Aug. 5, 1930. A. R. WOMRATH 1,772,408

AUTOMATIC BOOK EXCHANGE

Original Filed June 13, 1923 3 Sheets-Sheet 1

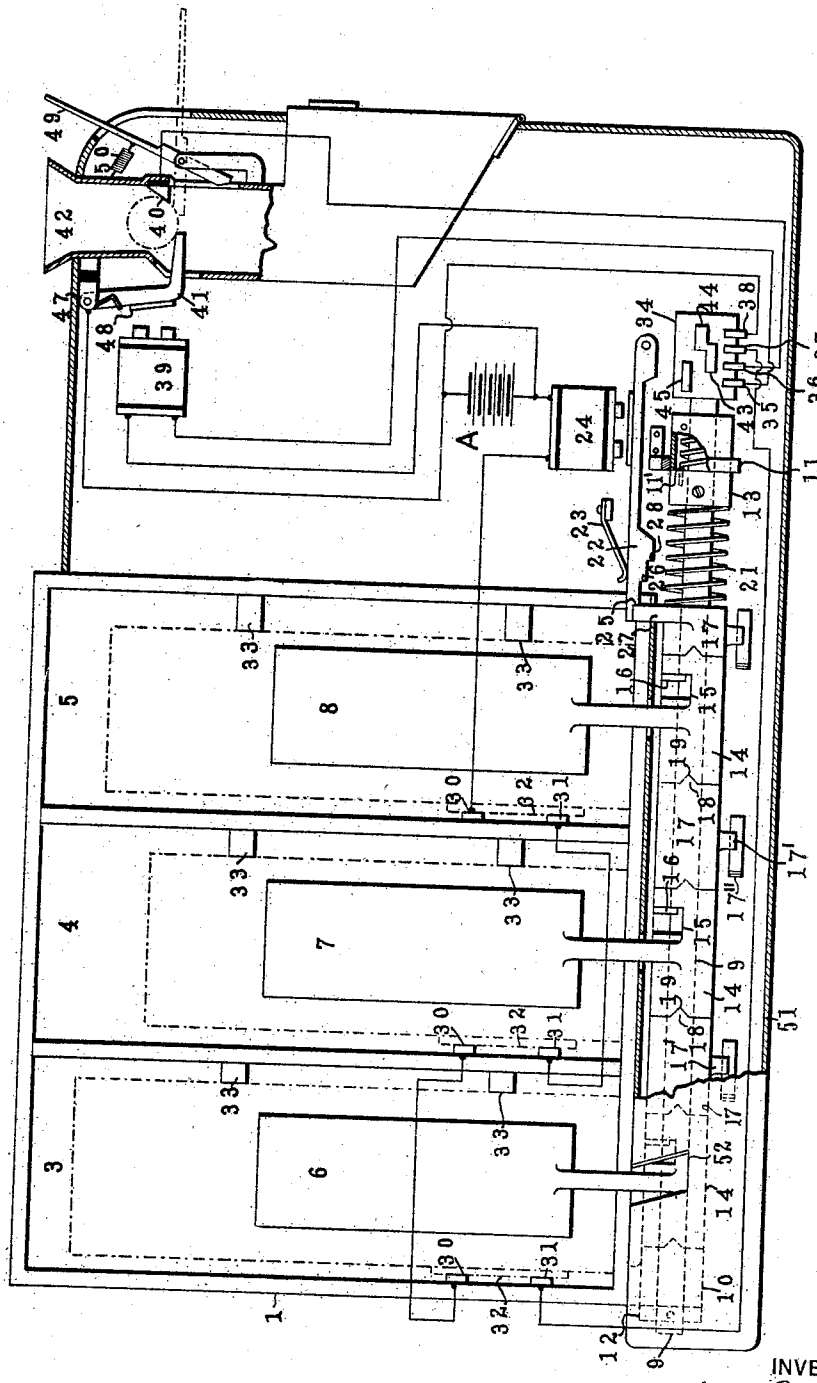


Fig. 1

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AUTOMATIC BOOK EXCHANGE

Original Filed June 13, 1923 3 Sheets-Sheet 2

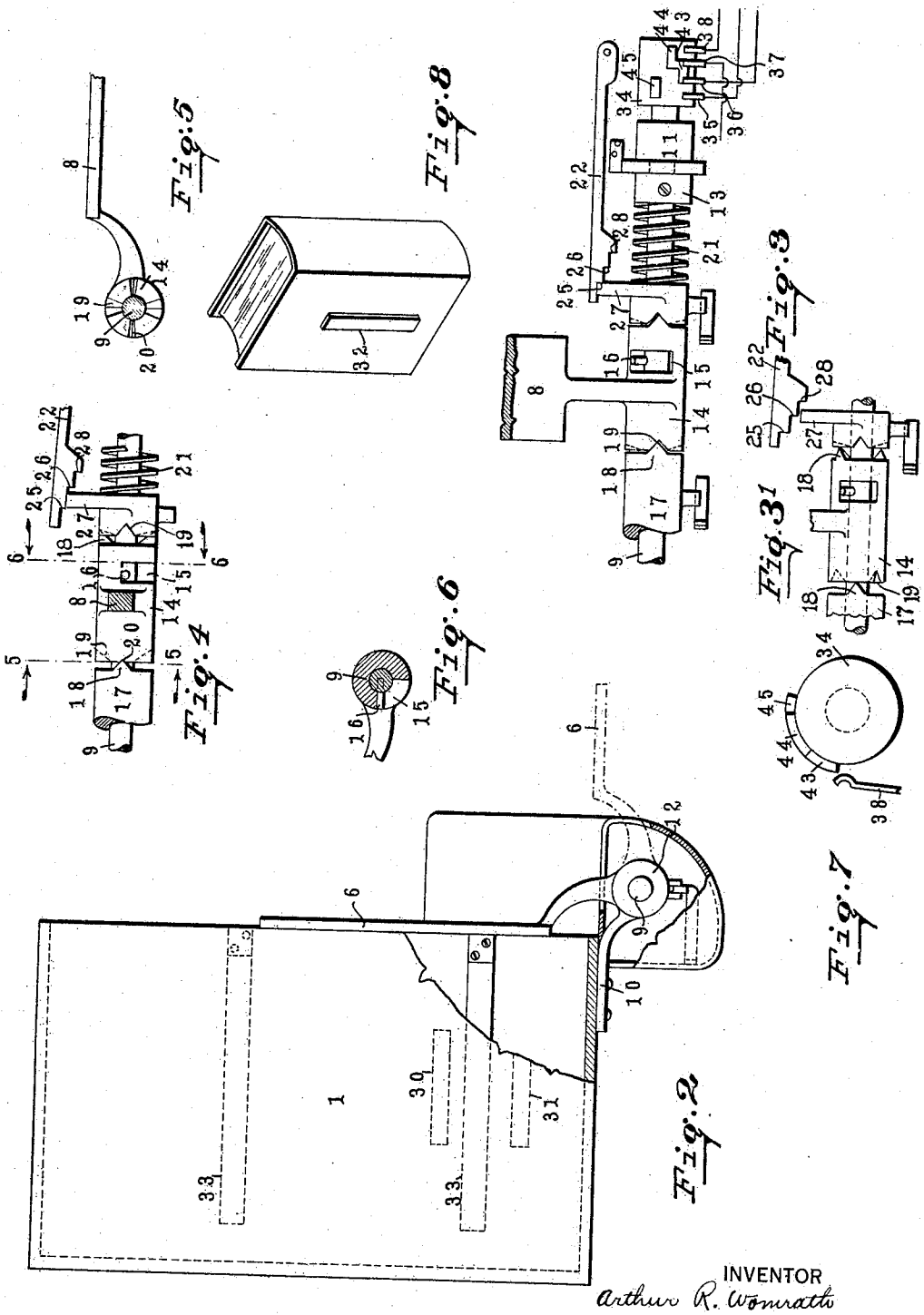


Fig. 2

Fig. 5

Fig. 8

Fig. 3

Fig. 4

Fig. 6

Fig. 31

Fig. 7

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AUTOMATIC BOOK EXCHANGE

Original Filed June 13, 1923 3 Sheets-Sheet 3

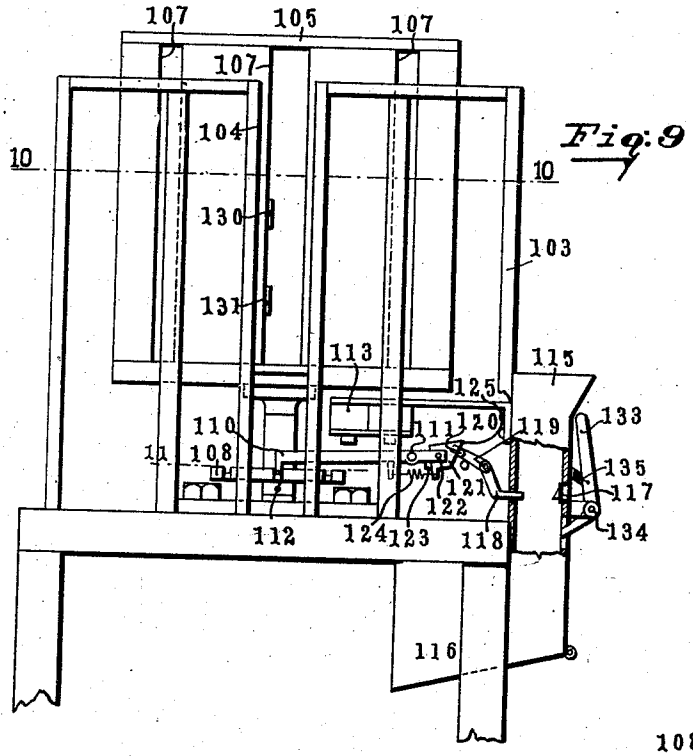


Fig. 9

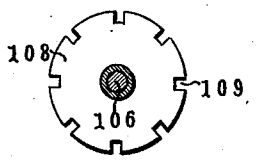


Fig. 11

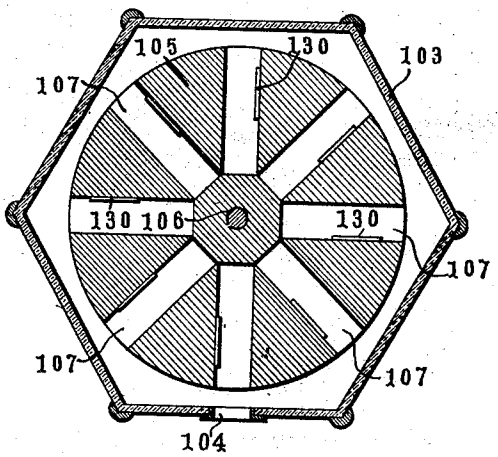


Fig. 10

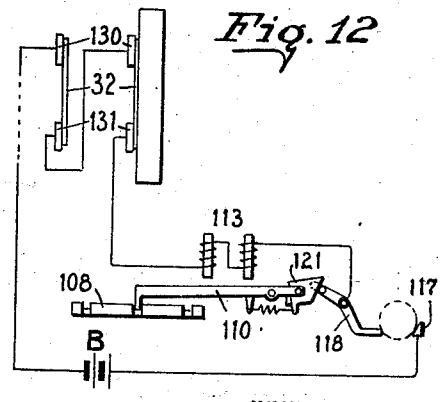


Fig. 12

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Patented Aug. 5, 1930 1,772,408

UNITED STATES PATENT OFFICE

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AUTOMATIC BOOK EXCHANGE

Application filed June 13, 1923, Serial No. 645,099. Renewed December 15, 1928.

This invention relates to an exchange device, and aims to provide an apparatus of this character which may be utilized in connection with dispensing and exchanging of articles, such as for example books.

A further object of this invention is that of providing an automatic exchange device by means of which a system of exchange may be practiced in that an article may be deposited within said device and another article withdrawn from the same upon certain mechanisms being operated, this actuation of the parts being accomplished entirely by the user of the device without any assistance from an attendant.

A still further object of this invention is that of constructing a device of the nature stated, in which it will be incumbent upon the person using the same to deposit an article within the apparatus before gaining access to another of the same.

Another object of this invention is that of furnishing an exchange device in the nature of a vending machine, which will incorporate a coin control mechanism associated with the device in such a manner as to prevent a withdrawal of any of the articles reposing therein, unless a coin of proper denomination has been deposited within said mechanism.

Still another object of this invention is that of providing a device of the nature stated, in which a structure will be incorporated preventing any actuation of the apparatus and consequential exchange of articles in the event of a user of the same depositing a spurious article therein.

An additional object is that of constructing an exchange device incorporating mechanism by means of which a locking of the device may be prevented until the desired articles is finally withdrawn, so that it will be possible for the user of the device to withdraw and individually examine any desired number of the articles and to finally reach a decision as to which of the same he desires, without repeatedly depositing additional coins to permit of this being done.

Other objects of the invention will in part be obvious and will in part appear hereinafter.

The invention accordingly comprises the features of construction, combination of elements, and arrangement of parts, which will be exemplified in the constructions hereinafter set forth and the scope of the application of which will be indicated in the claims.

For a fuller understanding of the nature and objects of the invention, reference should be had to the following detailed description taken in connection with the accompanying drawings, in which:

Fig. 1 is a partly sectional front elevation of an exchange device, certain of the exterior parts of which have been broken away to disclose the underlying construction;

Fig. 2 is a side elevation thereof;

Fig. 3 is a front view of a portion of the mechanism forming a part of said device;

Fig. 3′ is a similar view showing the parts in a position different from that shown in Fig. 3;

Fig. 4 is a further view similar to Fig. 3′, but showing the parts in still different relation to each other;

Figs. 5 and 6 are transverse sectional views taken along the lines 5—5 and 6—6 respectively, and in the direction of the arrows indicated in Fig. 4;

Fig. 7 is an end view of a portion of the mechanism shown in Figs. 1 and 3;

Fig. 8 is a perspective view of the type of article which may be vended by the exchange device;

Fig. 9 is a partly sectional front view of a form of device different from that illustrated in Figs. 1 to 7;

Fig. 10 is a sectional plan view taken along the lines 10—10 of Fig. 9;

Fig. 11 is a sectional plan view taken along the lines 11—11 of Fig. 9; and

Fig. 12 is a diagrammatic view of the essential parts of the apparatus as shown in Figs. 9 to 11, and indicating the circuit employed in this form of mechanism.

In the illustrated embodiments of the invention, the apparatus has been shown as a device for use in connection with a book exchanging system, such as may be employed in a rental library. While the invention has been designed particularly for this purpose,

it is here to be understood that the same is readily applicable for use in numerous other associations wherein the dispensing and exchanging of articles is to be effected.

Thus, referring more particularly to Figs. 1 to 7, it will be seen that the reference numeral 1 indicates a casing of any suitable size and design which may be formed of any desirable material. Partitions extend transversely of this casing and provide compartments 3, 4 and 5, access to which is normally prevented by means of closures such as panels 6, 7 and 8 associated, one with each of the compartments aforementioned.

With a view of supporting and permitting a proper actuation of these closures, and to provide an article-locking mechanism a shaft 9 may be rotatably mounted beyond the compartments in bearing members 10 and 11. A longitudinal movement of the shaft is prevented in any desirable manner, such as for example by securing collars 12 and 13, at points adjacent its ends, which collars engage the bearing members and counteract any tendency of axial movement. The panels are connected with the shaft 9 by attaching the same, one to each of the hubs 14, which latter rotatably encircle the said shaft and are each provided with a slot 15 within which a pin 16 extends, this pin being attached to the shaft and being held in engagement with the rear wall of the slot by any suitable means, such as a spring 11′, which has one of its ends secured to the bearing member 11, its opposite end being attached to the collar 13; the purpose of this construction being hereinafter brought out.

Interposed between each pair of hubs 14 are locking dogs 17, which are mounted for longitudinal movement with respect to the casing 1, but are prevented from rotating with the shaft 9 by any desirable means, such as for example by a lug 17′ attached one to each of the dogs and slidably engaging a fixed track 17″. Formed in one of the edges of each of the dogs and hub members are two pairs of recesses or notches 19 and 20, the second pair being of a depth less than the depth of the pair first mentioned. Formed on the opposite edges of each of the dog and hub members are projections acting as cams, which are shaped to correspond to the recesses 19 and are adapted to extend into the same. Thus it will be seen that when the parts are in the position shown in Fig. 1, the collars and hub members will form one continuous sleeve, encircling the major portion of the shaft 9, but when one of the closure members is swung so as to render one of the compartments accessible, all of the collars and hub members to the right of the one which supports the closure in question will be moved longitudinally of the shaft 9 to a distance equal to twice the depth of one of the recesses 19. This actuation of the parts is to be attributed to the fact that incident to the rotation of the hub member and the recesses formed therein as well as the cams 18 carried thereby, that this member will be caused to ride outwardly along the shaft, and this outward motion will be continued until the apex of the cams carried by the hub bear against the flat edge portion of one of the next adjacent dogs 17, while the cams of the dog located adjacent the opposite edge of the hub similarly engage the flat rear edge thereof. A continued swinging of the closure will result in the cams carried by the hub member and the dog last mentioned, finally reaching a position at which they will ride into the notches or recesses 20 formed respectively in the dog first mentioned and the said hub members, and the parts will then be in the position shown in Fig. 4, the purpose of this disposition of the mechanism being later brought out. An intimate engagement of the hub members and collars one with another is at all times assured by preferably utilizing a compression spring such as 21, which encircles the shaft 9 and has one of its ends bearing against the collar 13, while its opposite end engages a dog disposed beyond the outermost hub. Thus the tension of this spring or the spring 11′ may be accurately adjusted by moving the collar 13 either longitudinally or rotatively with respect to the shaft.

To normally prevent a movement of the closure members, a latch 22 is employed, which latch is positioned adjacent one of the ends of the shaft 9 and has its head shaped to provide a series of shoulders 25, 26 and 28, and this latch is caused by means of a spring 23 to bear against a lug 27, carried by the outermost dog 17. A disengagement of these parts may be effected, however, in that the body of the latch constitutes an armature with which a solenoid 24 cooperates, and their release may thus be accomplished by energizing this latter member.

Carried at the outer end of the shaft is a commutator 34, presenting contact segments 43, 44 and 45, which are adapted to be engaged by fingers 35, 36, 37 and 38. To furnish a token lock control, a member providing a slot 42 is positioned at a point convenient to the casing 1, and disposed within the slot is a contact member 40, which, when a token or coin is deposited, is adapted to engage, and in cooperation with a lever 41, to retain the same against further movement. The lever above mentioned has one of its ends extending into the coin slot, its opposite end being pivotally mounted as at 47, and an armature 48 is attached to this lever and is adapted to cooperate with a solenoid 39, which latter has one lead connected with the contact finger 35, its second lead being connected with one of the terminals of a battery A. Pairs of spaced contacts 30 and 31 are connected in series and disposed within each

of the compartments, and the solenoid 24 is connected with the contact 30 in the compartment 5, and a lead extends from the contact 31 in compartment 3 to the contact finger 37. The secondary lead of the solenoid 24 is connected with the battery A and the lever 41 is connected in series with the battery and solenoid 24, etc., while a further lead extends from the battery and is connected with the contact finger 38, and it will be noted that the insulated contact member 40 has a lead connected with it, which lead has its opposite end attached to the finger 36.

The invention viewed in certain aspects embraces a mechanism which is electrically actuated and where the same is employed for the practicing of a system of book exchange, it will be seen, reference being had to Fig. 8, that the article embraces a book. In the present embodiment of the invention there is secured to this book a contact member in the nature of a bridging portion 32, this member being of sufficient length to close the circuit between the spaced contacts 30 and 31, against which it is pressed by springs 33 associated with each compartment. Due to the provision of this member, it will be understood that the same acts as a control or key and prevents a user of the device from seeking to fraudulently exchange one of the articles within the apparatus for a spurious article, and it will be appreciated in this connection that the member 32 may be of any desired shape and the contacts or actuating portions with which this member cooperates may be correspondingly disposed within each of the compartments to insure against a fraudulent operation of the device. Thus an article lock control is provided, in that an article will be subject to deposit in each compartment before the circuit may be completed through the mechanism.

In use, it is to be understood in the type of machine which has been afore-described, that one of the compartments has its closure swung to the position indicated in dotted lines in Fig. 2, this compartment being the one from which the last article has been withdrawn. The closure of this compartment being in the position aforementioned, the mechanism controlling the operation of all the closures will be in the position shown in Fig. 4, and in this position of the parts it will be obvious that the opening of a second closure is prevented; first due to the fact that the shoulder 26 of the latch will engage the lug 27; secondly, for the reason that one of the closures is open, the parts will be incapable of moving to a sufficient extent longitudinal of the shaft to permit of the opening of a second of the closures, and thirdly, incident to the fact that when one of the closure members is open the contact segment 45 will engage the fingers 35 and 36, so that no circuit can be completed which will cause an energization of the solenoid 24. Thus it will be encumbent upon the user of the apparatus to deposit the article which is to be exchanged within the empty compartment of the device and then to swing the panel of such compartment into its fully closed position, so that the parts assume the relationship shown in Fig. 1. Prior to, during, or subsequent to the foregoing operation, a token or coin may be deposited within the coin slot 42, and this coin will move to the position shown in dotted lines in Fig. 1, at which point the circuit will be closed through the battery A, solenoid 24, contacts 30, bridging portions 32, contacts 31, finger 37, segment 44, finger 36, contact member 40, the coin, lever 41, and so back to the battery A thus energizing the solenoid 24. This closing of the circuit, preferably is prevented from occurring due to the disposition of the fingers 36 and 37 and segment 43, until the closure member which is to be swung to its open position has been slightly moved to bring the lug 27 into engagement with the shoulder 25 of the latch to thus guard against waste of current. Upon the solenoid 24 being active, the latch 22 will be elevated against the tension of the spring 23, and the closure may be swung to a partially open position, at which point the circuit will be closed through the battery A, solenoid 24, contacts 30, bridging portions 32, contacts 31, finger 37, segment 44, finger 38, and so back to the battery A. Thus, the latch is continued in elevated position so that the lug 27 may clear the shoulder 26 of the same, and finally when this lug has reached a position adjacent the shoulder 28 of the said latch, it will be understood that the cam members carried by the hub 14 to which the closure is attached will ride into the shallow notches 20 formed in the edge of the adjacent dog, while the corresponding shallow notches formed in the opposite edge of the hub will be engaged by the cam members associated with the opposite dog. Upon the closure reaching this fully open position, it will be understood that the space between the fingers 35 and 36 will be bridged by the segment 45, and thus the circuit in this instance will be closed through the battery A, solenoid 39, the fingers and segment aforementioned, the contact member 40, the coin, the lever 41, and so back to the battery. Thus the solenoid 39 will be energized and this will result in an immediate attraction of the armature 48, causing the lever 41 to be swung to a point at which the coin is free to drop down the slot 42 into a suitable receptacle. The article within the compartment which is now open may be withdrawn, and it will be seen that the parts will remain in the position first described in connection with the operation of the device, and the entire operation will be repeated when a second article is to be exchanged.

If desired, mechanism may be provided permitting of an operator withdrawing and examining an article without causing the parts to assume their locked position, this being accomplished by the use of a lever 49, which is pivotally mounted adjacent the coin slot, and has its inner end capable of being swung to a point (indicated in dotted lines in Fig. 1) at which it will prevent the coin from descending through the slot regardless of the movements of the lever 41. Thus, if an operator is uncertain as to whether he desires an article but wishes to examine the same, he may simply deposit a coin within the slot to effect an operation of the parts in the manner aforementioned, and by swinging the lever 49 against the tension of the spring 50, the coin will be held in such position that he may individually examine each one of the articles. It is to be noted, however, that according to the present embodiment of the invention it will be absolutely necessary to return each article to a compartment and to close the same before it is possible to open a second of these compartments, for the reasons afore-described.

Finally, it will be understood in connection with the apparatus aforementioned, that the same may be enclosed within a casing 51, which will form a continuation of the casing 1, and tangentially disposed slots 52 may be provided in the first mentioned casing to accommodate the movements of the arms which connect each of the closure panels with their respective hub members. In this connection, the purpose of the spring 11′, slots 15 and pins 16 is apparent, in that due to the provision of these parts each of the hub members is capable of turning independently of others of the same, and the turning of any hub member will effect a corresponding movement on the part of the shaft 9. Thus, a device is presented which will be extremely rugged and simple in construction, and positive in operation, and which will prevent any attempt of fraudulent operation of the mechanism on the part of the user, it being further understood that although for the purpose of illustration I have shown the device as being controlled electrically, that the same may readily be constructed in such a manner as to be capable of mechanical operation.

Finally referring to the structure shown in Figs. 9 to 12, it will be seen that in these figures there is illustrated a slightly different form of exchange device than has been shown in the figures before described, it being noted that in these latter views there is shown a device in the nature of a revolving book-case. It will be seen that the receptacle in these views includes a body 105, which is formed with a suitable series of radially extending compartments 107. Encircling the body 105 is a casing 103, formed with an opening 104, of sufficient size to permit of the withdrawal of one of the articles from its compartment, and the body 105 is rotatable with respect to the casing 103 by mounting the former on a shaft 106. Affixed to the shaft is an annular plate formed with a series of notches 109, corresponding in number to the number of compartments 107 provided in the body of the device.

With a view of normally preventing movement of the body of the receptacle with respect to the casing thereof, it will be seen that a latch 110 is provided, which is pivotally mounted as at 111, the end of this latch being bent as at 112 to form a portion adapted to individually engage the notches 109, and in order to disengage these parts a solenoid 113 is mounted above the body of the latch, it being thus seen that upon the solenoid being energized the latch will act as an armature, and a consequent disengagement of the same from the plate 108 will be effected. A coin slot 115 is positioned adjacent to the apparatus aforementioned, and disposed within this slot is an insulated contact member 117. Positioned adjacent to the contact member, and also extending into the slot, is one arm of a lever 118, which is pivotally mounted as at 119, the opposite end of this lever carrying a pin 120. Secured to the latch as at 122, and beyond the pivot 111 of the same, is a block 121, formed with a bevel surface which normally engages the pin 120 by virtue of a spring 124 provided for this purpose, it being noted that a stop member 123 is utilized to limit the movement of the block with respect to the latch.

In use, an article such as that shown in Fig. 8 is exchanged by thrusting the same into that compartment 107, which is in registry with the opening 104 of the casing, and the bridging portion 32 of this article serves to close the circuit through the contacts 130 and 131, which are provided in pairs within each of the compartments. Now upon a token or coin of proper denomination being deposited within the coin slot 115, the circuit will be closed through the battery B, contact member 117, coin, lever 118, solenoid 113, contact 131, portion 32, contact 130 and so back to the battery. This closing the circuit will result in an energization of the solenoid, and a consequent attraction of the armature provided by the latch, and this action will result in the latch being lifted to permit of a rotation of the receptacle body 105 to a point at which that article which is to be withdrawn is in registry with the opening 104. It will be noted that as a consequence of the elevation of the latch, the block 121 will rock with respect to the latch body, and slide past the pin 120. Upon the article aforementioned being withdrawn, the circuit will be broken between the contacts 130 and 131, which will cause a stoppage of the flow of current

through the windings of the solenoid, and a consequent return of the latch to its normal position—i. e., in engagement with one of the notches of the plate. Simultaneously with this relocking of apparatus, the upper face of the block 121 will engage pin 120 to rock the lever 118, and thus permit of the release of the coin so that the latter may fall into the receptacle 116 provided for this purpose. Similarly to the apparatus described in connection with Figs. 1 to 7, an operator may individually examine each one of the articles in that the lever 133, which is pivoted adjacent the coin slot 115, as at 134, may be swung to a point at which it will prevent the coin from dropping into the receptacle 116, and thus the operator is free to examine each one of the articles to be vended, it being noted, however, that each of these articles is returnable before a second of the same may be rendered available, due to the fact that the circuit is broken upon the withdrawal of each of the articles. However, upon the operator leaving the apparatus, the lever 136 will swing to its normal position by virtue of the action of the spring 135, and the coin will drop, thus finally breaking the circuit and requiring the depositing of a new coin, in order to again effect an exchange of articles.

Summarizing the operation somewhat, it may be observed, taking the construction in Fig. 1, for example, that when the exchange apparatus is ready for operation, one of the closures, or book retainers, 6 , 7, or 8, is open. To operate the apparatus the patron has a token and a book suitable for exercising control. The book may be obtained from an attendant, or may already be in possession of the operator. One of the most important features requires that the service shall be paid for and that a book shall be returned to the apparatus in exchange for the book to be removed from the apparatus. Thus the token pays for the service, and book is exchanged for book. The apparatus provides for exchange of books in a practical manner; it is a library and contains many books, either of which may be exchanged for the patron's book. As far as possible equal values of books are exchanged for one token. Having placed the patron's book in the empty compartment and the token in the opening 42, the particular closure may be moved to closed position and any other one closure may then be moved to open position, in the exchange operation of the device. Unless the control effect of the token control device is made variable by operation of the lever 49, only one book retainer may be lowered for one token. This variable control may be omitted if desired. But even if not used it will be noted that after deposit of token and book, any book may be selected and removed. It will be noted that the token in conjunction with the parts controlled thereby provides a retainer control device which is operable independently of the control keys of the book, although in the present embodiment both are required in order that exchange operation may be effected.

The invention accordingly comprises the features of construction, combinations of elements, and arrangement of parts, which will be exemplified in the constructions hereinafter set forth and the scope of the application of which will be indicated in the claims.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

Having described my invention what I claim as new and desire to secure by Letters Patent is:

1. A device for practicing a system of book exchange including in combination means for normally retaining a plurality of books against removal from said device and means forming a part of a further book and acting to release said first named means to permit of a withdrawal of any of said first named books.

2. A vending device including in combination means for normally retaining a plurality of key-carrying books against removal therefrom and means operated by associating an additional key-carrying book with said device, to permit of the removal of certain of said first named books therefrom.

3. A vending device including in combination means for normally retaining a plurality of key-carrying books against removal therefrom and means operated by associating an additional key-carrying book with said device, to permit of the removal of any one of said first named books therefrom.

4. A vending device including in combination means for normally retaining a plurality of key-carrying books against removal therefrom and means operated by associating an additional key-carrying book with said device, to permit of the removal of only one of said first named books therefrom.

5. An exchange device including in combination a plurality of receptacles, means associated with each of said receptacles whereby the same may be retained in a closed condition; each of said receptacles being adapted to contain an article and means carried by said articles to cooperate with said receptacle-closing means, whereby upon an article being deposited within one of said receptacles another of the same may be opened.

6. An article exchange apparatus in which a plurality of articles are adapted to be locked against exchange including, in combination, a token lock control device and an article lock control device and means requiring the actuation of both of said control devices to unlock the apparatus for exchange.

7. An article exchange apparatus in which a plurality of articles are adapted to be locked against exchange including, in combination, a token lock control device and an article lock control device, means requiring the actuation of both of said control devices to unlock the apparatus for exchange, and means whereby an exchange of articles relocks the apparatus against exchange.

8. An article exchange apparatus in which a plurality of articles are adapted to be locked against exchange including, in combination, a token lock control device and an article lock control device, means requiring the actuation of both of said control devices to unlock the apparatus for exchange and means for proportioning the number of articles received relative to the number of articles delivered in a single exchange actuation of the apparatus.

9. An article exchange apparatus in which a plurality of articles are adapted to be locked against exchange including, in combination, a token lock control device and an article lock control device, means requiring the actuation of both of said control devices to unlock the apparatus for exchange, means for proportioning the number of articles received relative to the number of articles delivered in a single exchange actuation of the apparatus and means adapted to be operated by exchange actuation of the apparatus to permit the delivery of any article.

10. An article exchange apparatus in which a plurality of articles are adapted to be locked against exchange including, in combination, a token lock control device and an article lock control device, means requiring the actuation of both of said control devices to unlock the apparatus for exchange, means for proportioning the number of articles delivered in a single exchange actuation of the apparatus, means adapted to be operated by exchange actuation of the apparatus to permit the delivery of any article and means adapted to be set to permit a plurality of exchanges of articles for unlocking actuation of the exchange apparatus.

11. An article exchange apparatus in which a plurality of articles are adapted to be locked against exchange including, in combination, a token lock control device and an article lock control device, means requiring the actuation of both of said control devices to unlock the apparatus for exchange, means for proportioning the number of articles received relative to the number of articles delivered in a single exchange actuation of the apparatus and means whereby an exchange of articles relocks the apparatus against further exchange.

12. An article exchange apparatus in which a plurality of articles are adapted to be locked against exchange including, in combination, a token lock control device and an article lock control device, means requiring the actuation of both of said control devices to unlock the apparatus for exchange, means whereby an exchange of articles relocks the apparatus against further exchange and means adapted to be operated by exchange actuation of the apparatus to permit the delivery of any article.

13. An article exchange apparatus in which a plurality of articles are adapted to be locked against exchange including, in combination, a token lock control device and an article lock control device, means requiring the actuation of both of said control devices to unlock the apparatus for exchange, means for proportioning the number of articles received relative to the number of articles delivered in a single exchange actuation of the apparatus and means adapted to be set to permit a plurality of exchange of articles for unlocking actuation of the exchange apparatus.

14. An article exchange apparatus in which a plurality of articles are adapted to be locked against exchange including, in combination, a token-lock control device and an article lock control device, means requiring the actuation of both of said control devices to unlock the apparatus for exchange, means for proportioning the number of articles received relative to the number of articles delivered in a single exchange actuation of the apparatus, means whereby an exchange of articles relocks the apparatus against further exchange, means adapted to be set to permit the delivery of any article and means adapted also to be set to permit a plurality of exchanges of articles for unlocking actuation of the exchange apparatus.

15. An article exchange apparatus in which a plurality of articles are adapted to be locked against exchange including, in combination, a token lock control device and an article lock control device and means whereby an exchange of articles relocks the apparatus against further exchange.

16. An article exchange apparatus in which a plurality of articles are adapted to be locked against exchange including, in combination, a token lock control device and an article lock control device, means for proportioning the number of articles received relative to the number of articles delivered in a single exchange actuation of the apparatus, means whereby an exchange of articles relocks the apparatus against further exchange and means adapted to be operated by exchange actuation of the apparatus to permit the delivery of any article.

17. An article exchange apparatus in which a plurality of articles are adapted to be locked against exchange including, in combination, a token lock control device and an article lock control device, means for proportioning the number of articles received relative to the

number of articles delivered in a single exchange actuation of the apparatus, means whereby an exchange of articles relocks the apparatus against further exchange, means adapted to be operated by exchange actuation of the apparatus to permit the delivery of any article and means adapted to be set to permit a plurality of exchanges of articles for unlocking actuation of the exchange apparatus.

18. An article exchange apparatus in which a plurality of articles are adapted to be locked against exchange including, in combination, unlocking mean, and means whereby an exchange of articles relocks the apparatus against exchange.

19. An article exchange apparatus in which a plurality of articles are adapted to be locked against exchange including, in combination, unlocking means, and means whereby an exchange of articles relocks the apparatus against exchange, the unlocking operation of said apparatus being effected only by articles of a predetermined character.

20. An article dispensing device including, in combination, means providing an electric circuit embracing a plurality of separate pairs of terminals, article retaining means controlled through said circuit and adapted to be actuated to permit the removal of a predetermined number of said articles less than all of the same and means actuated in response to the removal of articles to operatively set said retaining means against the removal of additional articles.

21. An article dispensing device including, in combination, means providing an electric circuit embracing a plurality of separate pairs of terminals, article retaining means controlled through said circuit adapted to permit an actuation of said retaining means for the removal of a predetermined number of said articles less than all of the same, means actuated in response to said removal of articles to operatively set said retaining means against the removal of additional articles and circuit controlling means including an article to be dispensed, said article being adapted to be positioned in the device to complete the circuit at one pair of said terminals.

22. An article dispensing device including, in combination, means providing an electric circuit embracing a plurality of separate pairs of terminals, article retaining means controlled through said circuit adapted to be actuated to permit the removal of a predetermined number of said articles less than all of the same, means actuated in response to said removal of articles to operatively set said retaining means against the removal of additional articles, circuit controlling means including an article to be dispensed, said article being adapted to be positioned in the device to complete the circuit at one pair of said terminals and means including a token for completing the circuit at another pair of said terminals.

23. In a library, in combination, means adapted to lock a plurality of books against exchange, a token lock control, a book lock control, means requiring the action of both of said controls to unlock the books for exchange and means adapted to restrict the number of exchanges to the number of tokens deposited in the receiver therefor.

24. A vending device, including in combination, a receptacle adapted to contain articles, a closure for said receptacle, a coin controlled means for locking said closure in closed position, and means controlled by the presence of an article in said receptacle for retaining said closure in operable condition.

25. A vending device, including means providing a plurality of compartments adapted to contain articles, a closure member for each of said compartments, a shaft adjacent said compartments, hub members secured to said shaft, a locking dog cooperating with said hub members for normally preventing movement of the same, and means cooperating with said dog whereby the same may be moved to permit of an opening of any of said closures.

26. A vending device, including means providing a plurality of compartments adapted to contain articles, a closure member for each of said compartments, a shaft adjacent said compartments, hub members secured to said shaft, a locking dog cooperating with said hub members for normally preventing movement of the same, a lug forming a part of said dog, a latch normally engaging said lug, and means for throwing said latch to permit of an opening of any of said closures.

27. A vending device, including a casing providing a series of compartments, a shaft adjacent said casing, a closure for each of said compartments, hub members encircling said shaft and attached one to each of said closures, locking dogs disposed adjacent to said hub members, cams forming a part of said dogs and members, said dogs and hub members being also formed with notches adapted to cooperate with said cams, means acting to cause a constant engagement of said members and dogs, a lug forming a part of one of said elements, a latch engaging said lug, and means for throwing said latch whereby said lug may be moved and said closures may be opened.

28. A vending device including a casing formed with a series of compartments, pairs of contact members disposed one within each of said compartments, each of said compartments being adapted to receive an article, for causing the circuit between the contact members to be closed, a closure for each compartment, means for controlling opening of any of said closures including an armature, a

solenoid positioned adjacent said armature and connected with said contact members, said solenoid being adapted to also be connected with a source of electrical energy, and means for closing a circuit through said source of energy, solenoid and contact members, whereby to actuate said armature.

29. A book exchange apparatus adapted to contain a plurality of books including, in combination, means adapted to lock the apparatus against exchange of books and requiring cooperation of a token and a control book to unlock the apparatus for exchange of books, and means whereby deposit of a token and a control book unlocks the apparatus for exchange of either of the other books for the control book and compels retention of the control book in the apparatus for the exchanged book.

30. A book exchange apparatus adapted to contain a plurality of books including, in combination, means adapted to lock the apparatus against exchange of books and requiring cooperation of a token and a control book to unlock the apparatus for exchange of books, means whereby deposit of a token and a control book unlocks the apparatus for exchange of either of the other books for the control book and compels retention of the control book in the apparatus for the exchanged book, and means adapted to be so set that the presence of the token in the apparatus and the addition of the control book to the apparatus is adapted to unlock the apparatus for successive exchanges for said token.

31. A book exchange apparatus adapted to contain a predetermined plurality of books including, in combination, means adapted to lock the apparatus against exchange of books, and means for unlocking the apparatus for exchange of books including unlocking control devices dependent, for unlocking actuation to permit exchange, on the presence in said apparatus of said predetermined plurality of books.

32. A book exchange apparatus adapted to contain a predetermined plurality of books including, in combination, means adapted to lock the apparatus against exchange of books, and means for unlocking the apparatus for exchange of books including unlocking control devices dependent, for unlocking actuation to permit exchange, on the presence in said apparatus of said predetermined plurality of books, said control devices including a token controlled device.

33. An article exchange apparatus including, in combination, means for normally retaining each of a plurality of control carrying articles in the apparatus adapted to be actuated to permit the removal of one of said articles, a control carrying article adapted to be received in said apparatus, a token lock control device, and means adapted, on deposit of a control carrying article in said apparatus and a token in said token lock control device, to release said retaining means so as to permit removal of another of said articles from said apparatus.

34. An exchange device including a receptacle adapted to contain an article, and means adapted to control opening and closing of said receptacle including a device associated with the contained article to control opening of said receptacle.

35. A library for exchange of books including, in combination, a control key provided on each of a plurality of said books, and means requiring the presence of a plurality of said key-provided books in the library in order to exchange a key-provided book for another book.

36. A library for exchange of books including, in combination, book retainer means, a control key provided on each of a plurality of said books, and means requiring the presence of a plurality of said key-provided books in the library in order to permit operation of said retainer means to effect exchange of books.

37. A library for exchange of books including, in combination, book retainer means, a control key provided on each of a plurality of said books, means requiring the presence of a plurality of said key-provided books in the library in order to permit operation of said retainer means to effect exchange of books, and a retainer means control device, operable independently of said keys, adapted to cooperate with said keys in order that exchange operation may be effected.

38. A library for exchange of books including, in combination, a book retainer means, a control key provided on each of a plurality of said books, means requiring the presence of a plurality of said key-provided books in the library in order to permit operation of said retainer means to effect exchange of books a retainer means control device, operable independently of said keys, adapted to cooperate with said keys in order that exchange operation may be effected, and means for varying the control effect of said independently operable device.

39. A book exchange library of the character described and having electrical control means limiting exchange to book for book, each book carrying an exchange-controlling, electrical contact member.

In testimony whereof I affix my signature.

ARTHUR R. WOMRATH.