May 3, 1955 H. INGOLD 2,707,442

MANUALLY OPERATED STORAGE DEVICES

Filed Jan. 24, 1952

Fig. 1

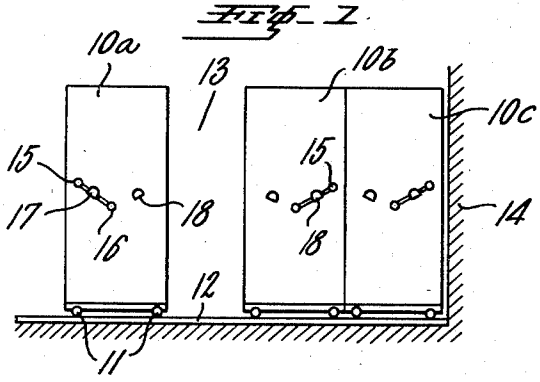
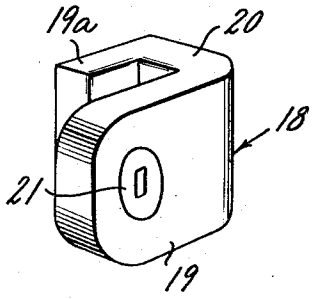


Fig. 3



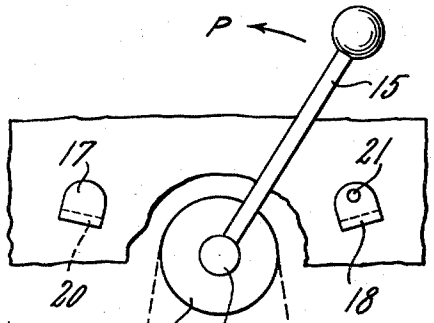


Fig. 4

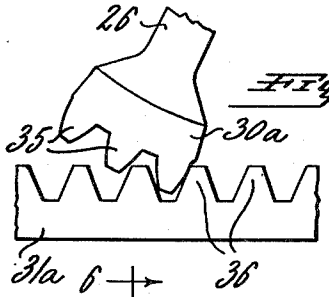
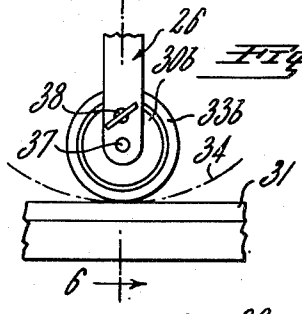


Fig. 5



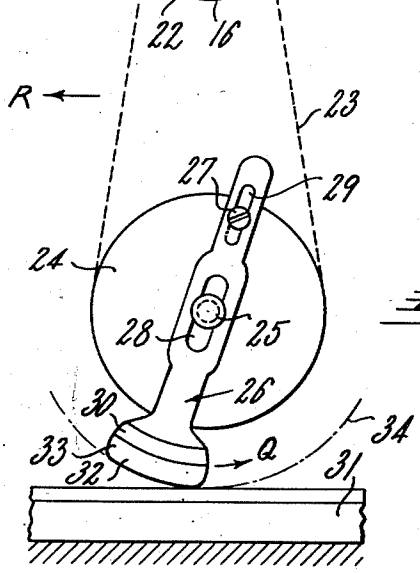
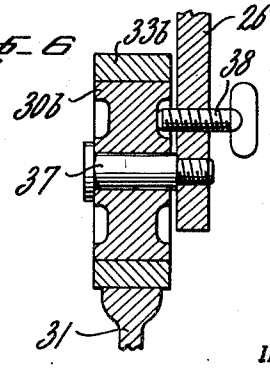


Fig. 2

Fig. 6



INVENTOR.
HANS INGOLD
BY Leon M. Strauss
AGT.

United States Patent Office

2,707,442

Patented May 3, 1955

2,707,442

MANUALLY OPERATED STORAGE DEVICES

Hans Ingold, Lucerne, Switzerland

Application January 24, 1952, Serial No. 268,015

Claims priority, application Switzerland May 2, 1951

8 Claims. (Cl. 105—31)

The present invention relates to manually operated storage devices and more particularly to separable, rail-supported container units for receiving and storing documents and various other objects and articles.

It is one of the objects of the present invention to provide means facilitating the displacement of a rollable container unit with a minimum of power and in a very simple and effective manner in one direction of movement and/or in a direction opposite thereto.

It is another object of the present invention to provide means affording the movement of one or more container units relative to other container units for selectively bringing about juxtaposition of all of said units for closing and locking the same against each other or for spacing predetermined container units to permit access thereto.

Still another object of the present invention is to provide means simple in construction, easy in operation, composed of a minimum of mechanical parts, to be manipulated by hand or foot, and very efficient in attaining relative displacement of the respective container units with respect to each other.

Yet a further object of the present invention is to provide means conducive to an aesthetic and attractive outer appearance of the container units of which only a few operating parts are exposed to view and to be actuated by the operator with a minimum effort and power to bring about desired movements of one or more container units along a predetermined path.

A still further object of the present invention is to provide means rendering possible the displacement of one or more container units relative to other container units by the application of a thrust or impact to said one or more units of a value sufficient to overcome at least the inertia of the respective units.

Yet another object of the present invention is to provide means permitting the securement of one or more movable container units in predetermined positions in the course of the respective movements.

The above and other objects and features will become apparent from the following detailed description, reference being made to the accompanying drawing in which:

Fig. 1 is a diagrammatical, elevational view of a plurality of movable, separable container units forming a storage device constructed according to the present invention;

Fig. 2 is an enlarged elevational view with parts of a container unit broken away, showing a motion translating mechanism for effecting movement of the respective container units;

Fig. 3 is an enlarged perspective view of a stop element used in the present invention;

Fig. 4 is an enlarged fragmentary, elevational view of a modified form of a motion translating mechanism for effecting movement of a container unit;

Fig. 5 is an enlarged fragmentary, elevational view of another modified form of a motion translating mechanism; and

Fig. 6 is a somewhat enlarged sectional view taken along line 6—6 of Fig. 5.

Referring now more particularly to the drawing, there is shown in Fig. 1 a storage device constructed according to the present invention which includes a plurality of movably disposed, separable container units **10***a*, **10***b*, **10***c*, each unit being mounted by means of rollers **11** on spaced apart tracks or rails **12**. Any suitable roller or ball bearings may be provided for the respective rollers **11** to decrease their frictional resistance to rotation, thereby facilitating their movement along the rails **12**. One or more of the container units **10***a*, **10***b*, **10***c* are movable relative to each other for selectively bringing about juxtaposition of all the units adjacent the support or wall **14** or for spacing a predetermined container unit, such as **10***a*, from the remaining units **10***b*, **10***c* to form an aisle **13** therebetween and permit access to the container units adjacent the aisle **13**.

Suitable motion translating means, such as embodiments illustrated in Figs. 2, 4, 5 and 6, are carried by each of the units **10***a*, **10***b*, **10***c* for effecting relative movement of the respective container units. The various motion translating means, subsequently to be described, are each actuated by an operating element **15** which is mounted on the outer or front face of the respective container unit for swinging or pivotal movement about the axis or pivot **16** between the spaced stops **17**, **18**. As clearly shown in Fig. 1, the respective container units are movable away from the wall **14** in response to counterclockwise pivotal movement of the operating element **15** from the position within the stop **18** to the position within the stop **17**. Conversely, clockwise pivotal movement of the operating element **15** returns the respective container units into juxtaposition with respect to each other.

In Fig. 3 there is shown in detail the structure of stop **18** which is the same as stop **17**. Stop **18** is in the form of a U-shaped body including spaced legs **19**, **19***a* interconnected by a bight **20**. One of the legs, namely **19**, is longer than the other and carries a lock **21** which may receive a key adapted to actuate a threaded spindle carrying a bolt (not shown) for locking purposes which is moved along the spindle to a position in which it impedes the withdrawal of the operating element or lever **15** from the U-shaped stop body **18**.

The legs **19***a* opposite the locks **21** of the stops **17**, **18** are fixed to the respective container units by any suitable means and, upon actuation of the lock **21**, the operating element **15** can be secured in either limit of its pivotal movement.

Referring now specifically to Fig. 2, there is illustrated one form of the motion translating means which is operable in response to pivotal movement of the operating element **15** from the limiting position in engagement with stop **18** to the limiting position in engagement with stop **17** to move the respective container unit **10***a*, **10***b*, **10***c* away from the wall **14**. Each of the motion translating means is arranged within the respective container unit, preferably on the rear face of the wall thereof carrying element **15** and pivot **16** so that only these latter parts of the translating mechanism are exposed to view.

This mechanism includes a small sprocket wheel **22** fixed to the axis **16**, and a large sprocket wheel **24** fixed to the axis or pivot **25**, the sprocket wheels **22**, **24** being interconnected to a sprocket chain **23**. Abutting against the sprocket wheel **24** is a bearing element **26** which is mounted for extensible and retractible movements with respect to the sprocket wheel **24**. The bearing element is provided with spaced, longitudinally extending slots **28**, **29**, slot **28** receiving the axis **25** and slot **29** receiving the lock screw **27** for securing the bearing element **26** in any predetermined position of the extensible and retractible movements. Bearing element **26** includes a depending shoe **30**

which is adapted to bear against an abutment, such as rail **12**, or an additional rail **31** arranged between the pair of rails **12**. The shoe **30** may be provided with any suitable friction lining **33** which enhances the gripping qualities of the curved bearing surface of the shoe **30** which swings through a predetermined arc **34** upon rotation of the sprocket wheel **24** in the direction of arrow Q. For example, the lining **33** may be fabricated of rubber or a plastic composition. Accordingly, when the shoe **30** is swung in the direction of the arrow Q and through the arc **34**, the bearing surface **32** engages the surface rail **31** and imparts a thrust to the respective container unit. By varying the engagement of the bearing element **26** with the rail **31**, a sufficient thrust can be imparted to the container unit to overcome its inertia and to effect the desired movement of the container unit in predetermined direction R.

It is to be noted that the axis **16** of wheel **22** lies in a vertical plane in which the axis or pivot **25** of bearing **26** is disposed whereby axes **16** and **25** are arranged one directly below the other.

In actual operation, the degree of engagement of the bearing element **26** with the rail **31** is adjusted by means of the lock screw **27** which can be loosened to permit the movement of the shoe **30** with respect to the sprocket wheel **24**, and thereafter tightened to fix the shoe **30** in adjusted position. Upon grasping the operating element **15** and pivoting the same toward the stop **17**, as indicated by the arrow P of Fig. 2, sprocket wheel **24** is rotated in a counterclockwise direction and swings the shoe **30** through a predetermined arc to impart the necessary thrust to the container unit to move the same in another direction.

In Fig. 4 there is illustrated a modified form of the motion translating means in which the shoe **30** is replaced by a gear segment **30***a* having one or more gear teeth **35**, and the rail **31** is replaced by a rack **31***a* having teeth **36**. The gear teeth **35** mesh with the rack teeth **36** during a predetermined arc of the swinging movement of the bearing element **26** to impart the desired thrust to the respective container units **10***a*, **10***b*, **10***c*. Positive engagement of the rack **31***a* and the gear segment **30***a* assures a positive drive without the possibility of slippage. It is clear that only a single gear tooth **35** is necessary to achieve the drive upon rotation of the element **26**.

In Figs. 5 and 6 there is illustrated a further modified form of the motion translating means in which the shoe **30** is replaced by a bearing wheel **30***b* which is rotatably journalled on the axle **37** carried by the lower end of element **26**. The rotatable bearing wheel **30***b* is provided with a friction rim or tire **33***b*, bearing wheel **30***b* being held in a fixed position on its axle **37** by means of locking screw **38** which is threadedly supported on the element **26** and is engageable in a recess provided in the face of the wheel **30***b*.

When employing any one of the motion translating means, it may be advisable to increase the gripping qualities of the rail **31** by providing the latter with a frictional lining fabricated of a suitable and durable material.

In view of the translation between the movements of the hand lever **15** and of the arm **26**, the container unit may be moved with a predetermined velocity since no considerable power or effort is required to bring about such movement of the container unit from its position of rest. The thrust or impact imparted to the container unit may be only of relatively short duration since said unit moves along a track or without considerable friction. Instead of a handle bar or lever **15** a foot actuated mechanism of like construction may be employed.

It can thus be seen that there has been provided in accordance with this invention a storage device comprising a plurality of movably disposed, separable container units normally disposed in juxtaposition with each other and movably relative to each other, motion translating means carried by each of said units and manually operable for

effecting relative movement of the separable container units, said motion translating means including abutment means adjacent said units, and bearing means mounted on the respective units for swinging movement and engaging said abutment means during a predetermined arc of said swinging movement to impart at least sufficient thrust to said respective units to overcome the inertia of the respective units for effecting their movement.

While several embodiments of the invention have been shown and herein described, it will be understood that the same is capable of modifications without departure from the general scope and spirit of the invention as defined in the claims.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent, is:

1. The combination, with a plurality of movably disposed, separable container units normally arranged in juxtaposition with each other and displaceable relative to each other, of motion translating means carried by each of said units and manually operable for effecting relative movement of the separable container units, said motion translating means including abutment means adjacent said units, bearing means mounted on the respective units for swinging movement and engaging said abutment means during a predetermined arc of said swinging movement to impart at least sufficient thrust to said respective units to overcome the inertia of the respective units for effecting their movement, and adjustment means on each unit and mounting said bearing means for adjustment with respect to said abutment means, whereby the engagement of said bearing means with said abutment means may be regulated to vary said thrust.

2. The combination according to claim 1, wherein said bearing means includes a wheel, and said abutment means includes a rail engageable by said wheel.

3. A storage device for documents, goods, and like articles, comprising rail means, at least one container unit, means mounting said container unit on said rail means for movement therealong, abutment means adjacent said container unit, and rotatable movement translating means carried by said container unit and adjustable relative to said abutment means for effecting movement of said unit, said movement translating means including a bearing element mounted for swinging movement and engageable with said abutment means during a predetermined arc of said swinging movement to impart an impact to said container unit of a value at least sufficient to overcome the inertia of the latter and to effect movement of said container unit.

4. A storage device for documents, goods, and like articles, comprising at least one container unit, abutment means adjacent said container unit, and rotatable movement translating means carried by said container unit and engageable with said abutment means for effecting movement of said unit, said movement translating means including a bearing element mounted for adjustment and for swinging movement relative to said abutment means during a predetermined arc of said swinging movement to impart an impact to said container unit with a value at least sufficient to overcome the inertia of the latter and to effect movement of said container unit.

5. In combination, a storage unit, and drive means for imparting movement to said storage unit, said drive means including operable means arranged on said storage unit for swinging movement about an axis, bearing means operatively connected to said operable means and oscillatable about an axis lying in the same plane as the axis of said operable means and therebelow, and abutment means engageable with said bearing means during oscillating movement of the latter.

6. The combination according to claim 5, wherein said bearing means is arranged for adjustment relative to its axis and to said abutment means, said bearing means including friction means for contact with said

abutment means upon manipulation of said operable means.

7. The combination according to claim 5, wherein said bearing means terminates in an arcuate end for engagement with said abutment means during oscillatory movement of said bearing means past said abutment means.

8. The combination according to claim 5, including stop means for limiting the swinging movement of said operable means.

References Cited in the file of this patent

UNITED STATES PATENTS

122,814	Collins	Jan. 16, 1872
450,532	Runser	Apr. 14, 1891
760,640	Mitchell	May 24, 1904
1,450,735	Sheal	Apr. 3, 1923

FOREIGN PATENTS

245,048	Germany	Apr. 8, 1911