ABSTRACT
A mounting construction for rectangular resilient bumper pad loosely mounted with limited movement in any direction with respect to a rectangular closure head mounted on the end of a movable deal drawer for banking or business equipment. The bumper pad has switch means mounted thereon adjacent at least two of its four corners. The deal drawer closure head has grooved channel-like actuator members located operatively adjacent each switch so that relative movement of the bumper pad at any location thereof, either toward or away from the deal drawer head, actuates at least one switch. These switches are connected in control circuits with a motor drive for the deal drawer so as to stop or reverse movement of the deal drawer upon actuation of any switch.

9 Claims, 15 Drawing Figures
DEAL DRAWER SAFETY DEVICE

BACKGROUND OF THE INVENTION

1. Field of the Invention
The invention relates to a safety device for a movable head of a deal drawer-like mechanism for banking or business transaction equipment. Such equipment may comprise either a bank drive-up or walk-up window, or a deal drawer for television or visual banking or business transactions in which the transaction is carried out through the extension of a deal drawer or the delivery of a pneumatic tube carrier to a customer station or to a customer in an automobile or other vehicle which has been driven to the location of the equipment.

The projection of a deal drawer in the use of any of such types of equipment by a power drive to an open position may cause the head to strike an automobile, or a customer, or some other object during such opening movement. Ensuing injury or damage to the person or object should be avoided. Similarly, movement of the deal drawer to closed position, particularly after a pneumatic tube carrier has been deposited by the customer on or into the deal drawer, can pinch the hand of the customer during closing movement of the deal drawer, if the hand has not been withdrawn. In either situation, movement of the deal drawer should be stopped or reversed at once to avoid damage or injury.

2. Description of the Prior Art
Prior art devices or mechanisms have been used as in U.S. Pat. Nos. 2,658,967, 3,308,903 and 3,237,933 for protecting vehicles from injury upon being driven into another object or for protecting a bank customer from injury in the manipulation of television pneumatic tube system banking equipment wherein the customer has access to a captive carrier through a hinged door.

In the vehicle protective device of U.S. Pat. No. 2,658,967, a projecting flexible finger is mounted on a fixed object, such as a vertical frame member for a garage door, so that movement of the finger in any direction by contact with any vehicle or object actuates a signal to warn that the vehicle or object is too close to the door frame.

In the motor vehicle bumper device in U.S. Pat. No. 3,308,903, the flexible pad on the vehicle bumper on striking an object, actuates a switch de-energizing the vehicle motor when the bumper contacts an obstruction.

In the television banking device of U.S. Pat. No. 3,237,933, primary and secondary doors are involved which have hinged movement between open and closed positions, through a door opening, and the door opening has frame elements that are movable to actuate safety switches to stop movement of the hinged door means when an obstacle is encountered.

None of these prior devices, however, provide a simple mechanism for guarding against injury or damage to a person or external object during movement of a deal drawer head of banking or business equipment, either to or from a projected position with reference to a closed position of the deal drawer.

SUMMARY OF THE INVENTION
Objectives of the invention include providing a cooperative mounting and switch actuating structure for a deal drawer safety device rectangular bumper pad movably mounted relative to the rectangular head of a deal drawer of business equipment so that any movement of the bumper pad at any corner or along any edge, either away from or toward the deal drawer head, actuates a switch in the control circuits of the deal drawer motor drive, either to stop or to reverse deal drawer movement, providing a bumper pad mounting and control switch construction which has simple and readily assembled and adjusted components satisfying the foregoing objective, and which safety device bumper pad prevents injury or damage to a person or object which the bumper pad may contact during movement of the deal drawer head in either direction between open and closed positions; providing a construction which requires both minimum force against and minimum movement of any part of the bumper pad to actuate one of the control switches for stopping or reversing deal drawer movement; and providing a construction which eliminates difficulties which were encountered in the construction of such protective device, which achieves the stated objectives simply, effectively and inexpensively, and which solves a problem and satisfies a need that has existed in the art.

These objectives and advantages are obtained by the deal drawer safety device construction, the general nature of which may be stated as including in a movable deal drawer having a rectangular head which may form the closure of an opening in customer banking or business equipment and movable between closed and open positions; a bumper pad loosely carried by the deal drawer head; control switches mounted at, at least two corners of the bumper pad; grooved, channel-shaped switch actuators mounted on the head adjacent the switches; spring means interacting between the head and bumper pad adjacent each of the four corners of the rectangular head; and the spring means biasing the bumper pad normally to a neutral position with the switch actuators engaged with the switch rollers in the valleys of the actuator grooves, whereby movement of any corner or edge of the bumper pad in either direction toward or away from the head, actuates at least one of the switches to a control position stopping or reversing the deal drawer motor drive with which the switches are connected.

BRIEF DESCRIPTION OF THE DRAWINGS
Preferred embodiments of the invention - illustrative of the best modes in which applicants have contemplated applying the principles - are set forth in the following description and shown in the drawings and are particularly and distinctly pointed out and set forth in the appended claims.

FIG. 1 is a somewhat diagrammatic perspective view of a visual pneumatic tube system banking equipment customer station with the deal drawer in closed position;

FIG. 2 is a view similar to FIG. 1 showing the deal drawer projecting a pneumatic tube system carrier to an open deal drawer position;

FIG. 3 is a fragmentary diagrammic view showing a customer in an automotive vehicle reaching for the carrier in the extended or open position of the deal drawer;

FIG. 4 is a view similar to FIG. 3 showing the customer handling a carrier for placing material in or removing it from the carrier, prior to return of the carrier to the deal drawer;
FIG. 5 is a rear elevation view of the bumper pad and deal drawer head assembly, forming one embodiment of the safety device construction of the invention, with the assembly detached from the deal drawer; FIG. 6 is a section looking in the direction of the arrows 6—6, FIG. 5; FIG. 7 is a section looking in the direction of the arrows 7—7, FIG. 5; FIG. 8 is an enlarged view of the left-hand portion of FIG. 6 showing the position of the parts when pressure has been applied to the front of the bumper pad at the top corner of or along the left-hand edge of the parts shown in FIGS. 5 and 6; FIG. 9 is a fragmentary rear view of the parts shown in FIG. 8 looking in the direction of the arrows 9—9, FIG. 8; FIG. 10 is an enlarged view of the top portion of FIG. 7 showing the position of the parts when pressure is applied to the front of the bumper pad at the lower portion of FIG. 7; FIG. 11 is an enlarged view of the top portion of FIG. 7 or of the upper right-hand corner of FIG. 5, looking in the direction of the arrows 11—11, FIG. 10, with the parts in the position of FIG. 10; FIG. 12 is a fragmentary sectional view taken on the line 12—12, FIG. 11; FIG. 13 is a view similar to FIG. 5 of a modified form of construction; FIG. 14 is a section taken on the line 14—14, FIG. 13; and FIG. 15 is a section looking in the direction of the arrows 15—15, FIG. 13. Similar numerals refer to similar parts throughout the various figures of the drawings.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

First Embodiment

The customer station for a visual banking unit is generally indicated at 1 in closed position in FIG. 1 and in open position in FIG. 2. Unit 1 is accessible to a customer who may drive up to a location adjacent the unit 1 in an automobile as indicated in FIGS. 3 and 4. Alternately, the unit 1 may be combined with a closed circuit television system as in U.S. Pat. No. 3,237,933 when the unit 1 is located out of visual range of a teller in a bank building remote from the unit 1.

In either event, the operation of the deal drawer, generally indicated at 2, is under control of a teller in a bank, whether within visual range or with visual contact through a closed circuit television system. The deal drawer 2 may deliver a pneumatic tube system carrier 3 to a location accessible to the customer 4 in the auto 5 (FIGS. 3 and 4) so that the customer can reach to the deal drawer 2 and remove or replace the carrier 3 from or to the deal drawer 2 when the latter is in open position (FIGS. 2, 3, 4).

It is important when a customer has arrived in an auto 5 at a location adjacent the unit 1 and when the deal drawer may be in closed position, as shown in FIG. 1, that the auto and customer be protected against damage or injury incident to opening and then closing of the deal drawer 2.

The deal drawer 2, accordingly, is provided with a closure member generally indicated at 6, mounted on and carried by the deal drawer 2. The safety device construction for the closure 6 constitutes fundamental aspects of the invention and is best shown in FIGS. 5 through 12.

Closure 6 has pivotal connection, through rods indicated by dot-dash lines 7 and 8 in FIG. 5, with levers 9 and 10 carried by deal drawer 2, the closure 6 being illustrated in FIGS. 5 through 12 detached from the deal drawer.

Deal drawer closure member 6 comprises a rectangular head 11 and a flexible rectangular bumper pad structure 12. The bumper pad 12 may consist of a thick pliable rubber pad 13 bonded to a shell plate 14. The rectangular bumper pad 12 has a larger size than the size of the rectangular head 11.

Shell plate 14 is provided with a central boss 15 extending loosely through a central opening 16 formed in head 11. A loose assembly of members 11 and 12 is maintained by retaining screw 17. A guide pin 18 (FIGS. 5 and 6) projects rearwardly of shell plate 14, preferably centrally at the upper end of plate 14 and extends through an enlarged opening 19 in head 11. A U-shaped bracket 20 is mounted on head 11 spaced above the lower edge of head 11 to which the rod 7 is pivotally connected through openings 21. Head 11 is formed with vertically extending channel-shaped flange means 22 at the side edges of head 11. In accordance with the invention, the web of the channel shape 22 is formed with a depressed groove 23. Blocks 24 hold the channel flange means 22 in channel shape and the blocks 24 also engage the ends of rod 8 for pivotal connection with the deal drawer 2.

A spring retainer cup 25 is mounted on and extends rearwardly from each of the four corners of the head 11. A coil spring 26 is held in one end in each cup 25 and the other end thereof presses against the rear of shell plate 14. This biases the head 11 and shell plate 14 away from each other with the assembly in normal position illustrated in FIGS. 6 and 7 and with the head of retaining screw 17 limiting biased movement of the bumper pad 12 away from the position shown.

However, because of the loose fit of central boss 15 on shell plate 14 in the opening 16 in head 11, there can be relative tilting against the biased spring pressure of springs 26, between the bumper pad 12 and head 11.

Two switches 27 and 28 are mounted on brackets 29 on the rear face of shell plate 14 at the upper corners thereof and the roller blades 30 have their rollers seated in the depressed grooves 23. The normal position of the parts is shown in FIGS. 5, 6 and 7. The brackets 29 may be adjusted by adjusting screws 31 to locate the switches 27 and 28 with the rollers of their blades 30 centrally located with respect to the depressed grooves 23, as shown in FIG. 6 when the switch blades 30 are in unactuated position.

FIGS. 8 and 9 illustrate actuation of the switch 28 by pressure against the bumper pad 12 directed toward the rubber pad 13 (toward the viewer) at the left-hand edge of or at the top left-hand corner of FIG. 5, as generally represented by the arrow 32 in FIG. 8. Such pressure, indicated by arrow 32, as when the closure 6 might strike the auto 5 on further projection of the deal drawer 2 in either FIGS. 3 or 4, tilts the bumper pad 12 (FIG. 8) so that the roller of blade 30 of switch 28 moves out of groove 23 in the flange means 22 to the position shown at 33 which is an actuated position of switch 28.

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FIGS. 10, 11 and 12 illustrate actuation of the switch 27 by pressure against the bumper pad 12 imparted toward the rubber pad 13 either at the bottom outside edge of closure 6, or on closing movement of deal drawer 2 when a finger or hand of a customer 4 might be pinched between the top of closure 6 and the case of unit 1. In this event, bumper pad 12 tilts outward at the top, as shown in FIG. 10, resulting in actuation of the roller of switch blade 30 of switch 27 to the position indicated at 34 in FIGS. 11 and 12.

Switches 27 and 28 are connected in the usual manner in the control and operating circuits for the motor drive for the deal drawer 2. When actuated, the drive either stops movement of the deal drawer or reverses such movement so as to avoid injury or damage to the person or object contacted or engaged by the front, edge or corner of closure member 6.

The particular grooved channel-shape 23 of channel portion 22 with which the switch blade rollers 30 are engaged and actuated are important. Overtravel of the switch blade, or bending thereof does not permit the switch blade roller to be engaged and held beyond the edge of the groove or beneath the ends of the portion forming the web of the channel shape 22 without the ability to return to the normal position, because of the channel flanges.

Furthermore, the construction illustrated in FIGS. 5 through 12 involves the cost only of and installation of two switches, and one of the two switches may be actuated by pressure in any direction at any point against or on the bumper pad 12.

Furthermore, the loose mounting of the bumper pad 12 on the head 11 guided by pin 18 and through the loose connection between boss 15 and central opening 16 retained by screws 17 and spring pressed by springs 26, provides a simplified assembly of the components of the safety device which can function in the manner described.

Second Embodiment

The modified form of construction shown in FIGS. 13 to 15, involves components of the closure 35 in which the head 36 and bumper pad 37 are not physically connected, except through the medium of spring tensioning devices, which hold the components assembled to the normal position illustrated.

The bumper pad 37 has a rubber pad 38 formed of thick, pliable material preferably rubber bonded to shell plate 39. Members 36 and 37 are generally rectangular with the bumper pad 37 having a larger size than that of the head 36.

Shell plate 39 has upper and lower brackets 40 bolted thereto at 41 with offset fingers 42 at the ends thereof. Head 36 has simple channel-shaped flanges 43 and 44 extending vertically at the side edges thereof. The flanges 43 and 44 are truly channel-shaped in cross section as shown in FIG. 14 and rubber stop blocks 45 are mounted within the channels 43 and 44 adjacent their upper ends to engage a rod similar to the rod 8 of FIG. 5. Likewise, a rod similar to rod 7 of FIG. 5 is engaged by U-shaped bracket 46 for mounting closure 35 on a deal drawer 2.

Head 36 may be made more rigid, and relative movement between it and bumper pad 37 controlled by a central reinforcing strap plate 47 having openings with cyclets 48 inserted therein through which guide pins 49 mounted on shell plate 39 project.

Four retainer cups 50 are mounted on head 36 adjacent each corner thereof. Springs 51 are retained by cups 50, reacting between cups 50 and shell plate 39 biasing shell plate 39 away from head 36 (FIG. 14). A similar set of four retainer cups 52 is mounted on head 36 adjacent retainer cups 50, but extending in the other direction (FIG. 14). Cups 52 retain springs 53 which react between the offset fingers 42 of brackets 40 and the retainer cups 52 and tend to bias shell plate 39 and therefore bumper pad component 37 toward head 36.

Thus, bumper pad 37 has a floating mounting on head 36 with the normal biased position as shown in FIG. 14. Channel-shaped brackets 54 with depressed central grooves 55 providing an M-shape in cross section are mounted at each corner of head 36 on channel flanges 43 and 44 to present the same switch control groove for closure 35 that is presented by the depressed grooves 23 in the flanges 22 of closure head 11.

An angular bracket 56 is mounted on and extends inward of shell plate 39 adjacent each corner thereof. Four switches 57, 58, 59 and 60 are mounted on brackets 56. The roller blades 61 of switches 57, 58, 59 and 60 have their rollers seated in the grooves 55 in the normal position of the components 36 and 37 of closure 35, similar to the manner in which the roller blades 30 of the construction shown in FIGS. 5 through 12 are normally seated in grooves 23.

Switches 57 through 60 are illustrated in the unactuated position of FIGS. 13 through 15 and are connected in a usual manner in the control and operating circuits for the deal drawer equipped with the closure 35. At least one of the switches 57, 58, 59 or 60 is actuated by pressure against the bumper pad 37 directed in any direction against the bumper pad so as to tilt the bumper pad 37 with respect to the head 36.

The construction of FIGS. 13, 14 and 15 thus operates in the same manner as that of FIG. 5 through 12 and the grooves 55 in the channel-shape of channel brackets 54 prevent the switch blade rollers from being held without the ability to return to the normal position, in the same manner as described in connection with the construction and operation of closure 6.

Although the construction of FIGS. 13, 14 and 15 involves four switches, rather than two, the floating mounting thereof avoids the necessity of forming the head 36 of heavy sheet or plate metal to maintain rigidity, or the necessity of providing reinforcing means for head 36, other than the central plate 47 which acts as a guide for relative movement between shell plate 39 and head 36.

The components of the safety device which can function in the manner described may be assembled readily and maintained in assembled condition by bolting the brackets 40 to the bumper pad 37.

Thus, the improved construction of both embodiments of the invention uses very simple means and components to provide a sensitive mounting of a bumper pad as part of the closure for a deal drawer so that a small force applied to the bumper pad moves it relative to the closure head to actuate a switch in the deal drawer drive either to stop or to reverse deal drawer movement when the deal drawer encounters a person or object during either opening or closing movement thereof.

The construction of the present invention, in either embodiment when in use, may be actuated by an aver-
age pressure of as small as 9 pounds, and plus or minus 
¼ inch movement of the bumper pad is sufficient to ac-
tuate one of the switches for stopping or reversing deal-
drawer movement.

Furthermore, the improved construction is simple to
assemble, maintain and provides a structure eliminat-
ing difficulties that have been encountered in the art,
achieving the stated objectives and solving existing
problems.

In the foregoing description, certain terms have been
used for brevity, clearness and understanding; but no
unnecessary limitations are to be implied therefrom
beyond the requirements of the prior art because such
terms are used for descriptive purposes and are in-
tended to be broadly construed.

Moreover, the description and illustration of the in-
vention is by way of example in the two embodiments,
and the scope of the invention is not limited to the
exact details shown or described.

For example, the improved deal drawer safety device
closure construction, rather than forming a closure for
a deal drawer which delivers a pneumatic tube carrier
to a customer as illustrated in FIGS. 1-4, may be
mounted on a deal drawer of a walk-up or drive-up win-
dow of equipment for carrying out banking or other
business transactions, as for example, a deal drawer
such as shown in U.S. Pat. No. 3,302,871.

Having now described the features, discoveries and
principles of the invention, the manner in which the im-
proved deal drawer safety device is constructed, assem-
bled and operated, the characteristics of the new con-
struction and the advantageous, new and useful results
obtained; the new and useful structures, devices, ele-
ments, arrangements, parts and combinations are set
forth in the appended claims.

We claim:

1. In business equipment deal drawer construction of
the type in which deal drawer means is moved to and
fro in opposite directions between open and closed po-
positions through an opening in the wall of a cabinet, in
which the deal drawer means has closure means form-
ing a closure for the opening when in closed position,
and in which power drive means and circuitry is pro-
vided for moving the deal drawer means in said oppo-
site directions; the improvement in which the closure
means includes a head and bumper pad means carried
by the head; control switch means connected with the
power drive circuitry including a switch mounted on
and adjacent at least each of two corners of the bumper
pad means; a grooved, channel-shaped, switch-actuator
mounted on the head adjacent each switch; spring
means interacting between the head and bumper pad
means biasing the bumper pad means normally to a
neutral position with respect to the head; and each
switch having switch blade roller means normally in un-
actuated position with the roller means engaged in the
groove of the adjacent switch-actuator when the bumber
pad means is in neutral position; whereby move-
ment of the bumper pad means in any direction upon
striking an object during deal drawer movement in ei-
ther direction between open and closed positions, actu-
ates at least one of the switches to arrest continued deal
drawer movement by the power drive means in the ob-
ject-striking direction.

2. The deal drawer construction defined in claim 1 in
which the spring means includes a retainer cup
mounted on the head adjacent each corner thereof and
a coil spring trapped in the cup and engaging the bumber
pad means to bias the bumper pad means normally to
neutral position.

3. The deal drawer construction defined in claim 1 in
which means is formed on the head to which levers on
the deal drawer are pivotally connected to provide the
closure means on the deal drawer.

4. The deal drawer construction defined in claim 1 in
which the head is generally rectangular in shape and
the bumper pad means is generally rectangular in shape
and has a larger size than that of the head; in which the
bumper pad means has a boss projecting therefrom
loosely mounting the bumper pad means on the head;
in which the head has a centrally disposed opening
through which the boss projects; and in which interen-
gageable guide means is formed on the head and bumper
pad means to maintain a generally matching rectangular
arrangement of the head and bumper pad means.

5. The deal drawer construction defined in claim 4 in
which two control switches are mounted on the bumper
pad means one each adjacent two corners of the bumber
pad means.

6. The deal drawer construction defined in claim 4 in
which a channel flange having a web formed with a de-
pressed groove defines side edges of the head to pro-
vide the switch actuator adjacent each switch.

7. The deal drawer construction defined in claim 2 in
which the retainer cups mounted on the head comprise
a first set of four cups which project away from the
bumper pad means; in which another set of four re-
tainer cups is mounted on the head projecting from the
head toward the bumper pad means; in which brackets
are mounted on the bumper pad means having offset
flanges spaced from said second set of cups; in which
coil springs are mounted in the second set of cups and
are engaged by said offset flanges whereby the springs
provide a floating mounting for the bumper pad means
on the head; and in which interchangeable guide means
is formed on the head and bumper pad means to main-
tain a generally matching rectangular arrangement of
the head and bumper pad means.

8. The deal drawer construction defined in claim 7 in
which four control switches are mounted on and adja-
cent the four corners of the bumper pad means.

9. The deal drawer construction defined in claim 7 in
which the side edges of the head are formed with channel-
shaped flange means; and in which a channel-
shaped bracket is mounted on the channel flange
means formed with a depressed groove in its channel
web adjacent each switch.

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