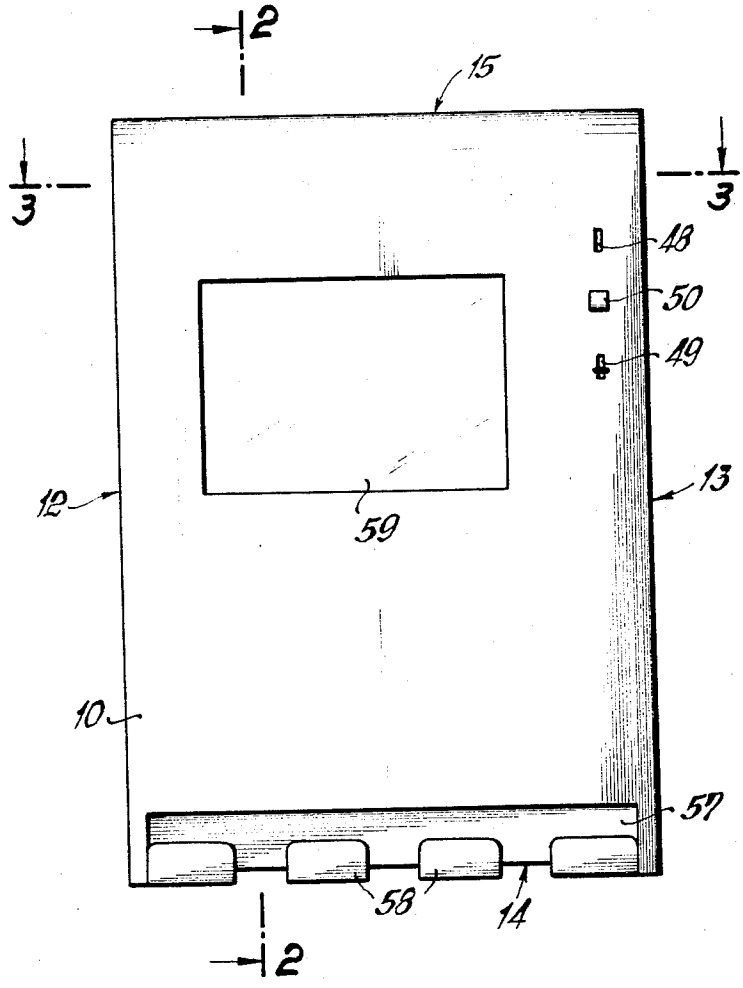
April 15, 1969 H. WENNER 3,438,546

DISPENSING APPARATUS FOR STACKED OBJECTS, SUCH AS NEWSPAPERS

Filed Nov. 11. 1967 Sheet 1 of 4

FIG. 1



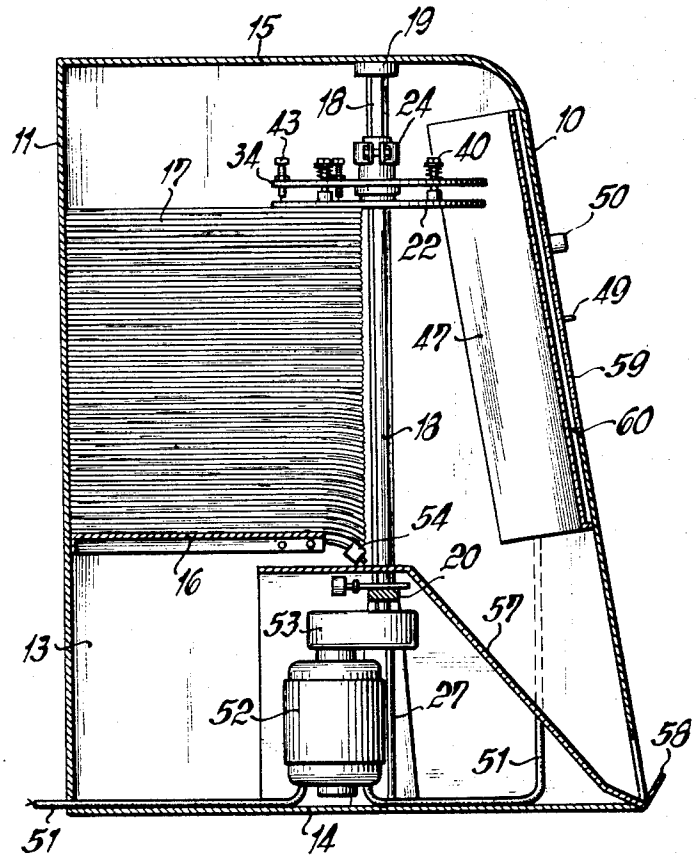
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DISPENSING APPARATUS FOR STACKED OBJECTS, SUCH AS NEWSPAPERS

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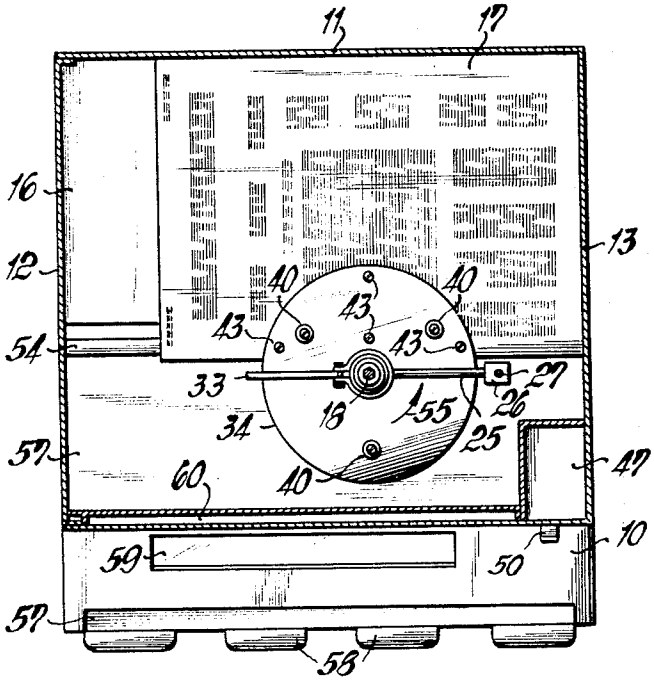
FIG. 2



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DISPENSING APPARATUS FOR STACKED OBJECTS, SUCH AS NEWSPAPERS

FIG. 3



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FIG. 4

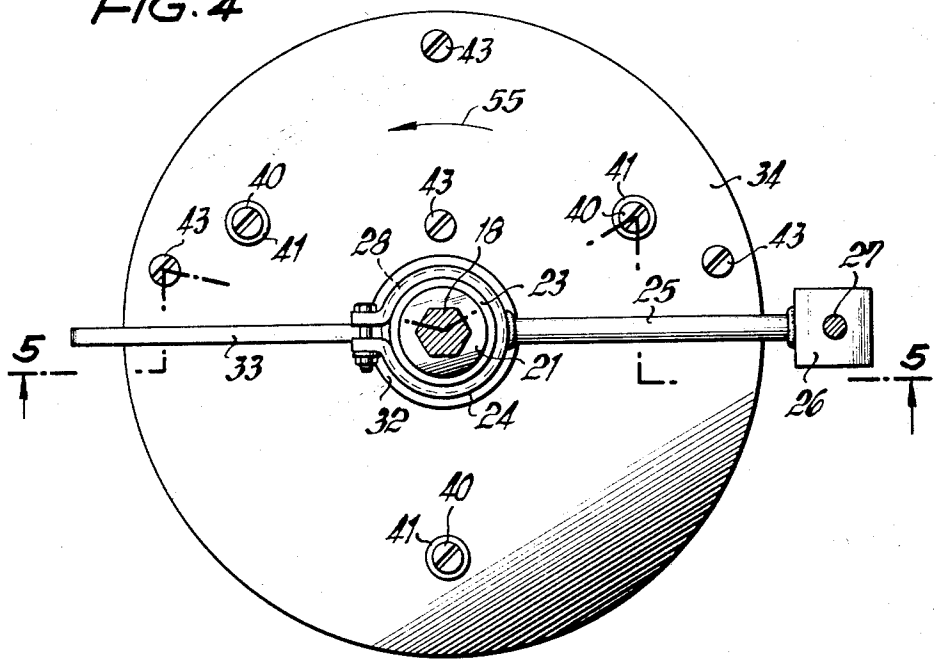


FIG. 5

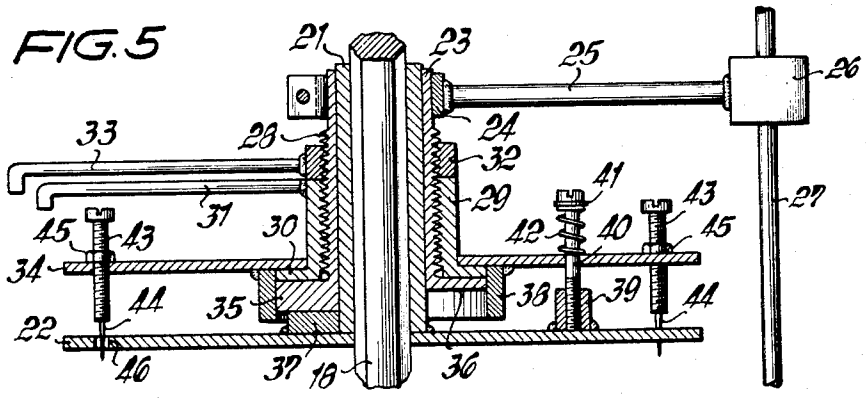
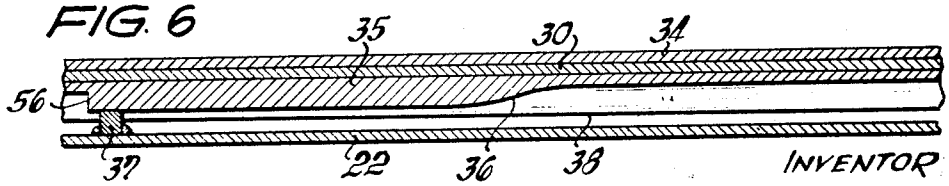


FIG. 6



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3,438,546

DISPENSING APPARATUS FOR STACKED OBJECTS, SUCH AS NEWSPAPERS

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Int. Cl. B23q 7/04; A01c 9/06; B65h 3/22
U.S. Cl. 221—215 10 Claims

ABSTRACT OF THE DISCLOSURE

A feeler plate is located below a transporting plate and rests on the uppermost object of a stack. The transporting plate has downwardly projecting needles passing through the feeler plate and engaging the uppermost object. Feeler plate and transporting plate are simultaneously turned so that the needles move the uppermost object off the stack whereupon the feeler plate drops onto the next object. Cam means connected with the feeler plate move the transporting plate and needles upward to release the object, whereupon a sharp shoulder in the cam means permits the dropping of the transporting plate so that the needles penetrate into the next following object.

Background of the invention

Apparatus is known for successively dispensing stacked objects, particularly printed matter, such as newspapers.

Apparatus according to the prior art is not fully reliable, since sometimes more than one newspaper is dispensed, and furthermore it is not possible to place the entire stack of objects in the apparatus, but each object has to be separately inserted into the apparatus which is time-consuming and uneconomical.

Summary of the invention

It is one object of the invention to provide an improved dispensing apparatus for stacked objects, particularly newspapers, which can be easily loaded and reliably and quickly dispenses single objects.

Another object of the invention is to provide a dispensing apparatus into which an entire stack of newspapers can be inserted without separation of the newspapers from each other.

Another object of the invention is to make use of the flexibility of the sheets of printed matter and newspapers.

With these objects in view, the present invention relates to a dispensing apparatus for stacked objects, particularly printed matter and newspapers.

One embodiment of the invention is constructed in the following manner:

Feeler means and transporting means are mounted on a drive shaft which extends along a stack of objects. The feeler means and transporting means are connected with the drive shaft for turning movement, but are independently movable in axial direction along the same and along the stack. The feeler means, preferably a circular feeler disc, are in contact with the uppermost object of the stack, and the transporting means, preferably a transporting disc, is located axially spaced above the feeler means and has engaging means, such as needles, passing through the feeler means. When the drive shaft is turned, the transporting means also turn and the engaging needles move the uppermost object off the stack so that it can drop off the needles. When the uppermost object is removed, the feeler means drops into contact with the next following object. Operating means, preferably including a circular cam and a cam follower, are located between the feeler means and the transporting means and actuated by the drive shaft to move the transporting means away from the feeler means and from the object engaged by the needles so that the same reliably drops off. After further turning, a steep shoulder in the cam means permits the dropping of the transporting means onto the next following object which is now on top of the stack, so that the needles penetrate into the same.

In the preferred embodiment of the invention, the stack rests on a support plate which is narrower than the newspapers so that projecting portions of the same can be bent by the weight of the newspapers above the same. A spring biased flap is hingedly connected with the support plate and resiliently supports the projecting portion of the lowermost newspaper so that the uppermost newspaper has a substantially horizontal top surface, although the respective projecting edges of the newspapers are thicker than the remaining supported parts.

The stack of newspapers is mounted in a casing with two adjacent sides of the stack in contact with a side wall and rear wall of the casing, while the space between the stack and the other side wall permits the turning of the dispensed newspaper from the position on the stack to the dispensing position located forwardly of the stack. During this turning movement of the dispensed newspaper, edge portions of the same are slightly bent while sliding along the adjacent walls of the casing.

The novel features which are considered as characteristic for the invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawings.

Brief description of the drawing

FIG. 1 is a front view of a dispensing apparatus according to the invention enveloped in a casing.

FIG. 2 is a vertical sectional view taken on line **2—2** in FIG. 1;

FIG. 3 is a horizontal cross-sectional view taken on line **3—3** in FIG. 1;

FIG. 4 is a top view of the dispensing apparatus, the casing being omitted;

FIG. 5 is a sectional view taken on line **5—5** in FIG. 4; and

FIG. 6 is a fragmentary developed view illustrating the cam track of a circular cam used in the embodiment of FIG. 5.

Description of the preferred embodiments

Referring now to the drawings, a casing has a slanted front wall **10**, a rear wall **11**, a detachable left side wall **12**, a right side wall **13**, a bottom wall **14** and a top wall **15**. A transparent window **59** in the front wall **10** permits viewing of a sample object, such as a newspaper located in a pocket **60** behind window **59**. The illustrated embodiment is a vending machine, and front wall **10** has a slot **48** for the insertion of coins, a coin return slot **49**, and a pushbutton **50** operating a switch connected into a circuit including wires **51** leading to an electric motor **52** which drives a drive shaft **18** through a reduction transmission **53**, as best seen in FIG. 2.

It will be understood that the coin operated vending mechanism **47** can be omitted if the printed matter is to be dispensed free of charge. Furthermore, the electric motor **52** may be replaced by a hand wheel, or by a turnstile if the printed matter is to be dispensed at an exhibition.

The stack of newspapers, printed matter, brochures, boxes, or the like, which will be referred to hereinafter as

"objects" rests on a rectangular support plate **16** which is secured to side wall **13** and rear wall **11** so that one side of the stack **17** abuts side wall **13**, and the rear of the stack abuts rear wall **11**, while the other side of the stack is spaced from side wall **12**, as best seen in FIG. 3.

Drive shaft **18** is substantially located in a plane of symmetry of the stack, and has one end located below the stack and support plate **16** and rotatably supported in a bearing **20**, and an upper end rotatably supported in a bearing **19** secured to top wall **15**. Outward of bearings **19** and **20**, drive shaft **18** is non-circular and preferably has a polygonal cross section, as best seen in FIG. 4. However, the drive shaft may also have longitudinal grooves, or a triangular or square cross section for guiding a bushing **21** whose lower end is secured to a feeler disc **22**, as best seen in FIG. 5. Since the inner bore of bushing **21** has a polygonal cross section, feeler means **21**, **22** is mounted on drive shaft **18** for turning movement with the same, but movable in axial direction. In the normal operative condition of the apparatus, the circular feeler disc **22** is placed on the uppermost object at the upper end of stack **17**, and rests on the same due to the force of gravity. When drive shaft **18** is turned, feeler disc **22** also turns and slides on the surface of the uppermost object, and when the same is removed from the stack, feeler plate **22** drops to the next following object which is possible since feeler means **21**, **22** is mounted on drive shaft **18** for axial movement.

Mounting means are provided for mounting a transporting disc **34** movable in axial direction of shaft **18**. A sleeve **23** surrounds bushing **21** and is movable on the same in axial direction together with a clamp **24** secured to an arm **25** carrying a slide block **26** sliding on a vertical guide rod **27**. Sleeve **23** and its flange **35** cannot turn on bushing **21**, but can move in axial direction since slide block **26** slides on guide rod **27**.

The mounting means further include a carrier having a tubular part **29** and a flange part **30** off which transporting disc **34** rests. Transporting disc **34** has a central circular opening through which the cylindrical part **29** passes so that transporting disc **34** is supported for rotation about the axis of drive shaft **18**. Tubular part **29** has an inner thread meshing with an outer thread on sleeve **23** so that when handle **31** is turned, carrier means **29**, **30** moves upward so that flange part **30** separates from flange **35** and raises transporting disc **34** so that its axial distance from feeler disc **22** is increased. A stop ring **38** is welded to the bottom surface of transporting disc **34**, and surrounds flanges **30** and **35**. A counter nut **32** has an inner thread meshing with the outer thread **28** of sleeve **23** and a handle **33** so that carrier means **29**, **30** can be locked in any adjusted position.

The bottom face of flange **35** is constructed as a circular cam ring **36** which has a lobe extending over almost 180° and which has a sloping shoulder in the region of reference numeral **36**, and a steep shoulder **56**.

A cam follower **37** is secured to the top face of feeler disc **22** and engages cam track **36**. The mounting means **21**, **23**, **29**, **30**, **35**, the holding means **24**, **25**, **26**, and the transporting disc **34** all rest by means of cam **36** and cam follower **37** on feeler disc **22** which rests on the uppermost object of the stack.

Feeler disc **22** carries several circumferentially spaced nuts **39** into which screws **40** passing through bores in transporting disc **34** are threaded. Springs **42** between transporting disc **34** and the heads **41** of screws **40** urge transporting disc **34** downward to rest on flange **30**. When flange **30** is raised by operation of handle **31**, transporting disc **34** moves away from feeler disc **22** and compresses springs **42** which abut on washers **41**. Preferably, three connecting screws **40** are provided, as shown in FIG. 4.

Three engaging means **43** are mounted on the transporting disc **34**, and are all located in one half of the circular transporting disc **34**, as shown in FIG. 4. Each engaging means consists of a threaded part engaging a threaded bore in transporting disc **34** and a needle **44** which passes through a corresponding bore **46** in feeler plate **22**. A counter nut **45** locks the engaging means in the illustrated position in which the points of the needles **44** downwardly project from the bottom face of feeler disc **22**.

In the illustrated embodiment of the apparatus insertion of a coin will cause operation of motor **52** to turn drive shaft **18** one revolution. As explained above, a revolution of the drive shaft can also be produced by a manually operated handle, or by a turnstile.

In the normal inoperative position of the apparatus, feeler disc **22** rests on the uppermost object of stack **17**, cam follower **37** engages a low portion of cam track **36**, the mounting means **21**, **23**, **29**, **30**, **35** are in a low position and support transporting disc **34** in a position in which needles **44** have penetrated into the uppermost object. All three engaging means **43** and needles **44** are located on the uppermost object which is under one-half of the feeler disc **22** and the transporting disc **34**. The stack abuts side wall **13** and rear wall **11**, and since the front edges of the folded newspapers are thicker than the rear edges, the portions of the front edges of the newspapers projecting from the narrower support plate **16** are bent downward, as best seen in FIG. 2. These projecting portions are resiliently supported by a flap **54** hingedly connected with the edge of support plate **16** and being upwardly biased by a spring, not shown. Due to the fact that the edges can bend downward, the top face of the uppermost newspaper is horizontal and flat, so that feeler disc **22** can slide on the same in full contact during turning movement.

When drive shaft **18** is turned one revolution by drive motor **52** and reduction transmission **53**, feeler means **21**, **22** turns with drive shaft **18**, and since connecting means **40** connect transporting disc **34** with feeler disc **22** transporting means **34**, **43** turn with drive shaft **18** and the feeler means so that the needles **44** move the uppermost object in a circular movement until the object can drop off the needles **44** onto a slanted guide wall **57** which guides the object to a position resting on the ledge **58** and partly projecting through an opening in the front wall adjacent the bottom wall.

During the transport of the uppermost object by transporting means **34**, **43**, **44** in the direction of the arrow **55** in FIG. 4, the rear edge of the transported object, for example a newspaper, will be bent upward by rear wall **11** so that the newspaper can be moved along the circular path of the transporting needles **44**. If no casing is provided, vertical rods may secure the stack of newspapers.

When the uppermost object has been removed from the stack, feeler disc **22** drops on the next following object which is now the uppermost object of the stack. When the drive shaft **18** and the transporting and feeler means have turned about 180°, cam follower **37** engages the sloping shoulder of cam **36** and moves onto the cam lobe, raising carrier means **23**, **29**, **30**, **35** so that the needles **44** are retracted from the object carried by the same, while feeler disc **22** acts as a stripper assuring the dropping of the transported newspaper onto the guide wall **57**.

Drive shaft **18** continues its turning movement, and after further 180° turning, when drive shaft **18** and feeler plate **22** have turned one complete revolution, cam follower **37** reaches shoulder **36** so that the carrier means of transporting plate **34**, and the same together with needles **44** drop the height of the cam lobe in axial direction, and needles **44**, advancing downward through openings **46** in feeler disc **22**, penetrate into the now uppermost object, which in the original position of the stack was the second object from the top. The initial condition of the apparatus is thus restored, and when another revolution of the drive shaft **18** is started, the now uppermost object will be transported by transporting means

34, 43, 44, 180° along a circular path until it drops off the needles.

The adjustable carrier means 29, 30 with locking device 32, 33 are not absolutely necessary, and if these parts are omitted, transporting disc 34 rests directly on flange 35, and has a central bore in contact with a smooth cylindrical surface of a sleeve corresponding to sleeve 23. In such a simplified construction, the distance between the transporting disc 34 and the feeler disc 22 cannot be adjusted, but transporting means 34, 44 will nevertheless be moved by cam means 36 and cam follower 37 as explained above. The adjustable carrier means 31, 29, 30 permits an adjustment of the axial distance between feeler disc 22 and transporting disc 34. In the construction shown in FIG. 5, the distance which the needle 44 drops is limited by the distance of the stop ring 38 from the top face of feeler disc 22. When carrier means 29, 30 is screwed upward so that the distance of stop ring 38 from feeler disc 22 is increased, needle 44 drops a greater distance and penetrates with a greater power into the uppermost object. In any event, the height which the transporting means drops, is limited by the height of the cam 36 which must be sufficient for a reliable penetration of needle 44 into the thickest object which is to be dispensed by the apparatus.

It will be understood that each of the elements described above, or two or more together, may also find a useful application in other types of dispensing apparatus for stacked objects differing from the types described above.

While the invention has been illustrated and described as embodied in a dispensing apparatus for dispensing vertically stacked newspapers, it is not intended to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of the present invention.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can by applying current knowledge readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the following claims.

What is claimed as new and desired to be protected by Letters Patent is set forth in the appended claims.

I claim:

1. Dispensing apparatus for stacked objects comprising, in combination, a support for supporting a stack of objects; a drive shaft extending along said stack; feeler means and transporting means mounted on said drive shaft for turning movement with the same and for independent axial movement along the same and said stack, said feeler means being in contact with the one object at the end of said stack, and said transporting means being located axially spaced from said feeler means and having engaging means passing through said feeler means, said transporting means having a first angular position in which said engaging means engage said one object one said stack so as to be coupled with the same for angular movement so that said one object is moved off said stack by angular movement of said transporting means with said drive shaft to a second angular position and is positioned to drop off said engaging means whereby said feeler means moves into contact with the next object at the end of the stack; and operating means between said feeler means and transporting means actuated by said drive shaft during angular movement of the same to move said transporting means in said second angular position away from said feeler means and from said one object, and then to effect movement of said transporting means in said first angular position toward said feeler means so that said engaging means engage said next object at said end of said stack.

2. Dispensing apparatus as claimed in claim 1 wherein said stack is vertical and said one object is the uppermost object of said vertical stack; wherein said drive shaft is vertical; wherein said feeler means include a feeler member slidably resting on the uppermost objects and having openings through which said engaging means project downward into engagement with said uppermost object; and wherein said operating means raise said transporting means in said second position, and drop said transporting means when the same return to said first position after one revolution.

3. Dispensing appartus as claimed in claim 2 wherein said operating means include a circular cam element and a cam follower element, one of said elements being secured to said feeler means for turning movement with the same, and mounting means secured to the other element and supporting said transporting means for angular movement, said mounting means being non-rotatable and movable in axial direction of said shaft; and further comprising means for connecting said transporting means with said feeler means for angular movement together so that said drive shaft turns said transporting means through said feeler means; said cam element and cam follower element raising said mounting means with said transporting means in said second position and dropping of said mounting means and transporting means in said first position.

4. Dispensing apparatus as claimed in claim 2 wherein said engaging means include a plurality of pins having engaging needles projecting downward through said openings in said feeler member for penetrating into the respective uppermost object.

5. Dispensing apparatus as claimed in claim 2 wherein said transporting means include a transporting member located above said feeler member and carrying said engaging means; means connecting said feeler means and transporting means for turning movement; comprising mounting means supporting said transporting member for turning movement about an axis coinciding with the axis of said drive shaft; means supporting said mounting means for movement along said drive shaft in axial direction with said transporting means; holding means for holding said mounting means nonrotatable; and wherein said operating means act on said mounting means for raising and dropping said mounting means in axial direction together with said transporting means.

6. Dispensing apparatus as claimed in claim 5 wherein said operating means include a cam ring secured to said mounting means and having at the bottom thereof a circular cam track including an axially projecting cam lobe bounded by two shoulders, and a cam follower secured to said feeler means and in contact with said cam track so that turning of said drive shaft with said feeler means causes axial movement of said mounting means and transporting means in said first and second angular positions of said transporting means when said cam follower passes over said shoulders.

7. Dispensing apparatus as claimed in claim 6 wherein said engaging means include vertical downward pointing needles, wehrein one of said shoulders is steep and controls the dropping of said transporting member with said engaging means so that said needles penetrate into said uppermost object when dropping with said transporting member in said first position of said transporting means after one revolution of said drive shaft.

8. Dispensing apparatus as claimed in claim 5 wherein said feeler means comprise a bushing surrounding said drive shaft and projecting in axial direction from said feeler member, said bushing being connected with said drive shaft for rotation and being movable in axial direction on the same; wherein said mounting means include a sleeve nonrotatably held by said holding means and surrounding said bushing mounted on the same for axial movement, and carrier means turnably supporting said transporting member; and wherein said operating means include a circular cam secured to the lower end

of said sleeve, and a cam follower secured to said feeler member.

9. Dispensing apparatus as claimed in claim 8 wherein said carrier means comprise a tubular part in threaded engagement with said sleeve so as to be adjustable in axial direction, and a flange part supporting said transporting member for turning movement, whereby by adjustment of said carrier means in axial direction, the axial distance between said transporting member and said feeler member can be adjusted, said transporting means including a stop means on said transporting member cooperating with said feeler member to limit the distance of dropping of said transporting means.

10. Dispensing apparatus as claimed in claim 2 wherein said objects are flexible, such as a newspaper; wherein said support includes a horizontal plate on which said stack rests, said plate being narrower than said objects

so that the lowermost object has a portion projecting beyond the edge of said plate and being bent by the weight of the objects located above the same; and comprising a flap hingedly connected with said plate and projecting from said edge under said projecting portion, said flap being resiliently biased to flexibly support said projecting portion so that the uppermost object has a substantially horizontal top surface.

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