP

[56]

References Cited

UNITED STATES PATENTS

2,830,813	4/1958	Hepp	271/95
3,176,976	4/1965	Hepp	271/DIG. 1

Primary Examiner—Robert G. Sheridan

Assistant Examiner—George F. Abraham

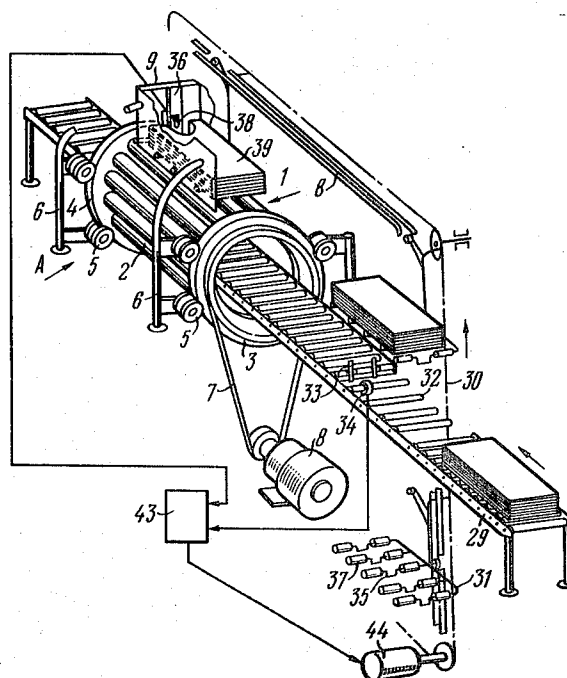
Attorney, Agent, or Firm—Holman & Stern

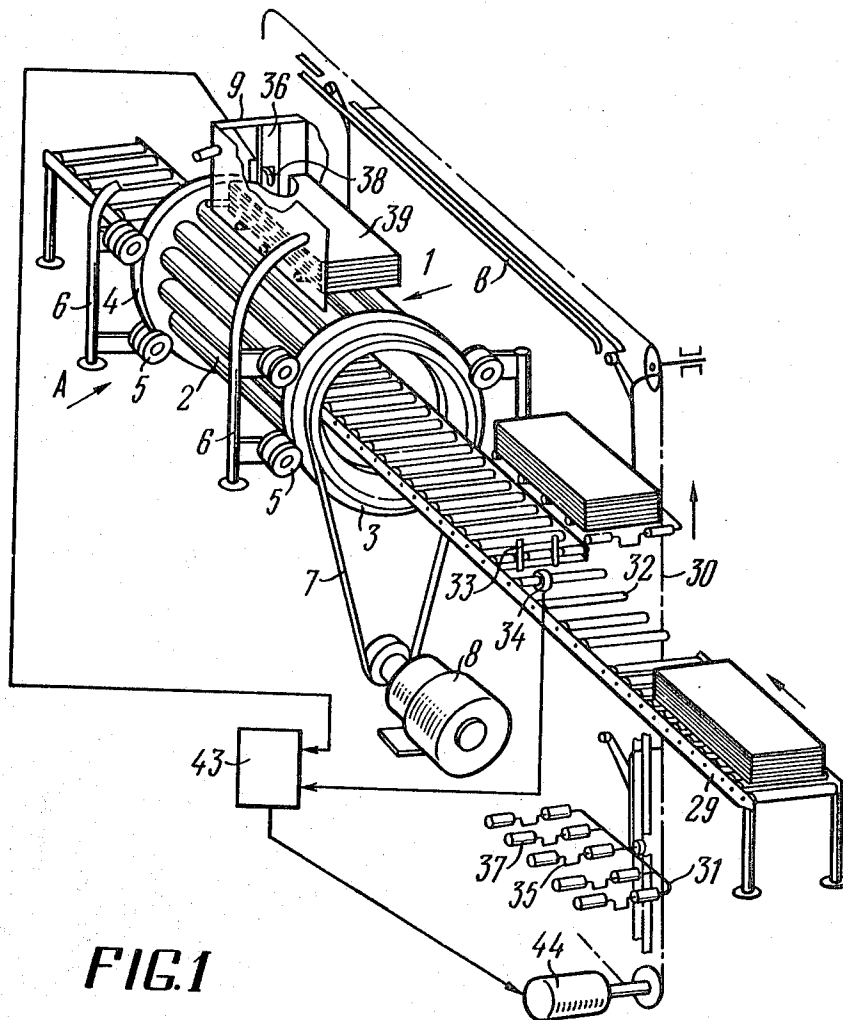
[57]

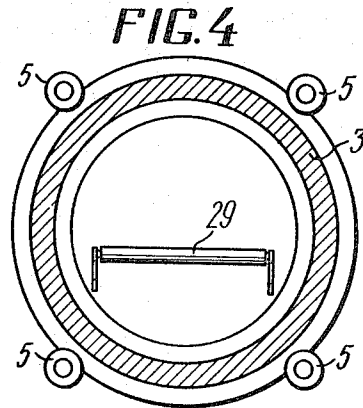
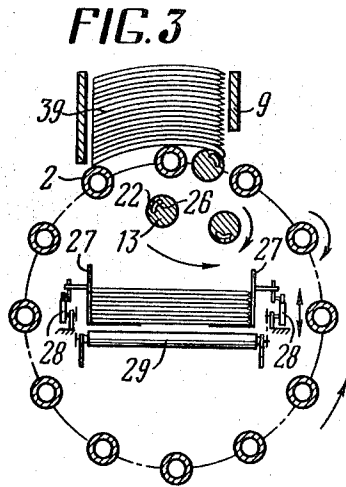
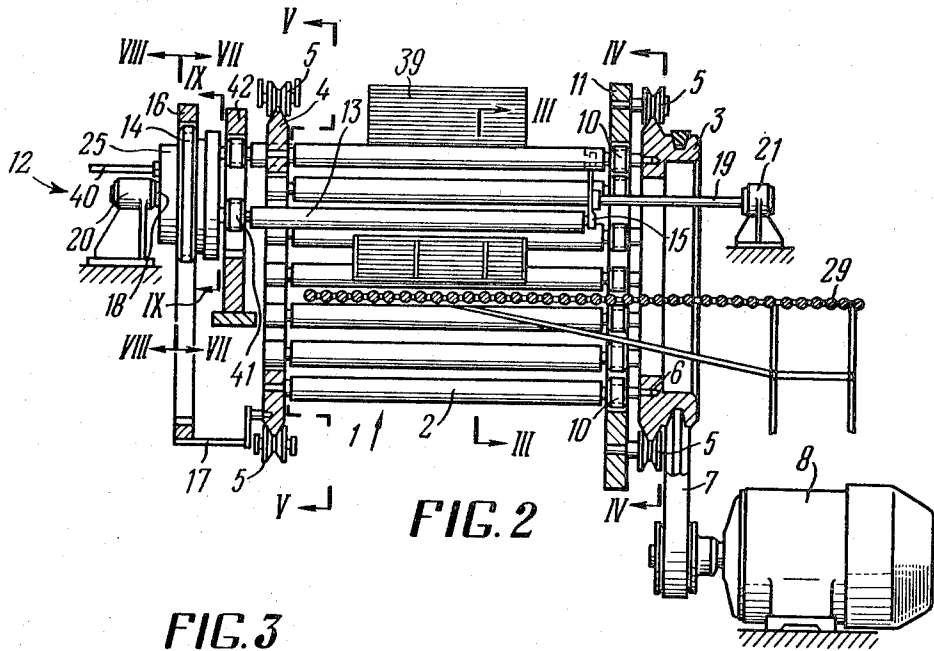
ABSTRACT

In an apparatus for dividing a pile of newspapers into separate portions in which the members in the form of bodies of rotation have perforations in the peripheries thereof, connectable to a source of vacuum supply, and are arranged so that they define a drum received eccentrically internally of a larger drum defined by a series of rollers, in the area of the pile being divided, whereby in operation, the members in the form of bodies of rotation and the rollers engage alternately the lowermost newspaper in the pile, with a vertically displaceable receiving hopper adapted to accumulate therein the newspapers separated from the pile being mounted under the smaller drum, and a rollerway for delivering the separated portions of the pile from the apparatus and for feeding the piles to be divided into the apparatus located downwardly of the hopper.

3 Claims, 10 Drawing Figures







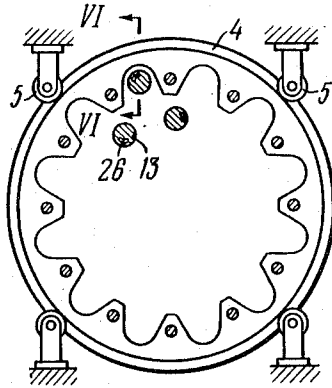


FIG. 5

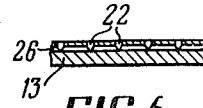


FIG. 6

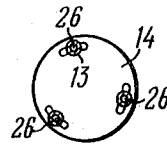


FIG. 9

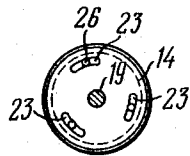


FIG. 7

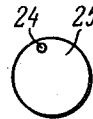


FIG. 8

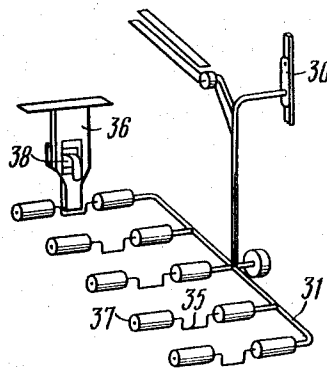


FIG. 10

APPARATUS FOR DIVIDING A PILE OF NEWSPAPERS INTO SEPARATE PORTIONS

BACKGROUND OF THE INVENTION

The invention relates to apparatus for dividing a pile of newspapers into separate portions, to execute the orders of small-lot subscribers and customers.

PRIOR ART

There is an apparatus for diving a pile of folded signatures of printed matter, e.g. of folded newspapers which is known in the art. The known apparatus comprises an intermittently rotatable drum constituted by a series of rollers uniformly spaced about the cylindrical circumference of axially spaced mounts, and a plurality of elements in the form of bodies of rotation, e.g. of discs, having perforation periodically connected to a vacuum supply source. The discs are mounted for circumferential rotation in the direction of the rotation of the drum and also for rotation about their respective axes, in a direction opposite to that of the rotation of the drum. The discs are uniformly distributed between the groups of the rollers, so that the discs, like the rollers, belong to the circumference of the drum.

In the hereinabove disclosed apparatus 1 successive newspapers are separated from the pile by the lowermost newspaper in the pile being grasped by the discs, which rotate together with the drum, the perforations in the discs being connected to the vacuum supply source, as the discs are passing under the pile. The separated newspapers are carried in succession by the discs, until they are arrested by a stop, and, as the perforations are disconnected from the vacuum, the newspapers are taken by a conveyor and carried into another apparatus, in which they are registered with the previously separated newspapers.

The productivity of such device is determined by the number of the discs disposed about the circumference of the drum. Any increase of the productivity of the apparatus by increasing the number of the discs is bound to result in the complication of a structure of the apparatus, due to the complication of the arrangement supplying a vacuum to the discs.

OBJECT AND SUMMARY OF THE INVENTION

It is, therefore, the main object of the present invention to provide an apparatus for dividing a pile of newspapers into separate portions, which offers high productivity and which provides for delivery from the apparatus of a smaller pile including a specified amount of newspapers.

It is another object of the present invention to provide an apparatus which provides for replenishing the newspapers in the pile which is being divided.

These and other objects are accomplished in an apparatus for dividing a pile of newspapers into separate portions, comprising a drum defined by a series of rollers uniformly spaced about the cylindrical circumference of the axially spaced mounts, the rollers being adapted to engage the lowermost newspaper in the pile to be divided, received in a loading hopper, the apparatus further including members defined by bodies of rotation having perforations in the peripheries thereof, with these perforations being periodically connectable to a source of vacuum supply, the members being mounted for rotation in the direction of the rotation of said drum, the members being also rotatable about the

axes thereof in a direction opposite to that of the rotation of said drum, in which apparatus, in accordance with the present invention, said members defined by bodies of rotation are arranged so that they form a second drum received eccentrically within said first mentioned drum in the area of the division of the pile, whereby the lowermost newspaper in the pile is engaged in operation alternately by said rollers of said first drum and by said members defined by bodies of rotation of said second drum, whereby said members are adapted to introduce successively the edges of the successive lowermost newspapers of the pile being divided into the successive spaces between the adjacent pairs of said rollers of said first drum; there being mounted downwardly of said second drum a vertically displaceable receiving hopper adapted to accumulate therein the newspapers separated from said pile, and a rollerway underlying said receiving hopper, for withdrawing the separated portions of said pile from said apparatus and for feeding piles to be divided.

The bodies of rotation may be either cylindrical rollers or a set of discs mounted about a common axis.

It is advisable in the present apparatus to have a vertically closed endless conveyor arranged alongside of said pile-feeding rollerway, with the conveyor carrying a plurality of pivotally mounted comb-like pendants adapted to pass intermediate of the rollers of said rollerway, with said rollers of said rollerway in the area of the passage of said pendants being mounted in a cantilever fashion; it is further advisable to have stop means associated with said rollerway, disposed downstream of said cantilever rollers in the direction of the motion of the piles of newspapers on said rollerway, said stop means being adapted to arrest the piles being fed in the area of the passage of said pendants, for the latter to lift the piles off said rollerway and to carry them into said loading hopper.

It is also advisable that the prongs of said comb-like pendants have U-shaped bends in the central portions thereof, for cooperation with a stop associated with said loading hopper, in which way the piles are removed off said pendants into said hopper.

The essence of the present invention is in the fact that, in the course of simultaneous rotation of the two abovementioned drums, the members defined bodies of rotation enter in succession each successive space between the adjacent pairs of the rollers of the first drum and engage the lowermost newspaper in the pile being divided. Thus, separation of a newspaper is effected each time any one of the members defined by bodies of rotation enters the space between two rollers, in which way an extremely high productivity of the apparatus is attained.

With a receiving hopper being provided internally of the drum for accumulation therein of the newspapers separated from the pile, and with a rollerway being arranged under this last-mentioned hopper, it becomes possible for the apparatus to deliver smaller piles containing specified amounts of newspapers.

The provision in the apparatus of a vertically closed endless conveyor carrying a plurality of pivotally mounted comb-like pendants, adapted for cooperation with the pile-feeding rollerway and with the stop associated with the loading hopper, makes it possible to replenish the supply of the newspapers in the pile being divided.

The present invention will be better understood from the following detailed description of an embodiment thereof, with reference being had to the accompanying set of drawings, wherein:

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 shows a general perspective view of an apparatus for dividing a pile of newspapers into several separate portions, with the details of the second drum omitted for clarity, constructed in accordance with the invention;

FIG. 2 is a sectional view viewed in the direction of arrow line A in FIG. 1;

FIG. 3 is a sectional view taken along line III—III in FIG. 2;

FIG. 4 is a sectional view taken along line IV—IV in FIG. 2;

FIG. 5 is a sectional view taken along line V—V in FIG. 2;

FIG. 6 is a sectional view taken along line VI—VI in FIG. 5;

FIG. 7 is a sectional view taken along line VII—VII in FIG. 2;

FIG. 8 is a sectional view taken along line VIII—VIII in FIG. 2;

FIG. 9 is a sectional view taken along line IX—IX in FIG. 2; and

FIG. 10 is a general view of the comb-like pendant, when it cooperates with the stop of the loading hopper.

DETAILED DESCRIPTION OF THE APPARATUS

Referring now in particular to the appended drawing, the apparatus comprises a drum 1 (FIG. 1) made up by a series of rollers 2 having the opposite ends thereof journaled for rotation, respectively, in mounts 3 and 4 (FIGS. 2 to 5) supported for rotation between roller bearings 5. The latter bearings are mounted on uprights 6. The mount 3 is drivingly connected via a Vee-belt transmission 7 to a motor 8, by which rotation of the drum 1 is effected in operation.

The rollers 2 are uniformly angularly spaced about the periphery of the drum 1, so that the rollers are adapted to engage the lowermost newspaper of a pile being divided, supported in a loading hopper 9.

The rollers 2 have pinions 10 mounted on their respective axes coaxially therewith, with the pinions 10 engaging internally a stationary toothed rim 11. With the rollers being positively driven for rotation in this manner, in a direction opposite to that of the rotation of the drum 1, the friction between the rollers and the lowermost newspaper in the pile is minimized.

Internally of the drum 1 and eccentrically in relation thereto, there is mounted downwardly from the hopper 9 a second drum 12 defined by another series of bodies of rotation in the form of rollers 13 uniformly spaced about the periphery of this last-mentioned drum and mounted for rotation together with this drum in the direction of rotation of the drum 1 with each one of the rollers 13 being positively rotatable in a direction opposite to that of the rotation of the drum 1. This is ensured by the rollers 13 having the ends thereof journaled for rotation, respectively, in mounts 14 and 15, with the mount 14 having an externally toothed rim meshing internally with an internally toothed gear 16. The latter gear is rigidly connected by a plurality of ties 17 to the mount 4 of the drum 1 for rotation therewith.

The mounts 14 and 15 are mounted, respectively, on axes 18 and 19 journaled in bearings 20 and 21.

The ratio of the meshing of the toothed rim of the mount 14 with the gear 16 is selected so that in the course of simultaneous rotation of the drums 1 and 12, the rollers 13 (FIGS. 3 and 5) successively enter the spaces between the adjacent pairs of the rollers 2. Thus, the rollers 13, alternately with the rollers 2, approach the lowermost newspaper in the pile supported in the hopper 9.

The rollers 13 have perforations 22 in the cylindrical peripheries thereof, with these perforations being periodically connectable to a source of vacuum to attract the lowermost newspaper in the pile to the roller 13 when the latter engages the newspaper, and in which way the edges of the lowermost newspapers in the pile can be successively introduced into the spaces intermediate of the adjacent pairs of the rollers 2 of the drum 1.

The perforations 22 (FIG. 6) are connected to the source of vacuum (not shown) only when the respective perforations underlie the folded edge of the successive newspaper to be separated from the pile. This connection is effected by means of grooves 23 made in the mount 14. The size and position of the groove 23 defines the time during which a perforation 22 is connected to the source of vacuum.

The grooves 23 selectively establish communication between a passage 24 (FIG. 8) provided in a stationary flange 25 adjoining the mount 14 and longitudinal passages 26 (FIG. 9) made in the bodies of the rollers 13 and supplying vacuum to the perforations 22.

A receptacle 27 for the accumulation of the newspapers separated from the pile underlies the drum 12 with the receptacle 27 being vertically reciprocable by cams 28.

Arranged downwardly of the hopper 9 and of the receptacle 27 is a rollerway 29 for delivering the separated newspapers from the drum 1 and for feeding the piles of newspapers to be divided.

Mounted alongside of the rollerway 29 is a vertically closed endless chain conveyor 30 having a plurality of comb-like pendants 31 pivotally mounted thereon. Those of the rollers 32 of the rollerway 29 which are disposed in the area of the passage of the pendants 31 are mounted in a cantilever fashion. Disposed downstream of the cantilever rollers 32 in the direction of the motion of the newspapers on the rollerway 29 are stops 33, adapted to arrest the pile being fed in the area of the passage of the pendants 31, so that the latter are able to lift the pile off the rollerway 29. A pickup device 34 is arranged adjacent to one of the cantilever rollers 32, to monitor the presence of a pile in the area of the transfer of the pile onto the comb-like pendants 31.

Each comb-like pendant is made up by a plurality of prongs with a U-shaped bend 35 in the central portion of each prong. The loading hopper 9 incorporates a stop 36 adapted to enter this U-shaped bend of the prongs, as the pendant 31 passes through the hopper. To facilitate removal of a pile off the prongs of the pendants, the straight portions of these prongs have rollers 37 received thereabout. The stop 36 carries thereon a pickup device 38 monitoring the level of the newspapers in the hopper 9.

The herein disclosed apparatus operates, as follows.

A pile 39 of newspapers, which is to be divided, is placed into the loading hopper 9 in which the pile rests on the rollers 2 of the drum 1. The motor 8 is energized to effect relative rotation of the drums 1 and 12. As long as the source of vacuum is not operated, no newspapers are separated from the pile 39.

When vacuum is supplied through a tube 40 (FIG. 2) into the passage 24, a successive roller 13 (FIG. 3) with its perforations 22 attracts the lowermost newspaper in the pile, as it approaches the side of the pile with the folded edges, and, as the last-mentioned roller 13 continues its rotation in the space intermediate of the adjacent pair of the rollers 2 of the drum 1, this roller 13 wraps the newspaper therearound, on account of this roller's rotation in the direction opposite to that of the drum 12.

The abovementioned rotation of the rollers 13 is effected by the meshing engagement of pinions 41 mounted on these rollers with a stationary internally toothed rim 42, which is similar to the engagement of the pinions 10 carried by the rollers 2 with the stationary internally toothed rim 11.

As the roller 13 wraps the newspaper therearound, the folded edge of the latter is moved to underlie the successive roller 2, which at this moment approaches the pile. At the moment when the supply of vacuum to the perforations 22 of the roller 13 is discontinued (on account of the shaped groove 23 breaking the communication between the passages 24 and 26 in the corresponding angular position of the roller), the folded edge of the newspaper is well beneath the roller 2, and the latter, in the course of its continuing rotation and motion with the drum 1, separates this newspaper from the pile 39.

The successive newspaper is separated from the pile in exactly the same manner as has been described hereinabove; it should be noticed that in the course of this separation, the rollers 13 and 2 alternately approach the pile from below, whereby at any given moment of the separation there are several newspapers that are being separated simultaneously, at different stages of the separation cycle, and in which way high productivity of the apparatus is ensured.

The number of the newspapers to be separated is programmed by means of a presettable counter (not shown) adapted to issue a signal to discontinue the supply of vacuum, when the preset number of the newspapers has been separated.

The newspapers separated from the pile 39 are accumulated in the hopper 27 constituted by a pair of yokes having the horizontal portions thereof shaped as combs, for the passage thereof between the rollers of the rollerway 29, as the hopper 27 is lowered in operation, and in which way the separated portion of the pile is transferred onto the rollerway, to be delivered from the apparatus.

When the number of the newspapers in the pile 39 in the hopper 9 becomes short of a pre-specified value, the correspondingly preset pickup device 38 reacts and sends an output signal to a coincidence circuit 43 which is adapted to send a control signal to actuate drive 44 of the conveyor 30.

However, the conveyor 30 is actuated only when the coincidence circuit 43 receives not only the signal from the pickup device 38, but also a signal from the pickup device 34, announcing that there is a pile of newspapers engaging the stop 33 and supported by the cantile-

ver rollers 32, which is the pile that has been supplied along the rollerway 29, to be added to the pile already in the hopper 9.

When the conveyor 30 is actuated, the successive one of the pendants 31, which is beneath the rollerway 29, starts rising and passes between the cantilever rollers 32, lifting the pile off the latter. The conveyor 30 is driven intermittently, and its stepwise motion is continued as long as the level of the newspapers in the hopper 9 is short of the preset value.

As the pendant 31 carries the pile through the hopper 9 (on the horizontal run of the conveyor 30), the pile is arrested by the stop 36 entering the U-shaped bend 35 of the prongs of the pendant 31, whereby the pile is taken off the pendant 31, to lie on top of the newspapers already in the hopper.

What we claim is:

1. An apparatus for dividing a pile of newspapers into separate portions, comprising: a loading hopper, a drum mounted for rotation along its longitudinal axis and defined by a series of rollers uniformly spaced about the cylindrical circumference of spaced mounts and adapted to engage the lowermost newspaper in a pile, received within said loading hopper; members defined by bodies of rotation, mounted for rotation bodily in the direction of the rotation of said drum and also for rotation about their own respective axes in a direction opposite to that of the rotation of said drum, said members being arranged so that they form a second drum eccentrically received within said first-mentioned drum in the area of said pile being divided, whereby in operation said rollers and said members are adapted to engage alternately the lowermost newspaper in said pile; perforations in the peripheries of said members periodically connectable to a vacuum supply means; a receiving hopper adapted for accumulation therein of the newspapers separated from said pile, arranged under said second-mentioned drum and mounted for vertical displacement; a rollerway for delivering the portions separated from said pile from said apparatus and for supplying the piles of newspapers to be divided, and said rollerway being arranged below said receiving hopper adapted for accumulation therein of the newspapers separated from said pile.

2. The apparatus as claimed in claim 1, wherein there is provided a vertically closed endless conveyor arranged alongside of said pile-feeding rollerway, said conveyor carrying a plurality of pivotally mounted comb-like pendants adapted to pass intermediate of the rollers of said rollerway, said rollers of said rollerway in the area of the passage of said pendants therebetween being mounted in a cantilever fashion; stop means associated with said rollerway and disposed downstream of said cantilevered rollers in the direction of the motion of the piles of newspapers on said rollerway, and said stop means being adapted to arrest the piles being fed in the area of the passage of said pendants, for the latter to lift the piles off said rollerway and to carry them toward said loading hopper.

3. The apparatus as claimed in claim 2, wherein the comb-like pendants have prongs with U-shaped bends in the central portions thereof, for cooperation with a stop associated with said loading hopper, whereby the piles are removed off said pendants into said loading hopper.

* * * * *