Jan. 24, 1967 H. BOLLIGER 3,300,015

VENDING MACHINE FOR THREAD SPOOLS AND OTHER SUBSTANTIALLY SPOOL-LIKE ARTICLES

Filed June 11, 1965 4 Sheets-Sheet 1

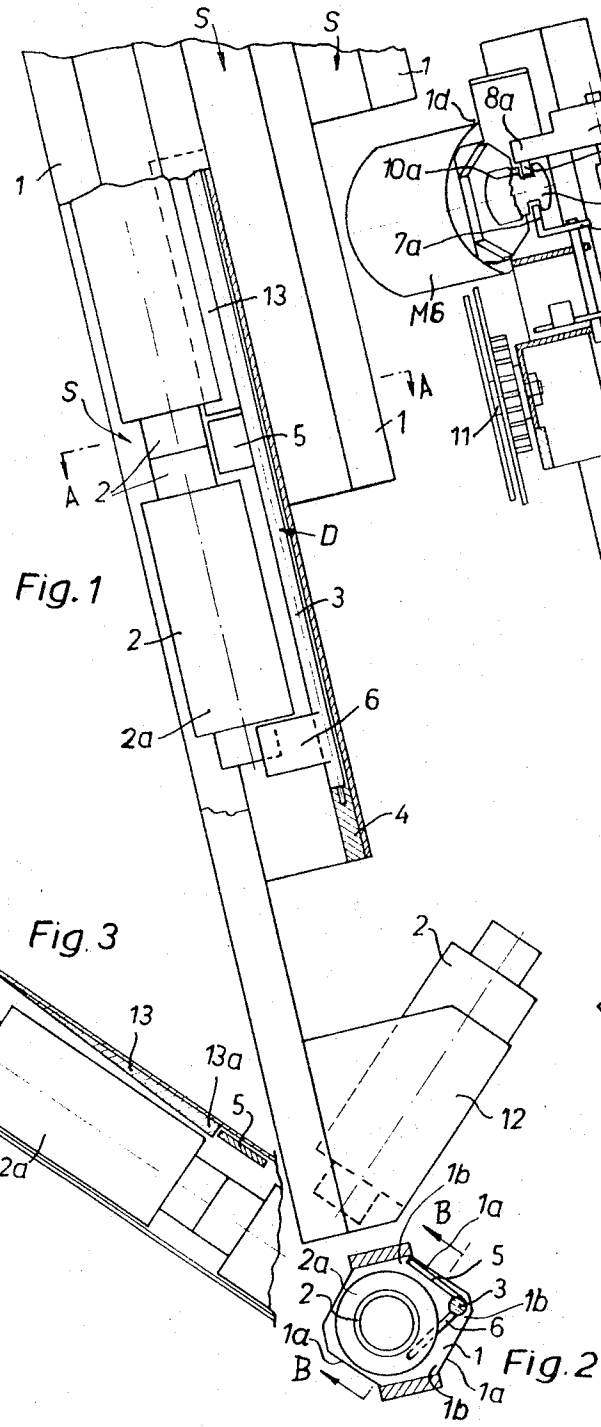

Fig. 1

Fig. 4

Fig. 3

Fig. 2

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Fig. 5

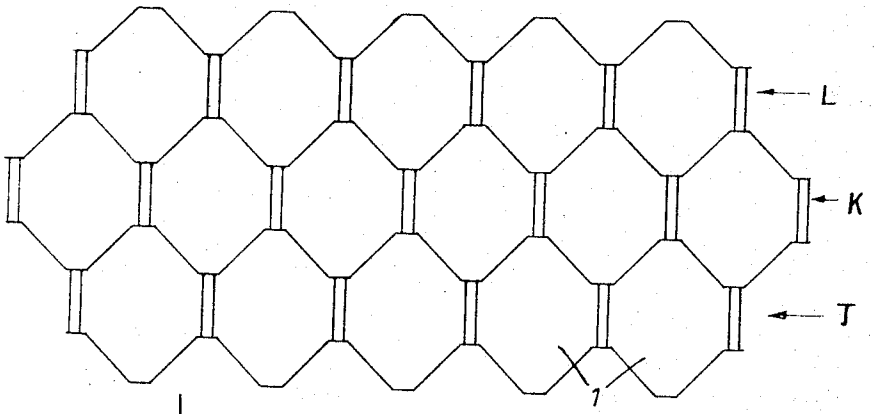
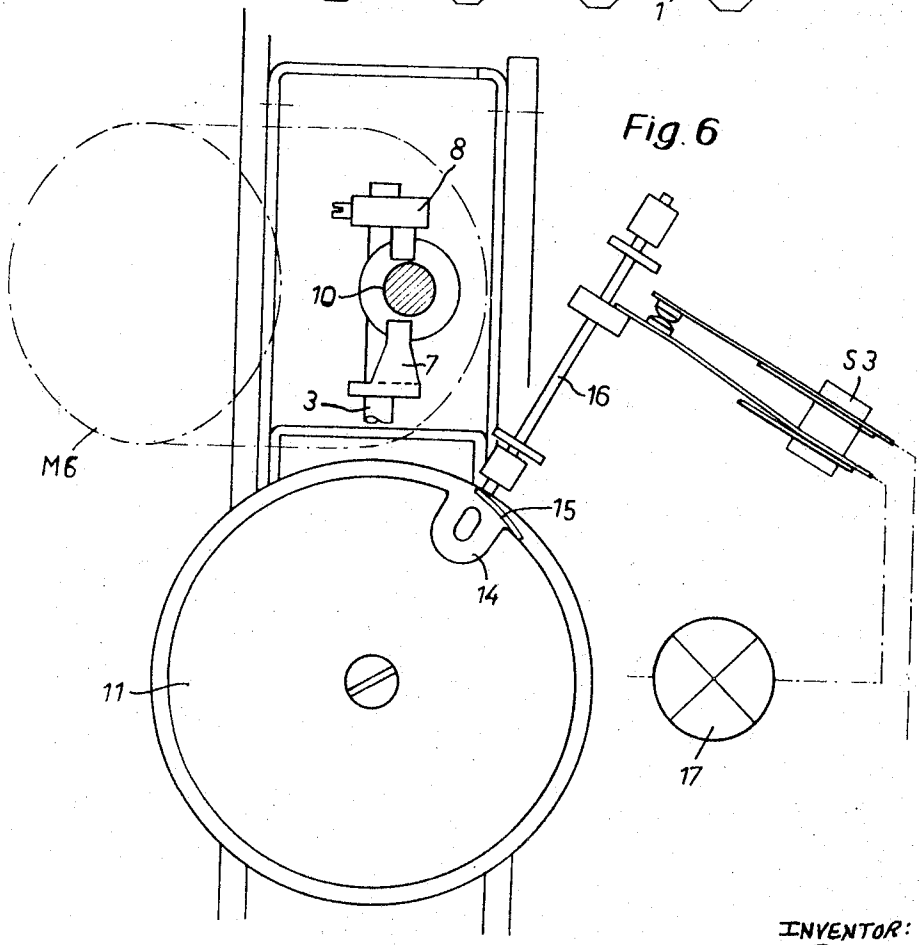


Fig. 6



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VENDING MACHINE FOR THREAD SPOOLS AND OTHER SUBSTANTIALLY SPOOL-LIKE ARTICLES

Filed June 11, 1965 4 Sheets-Sheet 3

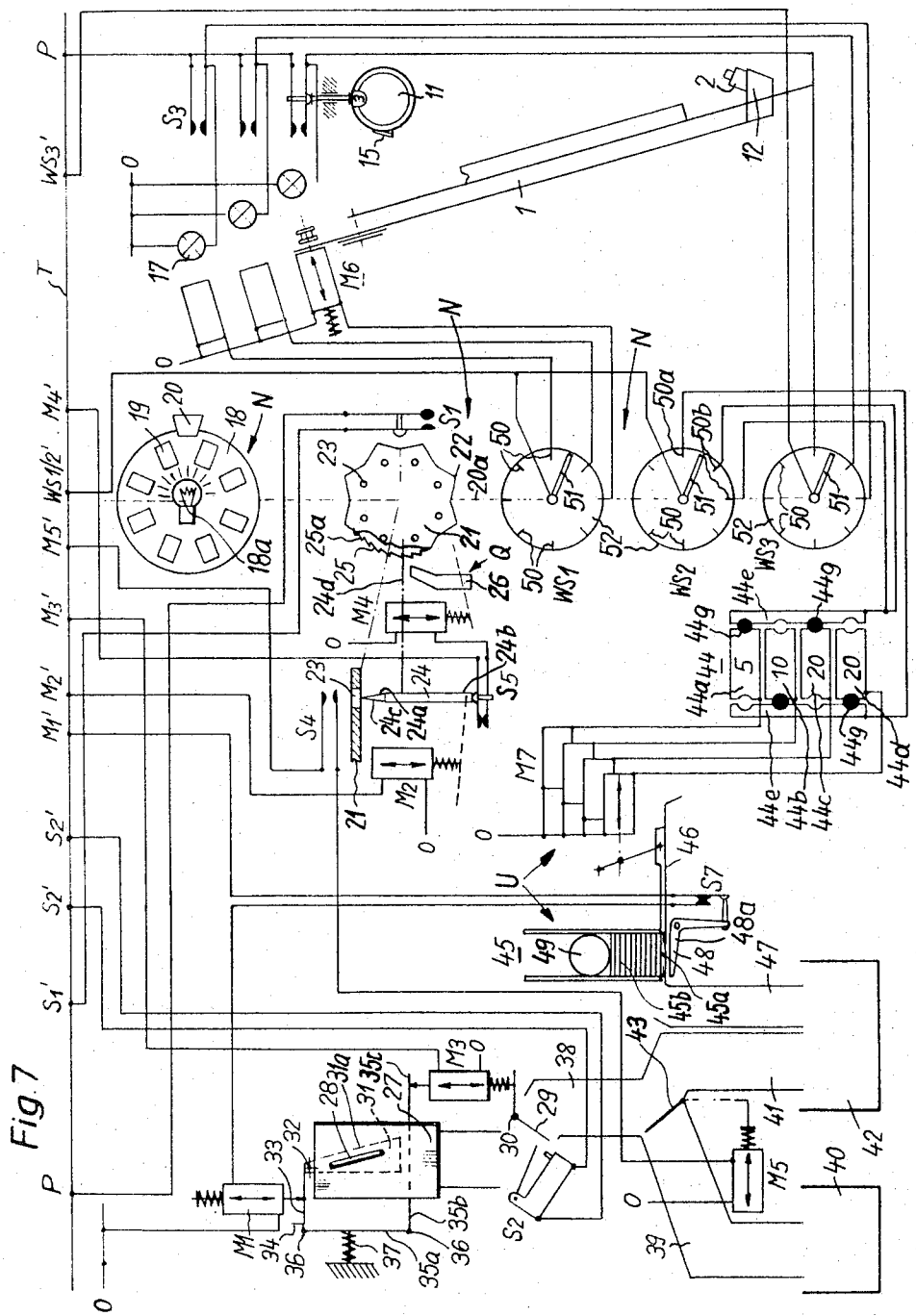

Fig. 7

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VENDING MACHINE FOR THREAD SPOOLS AND OTHER SUBSTANTIALLY SPOOL-LIKE ARTICLES

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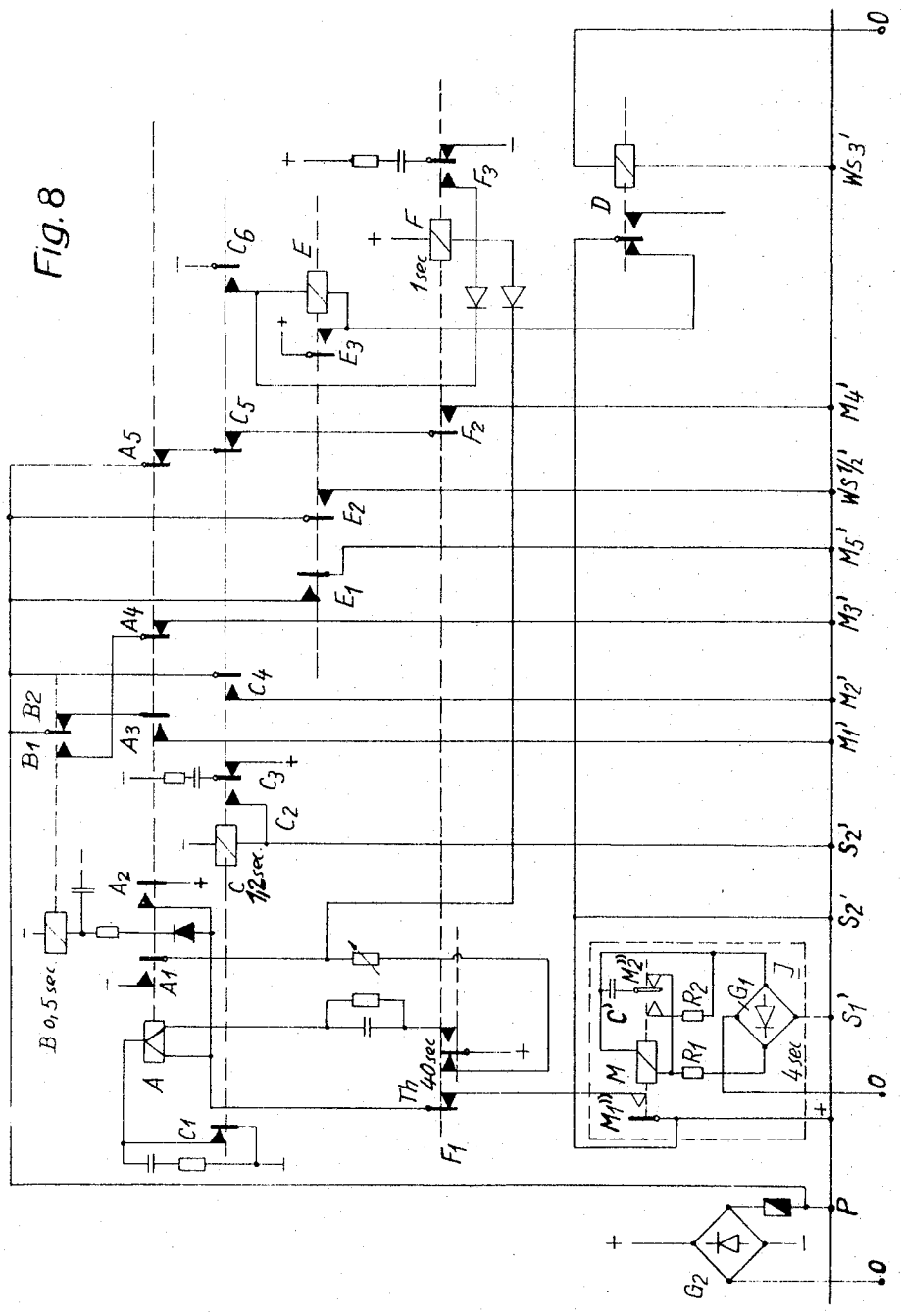
Fig. 8



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3,300,015

VENDING MACHINE FOR THREAD SPOOLS AND OTHER SUBSTANTIALLY SPOOL-LIKE ARTICLES

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Claims priority, application Austria, June 16, 1964, A 5,135/64
25 Claims. (Cl. 194—2)

The present invention relates to a new and improved vending device or machine for articles, specifically for the automatic dispensing or delivery of a selected spool from an assortment of stored thread spools differing in color and/or price after insertion of a coin or coins and incorporating mechanism for returning the correct change.

Due to the characteristics of the articles being sold and the selection process, special requirements are placed upon the construction and manner of operation of vending machines for thread spools which for conventional vending machines do not play any, or only a subordinate role.

Thus, above all, the color of the thread or yarn is decisive when purchasing a thread spool. It is not unusual to offer an assortment of one hundered and more color shades. Also the price difference for individual assortments or types is of importance. The usual packaging of the change-money with the article is not possible without additional expenditure, for example special packages, due to the smallness of the thread spools.

Completely new problems are brought about by the selection process itself. Typically, selection of a thread spool is undertaken by comparing a brought along sample with the color of the thread wound upon the spool. The multiplicity of color shades considerably complicates such comparison so it oftentimes happens that after having made a selection it is still necessary to undertake a correction. Practical vending machines for thread spools must be able to cope with this circumstance if they are to fulfil their purpose of providing quick customer service largely free of complaints.

In addition to these special factors there must, of course, not be forgotten those requirements which are generally placed upon vending machines. Applying such to thread spool vending machines this would mean that there must be provided an apparatus in which as large a number of different spool types can be accommodated in as small a space as possible, that each spool storage channel contains a sufficient number of spools, that the manner of stacking them must take place such that for trouble-free operation no spool can be introduced into the storage means in improper position, and that the supply of spools within each storage means at any given moment is visible. This is to mention only a few of the requirements. Apart from these, it must be possible for the sales personnel to simply and quickly service the vending machine and there must be as simple and trouble-free operation as possible for the customer, and so forth.

Accordingly, it is a primary object of the present invention to provide a new and improved vending machine which overcomes the mentioned disdvantages of prior art machines of this type as well as fulfilling the above explained desirable requirements.

A further important object is to provide an improved vending machine which enables the customer after having made a selection of the type of article to be purchased to change his or her mind and pick a different type of article.

Still another considerable object of the present invention concerns an improved vending machine which is relatively simple in construction, highly reliable in operation, prevents the use of incorrect or counterfeit coins for purchase of the articles, returns the proper change, is relatively easy to operate by the vendee, easy to service by the vendor, and generally provides for trouble-free and complaint-free operation.

Generally speaking, the inventive vending machine, according to one of its most important aspects, incorporates a locking element or slide which closes the coin deposit slot in the rest position of the vending machine and is controlled for movement into opening position by a spool selecting mechanism, which can be adjusted or set according to price and/or thread color, through the agency of a delay device which responds upon actuation of the selecting mechanism and such locking slide is controlled in the closing direction by dropping in the coin or by a time-control which responds to actuation of the selecting mechanism.

Consequently, there is forcefully provided a so-called "think-over" or "reconsideration time" for the customer between the time when he has made his selection and the placing into operation of the dispensing mechanism during which period the customer can correct his selection so that in spite of an original improper selection such customer will still be properly served by the vending machine. Thus, while the above constitutes one of the very important features of the present invention there are still many others which will be considered during the detailed description of the invention given hereinafter.

Hence, other features, objects and advantages of the invention will become apparent by reference to the following detailed description and drawings in which:

FIGURE 1 schematically illustrates in fragmentary, partially cross-sectional view the lower end of a storage device for thread spools with its dispensing mechanism and designed according to the invention;

FIGURE 2 is a cross-sectional view through a storage channel for thread spools shown in FIGURE 1, taken along the line A—A;

FIGURE 3 is a longitudinal cross-sectional view through a portion of a storage channel shown in FIGURE 1, substantially taken along the line B—B of FIGURE 2;

FIGURE 4 is a fragmentary view schematically illustrating the upper end of a storage device for thread spools, depicting details of the actuating mechanism for the dispensing device and counting device for the stacked spools;

FIGURE 5 schematically illustrates in cross-section a preferred arrangement of a multiplicity of storage devices for thread spools;

FIGURE 6 schematically illustrates details of a counter for indicating the spools which are missing in the associated storage channel and the control device for the signal lamp for indicating when such storage channel is empty;

FIGURE 7 schematically illustrates an exemplary circuit arrangement interconnecting all of the individual components of the inventive vending machine; and

FIGURE 8 illustrates a circuit diagram of an exemplary relay control for switching the individual components of vending machine depicted in FIGURE 7.

At this point it is mentioned that it is possible to use any desired type spool storage arrangement in the inventive vending machine for thread spools. However, certain particular advantages are obtained by using a spool storage incorporating certain important inventive features as will be described in the exemplary embodiment considered hereinafter. It is also pointed out that while the inventive vending machine will be illustratively described for the vending of thread spools it could also equally well be used for other type articles.

Considering now FIGURES 1 to 4 it will be observed that each of the inventive spool storage means S depicted comprises a vertical or somewhat inclined storage chan-

nel 1 into which the thread spools 2 are pushed in stacked fashion. These type storage channels 1 in addition to an easy and uncomplicated loading with thread spools, also ensure for minimum space requirements. This is of particular importance when considering the large number of thread types which have to be offered. By referring to FIGURE 2 it will be observed that each storage channel 1 is bounded by walls 1*a* arranged to advantageously possess a hexagonal cross-section, providing the advantage that the stacked thread spools 2 guided therein do not contact complete wall surface portions of the aforesaid channel 1, rather are only guided along contact lines with the walls 1*a* of the storage channel 1 so that friction is minimum and such spools freely slide. Moreover, the described configuration of spool channel 1 ensures that in the corners 1*b* of the profile of such channel sufficient space is available for housing the control elements of the dispensing mechanism, generally indicated by reference character D, without hindering sliding of the thread spools 2 by such elements. To prevent electrostatic charges which could have unfavorable effects due to the fibrous consistency of the stored threads, the storage channels 1 are preferably manufactured from sheet metal, aluminum sheet for instance.

With the just-considered storage channel 1 for the thread spools 2 the dispensing mechanism D for such spools is quite simple to construct. In the exemplary embodiment it comprises a rockable rod 3 which extends from a corner 1*b* of the aforesaid storage channel 1 throughout the entire length thereof. This rod 3 is rotatably mounted in bearings 4 at its upper and lower end. A pair of wings or vanes 5, 6 which are offset through a certain angle with respect to one another and spaced along the length of the rod 3 a distance substantially corresponding to the length of a thread package 2*a* wound on a given spool 2 are mounted to the lower end of rod 3. An inspection of FIGURES 1 and 2 will best reveal such arrangement. Each wing 5 and 6 is dimensioned such that it engages beneath the thread package 2*a* of the thread spool 2 which momentarily bears against the relevant wing 5 or 6 and thus supports the entire stack of thread spools 2.

In the rest position the stack of thread spools 1 bears against the lower wing 6 and the upper wing 5 lies adjacent to the neighboring wall 1*a* of the storage channel 1. Should the rod 3 be turned somewhat then the upper wing 5 pivots beneath the thread package 2*a* of the second spool 2 of the stack, at the same time the lower wing 6 releases the lowermost spool 2 and comes to lie adjacent to its neighboring wall of the storage channel 1. Thus, the lowermost spool 2 can slide out of the corresponding storage channel 1 and is caught in a thread receiving receptacle or container 12. Opposite movement of rod 3 rocks the lower wing 6 back again to its rest position whereas the upper wing 5 releases the stack of spools 2 which then slide down in the storage channel 1 until they bear against the lower wing 6. Rocking-in and rocking-out of the wings 5 and 6 requires a more or less exact guiding of the thread spools 2, at least in the neighborhood of the wings 5 and 6 so that jamming is prevented. To this end, FIGURE 3 illustrates a guide sheet or plate 13 secured to an inner wall 1*a* of the relevant storage channel 1 and which is shown to extend in the form of a flat wedge up to the wing 5. The wings 5 or 6 can then pivot beneath the blunt end 13*a* of the guide plate 13 so that it is completely screened by such guide plate 13 when the thread spools 2 slide down the storage channel 1.

Displacement of the rod 3 advantageously takes place by means of a lifting magnet or solenoid relay M6 which, as best shown in FIGURE 4, is connected to the upper end 1*d* of the storage channel 1. Coupling of lifting magnet M6 and rod 3 can be effected by means of a control lever 8 secured to the upper end of the aforesaid rod 3, the free end 8*a* of which engages by means of a pin 9 in the groove 10*a* of a grooved nut 10 secured to the lifting magnet M6. By means of the same lifting magnet M6 it is possible to simultaneously actuate, via an actuating rod 7 also engaging by its flexed end 7*a* in groove 10*a*, a mechanical counter 11 which, during each dispensing operation indexes through one unit, thus registers the number of thread spools 2 removed from the storage channel. Counter 11 will be considered in greater detail later. In order to insert the thread spools 2 into the corresponding storage channel 1, its rear wall 1*e* (FIGURE 4) is removed for a certain distance, so that somewhat beneath the upper end 11 of the storage channel 1 there is formed an opening 1*c*, through which the spools 2 can easily be manually inserted into such storage channel 1. It will be understood that each storage channel 1 contains its assortment or type of spool.

The inventive vending machine contemplates combining into a unit a multiplicity of the described spool storage means or channels 1. Arrangement of the individual storage channels 1 into an assembly preferably takes place, for instance, in the form of a honeycomb, as best shown in FIGURE 5. This arrangement provides advantages which are immediately apparent so that they need not be explained more fully. As shown, a number of rows J, K, L, etc. of storage channels 1 are arranged behind one another. Each row of storage channels or each storage channel per se can be provided with a receiving-container 12, in which case the rows of storage channels are offset in step-wise manner, as depicted in FIGURE 1, or an appropriately large receiving-container can be provided for all of these storage channels 1.

It will be recalled that each storage channel 1 supports at its upper end 1*d* a lifting magnet or solenoid relay M6 associated with a counter or counting device 11, beneath the latter there being located the inlet opening 1*c* for the thread spools 2. Thus, the individual rows of storage channels 1 must be offset at the top such that always the infeed openings 1*c* of one row of storage channels is above the lifting magnets of the row lying in front of it. In this manner, there is simultaneously obtained sufficient space for accommodating their control components. It appears unnecessary at this point to consider further details of the storage means S for the thread spools 2. What is important in the illustrative embodiment is that for dispensing one thread spool actuation of a single lifting magnet or solenoid relay is required and sufficient.

As already explained, the same lifting magnet or solenoid relay M6 operates the counter 11 for indicating supply or quantity. It will be understood that a commercially available disk-shaped counter can be used, the actuating rod 7 of which engages via pin 7*a* in groove 10*a* of the grooved nut 10 arranged at the lifting magnet M5. Such a counter 11 is associated with each storage channel 1 and has the function of indicating to the sales personnel the number of thread spools 2 with which the relevant storage channel can be filled, and further, to indicate when such storage channel is empty. Advantageously, a subtracting counter 11 is employed. Thus, when filling the storage channel 1 with thread spools 2 the instrument dial 14 of counter 11 (FIGURE 6) is turned or otherwise set to the number of spools filled into the corresponding storage channel 1. Whenever a thread spool 2 is dispensed the counter 11 trips down by one unit or step. When the supply of spools 2 is exhausted a suitable signal is advantageously delivered. To this end, a lug or flap 15 is secured to the indicator dial 14 for instance. The lug 16 revolves with the indicator dial 14 and in the zero position of the counter 11 depicted in FIGURE 6 it actuates a tripping lever 16 operably associated with a switch S3 whereby a signal current circuit is closed. The latter contains for instance as the indicator a signal lamp 17, although it would be possible to use an audible indicator, or otherwise.

The signal lamp 17 stays lit until such time as the corresponding storage channel 1 is again filled and the

indicator dial **14** properly positioned. In order to simplify the filling operation the cover plates of the counter **11** can be advantageously marked with the color of the thread type contained in the corresponding storage channel **1**. If periodic checking of the counters **11** indicates that from one or more of the storage channels **1** at least 10 thread spools have been sold then it is always possible to refill with a complete package. This also simplifies servicing of the vending machine. It will seldom happen that a storage channel **1** is emptied. In the event, however, that such does occur, an additional switching or control circuit or network is provided which controls the inserted coins such that they are led to a coin-return slot, as such will be more fully explained hereinafter. The use of an early warning signal which indicates that only for instance three spools are stored in a given storage channel is quite readily possible, but not recommendable since the vending machines, in most cases, can also be used by customers during the normal closing time of the store, so that this early warning signal in the most favorable situation would only have a limited importance.

Selector mechanism or means N is associated with the storage channels **1** to enable selection of a thread spool. A possible physical structure of selector means N is schematically depicted in the circuit diagram of FIGURE 7. Such selector means N operates as a multiple switch and essentially is composed of selector plate or disk **18** provided with thread color patterns or specimens **19** and the setting or adjustment mark **20**, a cam disk **21** and a series of selector switches WS1, WS2, WS3, all of which are commonly threaded upon a shaft which is schematically illustrated by the dotted line **20***a*.

With the shaft **20***a* of the selector means N vertical, fabric samples **19** in the form of small panels or plates corresponding to the type of thread contained in the storage channels **1** are applied to the upper surface of the selector disk **18**. At each of these fabric color samples or patterns **19** there is advantageously also indicated the thread number and the cost of the corresponding spool. In order to ensure for a relatively positive comparison the specimen or sample patterns **19** must advantageously possess a certain minimum size and are arranged with sufficient spacing from one another about the circumference of the selector disk **18**, the base color of which is preferably neutral. A photometric standard light e.g. daylight lamp, schematically indicated at **18***a*, associated with the selector disk **18** and which upon actuation of the latter is energized, considerably simplifies comparison between the brought along thread pattern and the pattern sample **19**, such lamp **18***a* again extinguishing by means of the time control responding to actuation of the selector means which will be considered shortly.

The cam disk or plate **21** is arranged beneath the selector disk **18** and rigidly connected for rotation with the latter. Each storage channel **1** of the spool storage means S corresponds to a cam surface or member **22** provided at the circumference of the cam disk **21**. The cam surfaces **22** serve to actuate a switch S1, the function of which will be more fully explained shortly. Additionally, radially inwards and behind each cam surface **22** the cam disk **21** is provided with a respective aperture or hole **23**, all of which are equidistantly spaced from the center of the cam disk **21**, in other words, lie on a circle. A blocking device in the form of a tripping or switching pin **24** actuated by an electromagnet M2 is vertically mounted in such a manner that during its axial displacement and with correct positioning of the cam disk **21**, i.e. when the selector disk **18** is adjusted or set to the selected color, it slides through the corresponding hole **23**. When this happens the upper end **24***a* of this tripping pin **24** closes a switch S4 arranged above the cam disk **21** and at the same time its lower end **24***b* opens a switch S5 located beneath this cam disk **21**.

Tripping pin **24** possesses a conically tapering tip **24***c* at its upper end **24***a* so that if the selector plate **18** is not exactly positioned its position can be corrected through pushing the tripping pin **24** into the associated hole **23**. It will be understood that in order to facilitate illustration, the tripping pin **24** is depicted laterally adjacent the cam disk **21**, whereby however, a reference or direction line **24***d* tends to indicate where it is actually spatially positioned. Moreover, the cam disk **21** is rigidly connected for rotation with a ratchet disk **25** arranged beneath it. In FIGURE 7 the cam disk **21** has a portion broken away so that a part of the mentioned ratchet disk **25** is visible. An adjusting or setting mechanism Q engages with the locking teeth **25***a* of the ratchet disk **25**, having the function of bringing back into the starting or rest position the cam disk **21** and with it the entire selecting means N after the delivery or dispensing operation is completed. The adjusting or setting mechanism Q is controlled by a magnet M4 and is of known construction so that it does not have to be considered in any greater detail. This adjusting mechanism Q is only shown symbolically in FIGURE 7 by its pawl **26**.

The selector switches WS1, WS2, and WS3 consist of insulated disks **52** with contacts **50** fixedly applied to their circumference and corresponding in number to the number of available storage channels **1**. Each disk **52** has a center tap **51** which is rigidly connected for rotation with the shaft **20***a* of the selector mechanism N. During rotation of the selector disk **18** the center taps **51** slide over the contacts **50** of the corresponding selector switch WS1, WS2, and WS3. It will be understood that the selector switch WS1 cooperates with the lifting magnets or solenoid relays M6, the selector switch WS2 with the coin-change mechanism U and the selector switch WS3 with the counter-mechanisms **11**. By means of these selector switches WS1, WS2 and WS3 the following functions are controlled, to wit: selector switch WS1 controls the dispensing of the goods, selector switch WS2 the money-change return, and selector switch WS3 the coin-return when the selected storage channel **1** is empty.

The foregoing explanation has thus generally outlined the most important components of the inventive vending machine. The construction of the other components, such as coin tester or checker, coin-return mechanism and so forth, will be described to the extent sufficient to enable those skilled in the art to understand the inventive concepts during the subsequent detailed description of the circuit arrangement of FIGURE 7 as well as its mode of operation.

Turning attention now to FIGURE 7 it will be appreciated that such depicts an exemplary embodiment of inventive vending machine for thread spools **2**. According to the invention the coin insert slot **28** in the rest condition of the vending machine is closed by a locking slide or cover plate **31**, or equivalent structure, shortly to be described. The coin tester or checker **27** exhibiting the coin insert slot **28** and provided with a switch S2 and flap member **29** is only schematically depicted in the drawings since it is of conventional construction and known to the art. The locking element or slide **31** for the coin insert slot **28** can, for instance, incorporate a closure flap **31***a* pivotable about an axis of rotation provided by pivot shaft **32**. Closure flap **31***a* is actuated by an arm **33** hingedly connected therewith. Actuation takes place via a lifting magnet or solenoid relay M1 which when energized presses the arm **33** downwardly so that the coin insert slot **28** is open. In order to fix the open position of the coin insert slot **28** there is provided an angle lever **35***a*, **35***b* pivotable about the point of rotation **36**, one arm **35***a* of which is provided at its end with a nose **36** which engages under the action of a spring **37** above the flexed end **34** of the arm **33** when the latter is pressed down. The free end **35***c* of the other lever arm **35***b* is in operable cooperation with a further lifting magnet or solenoid relay M3 by means of which the angle lever **35***a*, **35***b* is rocked against the action of

spring 37, so that the blocking action of the arm 33 effected by the nose 36 is again released and thus the coin insert slot 28 is closed. Accordingly, alternative switching of the lifting magnets M1 and M3 brings about alternate opening and closing of the coin insert slot 28.

A chute or shaft 38 is operably associated with the coin checking device 27 by means of which the checked coins either fall via a branch channel 39 into the cash box or compartment 40 or via the other branch channel 41 into the coin return box 42. Chute 38 is closed by a flap member 29 pivotable about a shaft or pin 30. Flap member 29 can likewise be opened by means of the lifting magnet M3. A flap 42 pivotably mounted in the branch-off or bifurcated section of both coin guide channels 39 and 41 serves as separator or divider means and is actuated by a magnet M5.

Normally, the coin checker device 27 contains a throughpassage for coins which can be flipped open when the inserted coins are smaller than the coin or coins intended for actuation. These smaller coins are directly conducted into the coin return box or container 42 without passing the coin chute 38. However, it can also happen that smaller coins jam in the coin checker 27. In order to remedy this the throughpassage capable of being flipped open is coupled with the lifting magnet M3 so that when the same is actuated the coin throughpassage is flipped open and coins jammed therein fall into the coin return container 42.

Since delivery devices for change money have been known for quite some time, such has only been schematically depicted in FIGURE 7. As known, such coin-change mechanism U embodies a plurality of chutes or tubes 45 each of which contains one denomination of small change, for instance a shaft with five unit denomination, one with ten and two with twenty, so that a sufficient number of combinations are possible for giving change. By means of an electromagnetically actuatable slider 46 actuated for instance by a magnet M7 the lowermost coin of a given tube 45 is pushed into a shaft or chute 47 which conducts it to the coin-return box or container 42. Once again, it is important that the vending machine according to the invention is blocked when the coin-change mechanism U is empty. This can be achieved, by way of example, that in the current supply circuit for the magnet M1 which frees the coin insert slot 28 there is electrically coupled an interruptor switch S7 which interrupts the supply of current when a coin-change tube or shaft 45 is empty. Opening of the switch S7 takes place for instance via an angle lever 48, one leg 48*a* of which covers a small opening 45*a* at the floor of the relevant coin tube or chute 45. A sphere or ball 49 is placed upon the stack of coins 45*b* which actuates the angle lever 48 via the opening 45*b* when no coin is located in the corresponding chute 45 and thus opens the current circuit. All of the coin change tubes or chutes 45, only one of which is shown, are combined into an assembly and each is advantageously pivotably mounted so that not only the ball 49 but also any foreign objects which possible have fallen into the relevant chute 45 can easily be removed.

The individual switching elements are electrically connected to a terminal or conductor strip T in the following manner:

The switch S1 actuated by the cam disk 21 is in rest position. Switch S1 couples the terminal designated S1′ of the terminal strip T to phase of the alternating-current network connected to terminal P of such terminal or conductor strip T. The center taps 51 of both selector switches WS1 and WS2 are coupled to the terminal WS1/2′. Each contact 50 of the selector switch WS1 leads to a lifting magnet or solenoid relay M6 for dispensing of the goods which, in turn, is coupled with the neutral wire or conductor O of the network. The contacts 50 of the selector switch WS2 lead, via a coordination mechanism 44 for coordinating the proper amount of change, to the magnets M7 actuating the coin-change mechanism U, magnets M7 in turn being coupled with the neutral conductor O.

The change-coordination mechanism 44 for coordinating the correct change, according to the invention comprises, for instance, four conductor blocks 44*a*, 44*b*, 44*c*, 44*d* arranged between two conductor strips 44*e* and 44*f*. The conductor blocks 44*a* to 44*d* can be selectively coupled with the conductor strips 44*e*, 44*f* by means of conducting pegs or plug 44*g*. Each conductor block 44*a* to 44*d* is electrically coupled with one of the magnets M7, and the contacts 50 of the selector switch WS2 are connected to both conductor strips 44*e*, 44*f*, for instance, as shown, the one contact 50*a* at the one conductor strip 44*e* and both subsequent contacts 50*b* at the other conductor strip 44*f*. In this manner, the conductor blocks 44*a* to 44*d* are associated via the magnets M7 with the individual coin tubes 45 and correspond to such designated for instance, by five-units, ten-units, and two twenty-units. Selective insertion of the conducting plugs 44*g* permits quick adjustment of the difference between the coin inserted and the price of the article and, thus, the change-money. If, as illustrated, the conductor block 44*a* for five-unit coins and the one conductor block 44*c* for twenty-unit coins are connected with the second and third contacts 50*b* of selector switch WS2 coupled with the strip 44*f*, and the conductor block 44*b* for ten-unit coins and the other conductor block 44*d* for twenty-unit coins are coupled with the conductor strip 44*e* connected with the first contact 50*a* of the selector switch WS2 then the following results: If the center tap 51 of the switch WS2 is situated at the first contact 50*a* then both of the magnets M7 for the ten and twenty-unit coins are energized and, therefore, thirty units change is returned. If such center tap 51 is placed at the second or third contacts 50*b* of the selector switch WS2 then the magnets M7 for the five-unit and other twenty-unit coin denominations are energized and the change amounts to twenty-five units. The setting for the correct change is quite simple, whenever there is a change in price such is undertaken by the maintenance personnel through proper positioning of the conductive plugs 44*g*.

The center tap 51 of the selector switch WS3 is coupled with the terminal WS3′ and each of its contacts 50 are connected to one pole of a respective switch S3 as well as to the neutral line O of the network via an associated signal lamp 17. The other poles of the switches S3 are connected with phase P of the network. The terminal WS3′ thus is coupled with O when the switch S3 is open and is coupled to phase P when such switch is closed, the associated signal lamp 17 simultaneously illuminating. It will be recalled switch S3 is actuated by the associated lug or flap 15 of its counter 11.

The magnet M1 actuating the locking element or slide 31 for the coin insert slot 28 is directly coupled, on the one hand, to the neutral conductor O and, on the other hand, via the switch S7 is coupled with the terminal M1′. The magnet M3 controlling closing of the coin insert slot 28 and at the same time opening of the coin chute 38 is coupled between terminal M3′ and neutral conductor O. The magnet M2 for actuating the aforedescribed blocking and the switch S5 is coupled between terminal M2′ and neutral conductor O, and the magnet M4 for return positioning of the selector disk 18 is, on the one hand, coupled to the neutral conductor O, and on the other hand, via the switch S5 is coupled with the terminal M4′. Both of the poles of the switch S2 at the coin tester or checker 27 are connected with both terminals S2′, and the magnet M5 operating the divider or separator flap 43 is connected to the neutral conductor O and via the switch S4 and the terminal M5′ with the terminal strip T.

The described individual elements are controlled by means of an electric control or switching circuit via the considered terminals of the terminal strip T.

Now, a practical relay control for controlling the switch elements is depicted schematically as an exemplary embodiment in FIGURE 8. By referring to such figure it will be understood that relay A serves the pairs of contacts or switches designated A1 to A5, and actuates the opening magnet M1 for the insertion of the money via contact pair or switch A3 and terminal M1'. This relay A also operates the closing magnet M3 via the contact pair or switch A4 and terminal M3', whereby both of the aforesaid magnets M1 and M3 are controlled via the contacts B1 and B2 of a control relay B which responds with a certain time-delay, assumed to be 0.5 second for instance. The control relay B in turn receives its switch command from switch or contact pair A2 simultaneously serving as the holding contact for the relay A. The switch A1 energizes a thermal-lag switch *Th* of standard construction and at the same time a relay F. The switching time of the thermal-lag switch *Th* is assumed to amount to 40 seconds for instance. Relay F operates the pairs of contacts or switches F1, F2 and F3, the switch F3 providing a holding contact for the relay F, so that after switching-off such only later releases after a predetermined time, assumed to be one second. Relay C is actuated via the terminals S2' by means of the switch S2 of the coin tester 27 and is similar to relay F, however, has a somewhat larger release time, for instance 1.2 seconds. Relay C operates the contact pairs or switches C1 to C6, switch C1 being coupled with the current supply conductor for the relay A. Switch C4 actuates the magnet M2 via the terminal M2' for the blocking mechanism 24 of the cam disk 21 and switch C6 energizes the relay E via the contacts of the relay D. By means of the contact C6 the relay F is also simultaneously switched-in, so that such accordingly has two switching circuits, one via the contact A1 and the other via contact C6. However, in so doing, care is taken that the holding contact F3 only has an effect upon the relay F by coupling-in diodes. Relay E has three contact pairs or switches E1 to E3 wherein switch E3 again provides a holding contact for the relay itself. The magnet M5 actuating the flap member 43 serving as separator for the chutes 39 and 41 leading to the cash container 40 and the return container 42 respectively, is connected to phase P via the terminal M5' and the pair of contacts or switch E1.

By means of the contact E2 the terminal WS1/2' is applied to phase and, thus, via the selector switches WS1 and WS2 the lifting magnets M6 for the delivery of the goods and the magnets M7 for delivering the proper change are also applied to phase. The relay D is coupled, on the one hand, via the terminal WS3' to the selector switch WS3 and, on the other hand, to the neutral conductor O of the power network. Relay D couples by its contact the relay E to the plus pole of a direct-current circuit which is furnished with current, for instance, by the rectifier arrangement G2. The magnet M4 for actuating the adjusting or setting mechanism Q is connected to phase by contacts A5, C5 and F2 via the terminal M4'.

An impulse generator J is connected to the terminal S1' and thus with the switch S1 connected thereto. Impulse generator J has the function of delivering an opening impulse to the relay A upon closing of the switch S1. As illustrated, impulse generator J, for instance, can be composed of a rectifier arrangement G1, the alternating-current branch of which is connected via the switch S1 to the power network and its direct-current branch contains a resistor R1 and a relay M. The charging and discharging via a resistor R2 of a capacitor C' in parallel with the relay M is controlled by the contacts M2'' of this relay. The stationary contact of a second switch or contact pair M1'' is connected with the switch F1 and the movable contact with the plus (+) pole of the direct-current circuit generated by the rectifier arrangement G2.

Further details of the control apparatus can be gathered by reviewing FIGURE 8 and will become more fully apparent from the hereinafter described manner of operation of the inventive vending machine.

It should initially be assumed that the setting of the vending machine has been properly performed, in other words that the desired color pattern 19 is approximately aligned with the mark 20 of the selector disk 18 and remains in this position and, further, the storage channels 1 are filled with thread spools 2 and there is available a sufficient amount of return change-coins.

(a) *Switching-in and placing of the inventive vending machine in preparatory position*

Turning of the selector disk 18 closes the switch S1. By means of the impulse generator J and via the closed switches or contacts M1'' and F1 an opening impulse delayed for about four seconds, for instance, arrives at the relay A which then responds.

For the sake of simplicity in the following description a completed switching operation by a pair of contacts or switch of a relay will conveniently be designed by application of a plus (+) marking to the relevant closed contacts, and a minus (—) marking for the relevant open contacts when no switching operation occurs. For instance, the abbreviated designation "rest position S1—, M1''—, F1+" signifies that in the rest position the switch S1 is open, the pair of contacts M1'' are open and the pair of contacts F1 are closed. The designation "switch S1+ causes M1''+ and thus brings about response of relay A" signifies that by closing the switch S1, the pair of contacts M1'' are closed and via the closed pair of contacts F1 an opening impulse arrives at the relay A which responds.

Response or energization of relay A, as explained above, causes the following:

A1+ and thus switching-in of the thermal-lag switch *Th* with a holding time of 40 seconds for instance. At the same time relay F responds so that F1—, that is relay A is not coupled to the impulse generator J and F2+.

As already mentioned, the relay F has via the contact F3 an effective holding time of 1 second for instance, after switching-off the relay. A2+ is the holding contact for relay A so that such remains energized. The relay B responds with a delay of 0.5 second together with closing of switch A2.

A3+ actuates via the still closed contact B2 the opening magnet M1 so that coin insert slot 28 for the insertion of the coin is opened. Due to blocking or locking arrangement 34, 36 (FIGURE 7) the coin insert slot 28 remains open for such length of time until the closing magnet M3 is energized or switched-in.

A4— interrupts supply conductor for the closing magnet M3.

A5— interrupts current feed for the return magnet M4 which would be closed because of C5+ in the rest position of relay C and F2+ due to the now energized relay F.

As stated, after 0.5 second relay B is energized.

B1+ remains ineffective since A4— so that the closing magnet M3 remains switched-out.

B2— causes interruption of the current supply for the opening magnet M1, the coin insert slot 28 however, remains open due to the locking arrangement 34, 36.

The closure 31 is only prepared for the closing operation.

Accordingly, due to actuation of the selector disk 18 the following condition has been reached: the coin insert slot 28 which has been open with about a four seconds delay for instance, after rotating a color pattern 19 past the adjustment mark 20 is open, the coin chute 38 is closed by the flap 29 and the separator flap 43 is positioned such that the coin return container 42 is free.

(b) *No insertion of money or incorrect money is inserted*

If smaller coins are inserted then such coins do not reach the flap 29 rather, as already indicated, fall directly into the return slot or possibly remain caught in the coin tester 27 so that the switch S2 is not actuated.

Coins which are the right size, yet for instance, lighter, or metal disks, remain caught in front of the drop chute **38** because of the closed flap **29** without actuating the switch S2.

The given setting is thus not changed.

After for instance, 40 seconds, the thermal-lag switch T*h* switches-in and brings about via an impulse de-energization or falling-off of relay A;

A1— switches-out thermal-lag switch T*h* and relay F which first falls-off one second later due to the holding contact F3, so that there still remains F1— and F2+.

A2— interrupts the holding contact for relay A and de-energizes relay B which after a time-delay of 0.5 second falls-off.

A3— means that opening magnet M1 remains without current.

A4+ and due to the still closed contact B1 switches closing magnet M3. Coin insert slot **28** is closed and the coin chute **38** opened and at the same time the coin throughpassage flipped open so that any smaller coins possibly jammed in the coin throughpassage fall directly into the coin return container **42** since at the same time the separator-flap positioning magnet M5 is switched-out and thereby the coin box **40** closed off by the flap **43** and the coin return container **42** opened.

A5+ causes switching-in of the return magnet M4 since C5+ and F2+.

The selector disk **18** is brought into rest position. After 0.5 second the relay B switches-off.

B1—, closing magnet M3 is switched-off and closes coin chute **38**.

B2+ remains without effect since in the meantime there is reached the condition A3—. After 1 second relay F also falls-off and there exists F1+ and F2—, whereby the starting position i.e. the rest condition of the vending apparatus is again attained.

After non-used placing into operation the vending machine automatically switches to the starting or rest position, any caught smaller or counterfeit coins falling into the coin return container **42**, as explained above.

(c) *Normal delivery of goods*

As starting condition the situation mentioned previously under item (a) appears, in other words, desired color pattern **19** is aligned with adjustment or setting marker **20**, the coin insert slot **28** is opened, the coin chute **38** is closed and the separator flap **43** is positioned "coin-return free."

Furthermore, the relays A, B and F respond, i.e., A1+, A2+, A3+, A4—, A5—, B1+, B2—, F1— and F2+. From the rest position of the other relays there results as starting condition C1+, C4—, C5+, C6— and E1—, E2—, E3—. The thermal-lag switch T*h* is switched-in, the contacts of the relay D closed, the switch S1 is closed, the switch S7 of the return change mechanism is closed, the switches S3 are all open since, as assumed, all of the storage channels **1** contain thread spools **2**. Furthermore the selector switches WS1, WS2, WS3 are assumed to be located at their first contact for instance.

With insertion of a coin, for instance of a hundred units denomination, the switch S2 is closed and, thus, the relay C is energized via the direct-current circuit and has a holding time of 1.2 seconds, for instance.

C1— causes relay A to fall-off.

C4+ actuates the blocking magnet M2 so that the tripping pin **24** slides through the hole **23** of the cam disk **21** and such corrects a possible non-exact setting of the select or device N and blocks such against any further rotation. At the same time the switch S5 is opened and the switch S4 closed by means of this tripping pin **24**.

C6+ connects relay E via the contact of the relay D with the direct-current circuit so that E1 and E2 become positive.

E2+ connects the terminal WS1/2' with phase P. This results in actuation of the lifting magnet M6 via the selector switch WS1 and the selected thread spool **2** is released which then falls into the container or receptacle **12**, and, further, that via the first contact **50***a* of the selector switch WS2 which was assumed to be switched-in and the coin coordination mechanism **44**, the magnets M7 associated with the 10 and 20 unit coin denomination storage chutes **45** are energized, whereby 30 units of change are returned via the chute **47** into the return contain **42** for coins.

At the same time as the coin is inserted the relay A is caused to fall-off or de-energize via C1—, i.e., A1— switches-off thermal-lag switch T*h* and at the same time the relay F which, however, remains responsive because C6 is positive.

A2— causes, as already mentioned, switching-off of the relay B and interruption of the holding contact for relay A. A3— and B2— the opening magnet M1 remains without current.

A4+ delivers a supply of current to the closing magnet M3, so that the coin insert slot **28** is closed and the coin chute **38** is freed, so that coins therein are guided and arrive at the separator flap **43**. However, with S4+ and E1+ the magnet M5 is also actuated so that with the simultaneously opened throughpassage channel in the coin tester **27** the cash container **40** is opened and the coin falls into such.

A5+ prepares the actuation of the return magnet M4 since C5 is still open.

Upon release of the switch S2 the relay C is switched-off which, however, since C2+ still remains energized for 1.2 seconds, so that sufficient time is available for expiration of the switching operation.

After 0.5 second relay B drops-off which, as described under the sub-title (b), results in the coin chute **38** again being closed by switching-out the magnet M3.

Dropping off or de-energization of the relay C causes C4— and thus release of the blocking action brought about by the tripping pin **24**, switch S4 being opened and switch S5 simultaneously closed.

C5+ causes actuation of the return magnet M4 since F2+ and S5+ so that the selector device N is brought into its starting position and thereby the switches S1, WS1, WS2 and WS3 are opened.

C6— switches-off relay E so that E1 and E2 become negative.

S4— brings the separator flap **43** into its starting or rest position "coin return free" and a second later the relay F likewise switches-off, so that the starting condition is again completely present.

(d) *Coin insertion with empty storage channel*

If the selected storage channel **1** does not contain any thread spools **2** then by means of its counter **11** its associated switch S3 is closed and the corresponding signal lamp **17** illuminates. It is advantageous to place the signal lamp **17** in a position such that they are only visible by the service personnel since observation of a large number of signals lamps will only disturb the customers. It is also advantageous to construct the vending machine such that with an empty storage channel **1** the inserted coin again arrives in the coin return container **42** without further operation being triggered.

With the adjustment or setting of the selector disk **18** the selector switch WS3 is also closed. With empty storage channel the relay D responds and opens its contact, so that through closing the contact pair or switch C6 by means of the inserted coin via the switch S2 the relay E remains switched-out. E2 remains open and thus the magnets M6 and M7 which actuate the spool delivery and coin-change mechanism are without current, i.e. neither a spool nor change is given. Since also E1 remains open, the current circuit supplying the magnet M5 also is interrupted so that the separator flap **43** remains in its starting position for "coin return-container free" and the inserted coin arrives at the return-container **42**. The remaining operations are the same as already described above under sub-title or item (c).

(e) *Selector disk remains in intermediate position with open coin insert slot*

By turning the selector disk **18** the relay A is caused to respond due to a cam surface **22** going past the switch **S1**. If the selector disk **18** then remains in an intermediate position then the switches **S1**, **WS1**, **WS2** and **WS3** are switched out, however, the coin insert slot **28** is open since relay A has responded and will remain open for approximately 40 seconds. Now, if money is inserted then switch S2 is also closed and the relay C is caused to respond.

C4+ indeed brings about switching-in of the magnet M2 but nothing happens because due to the false positioning of the cam disk **21** no hole **23** is located above the tripping pin **24**, so that such cannot be moved. Consequently, switch **S5** remains closed and switch **S4** open.

The open switches **WS1**, **WS2**, **WS3** and **S4** prevent that with the occurring further switching operations neither a spool nor change-money is delivered and the inserted coin falls into the coin return container **42**.

As should be apparent from the foregoing description of exemplary embodiment of inventive vending machine for thread spools, the only manipulation necessary by the customer for actuating the machine is the setting of the desired color and naturally, insertion of the coin when the coin insert slot **28** is open. As fully explained, this coin insert slot **28** only opens after the passing of a certain period of time so that the customer can still undertake a corrective setting or adjustment. These manipulations can be so clearly and understandably clarified by configuration and constructilon of the apparatus that no written instructions are necessary. It is impossible to carry out cheating at the vending machine and with erroneous setting the vending machine responds such that the inserted coin or coins, without delivery of goods and change-money, fall into the coin return container, so that it is practically impossible for customer complaints to appear. The maintenance on the part of the sales personnel is so simple that also no faults are to be anticipated and, thus, the vending machine can always be maintained in an operating condition.

Quite obviously, the inventive machine, particularly the storage and delivery mechanism can be used, apart from thread spools, also for other articles, particularly other spool-shaped small articles, for instance electric fuses, tubular lamps and the like. Naturally, instead of only a single coin having to be inserted in the coin insert slot it would also be possible to require more than one coin for triggering the vending machine.

While there is shown and described present preferred embodiment of the invention it is to be distinctly understood that the invention is not limited thereto but may be otherwise variously embodied and practiced within the scope of the following claims.

What is claimed is:

1. In a vending machine for automatic dispensing of a selected article from an assortment of stored articles after insertion of the proper coin amount, the improvement comprising a coin insert slot, a displaceable closure member normally closing said coin insert slot, adjustable selector mechanism for enabling selection of a desired article from the assortment of stored articles, an electric circuit for controlling operation of the vending machine operably coupling said adjustable selector mechanism with said closure member, said electric circuit including time-delay means responsive to actuation of said adjustable selector mechanism for displacing said closure member with a certain time-delay from its position normally closing said coin insert slot into an ineffectual position where said coin insert slot is open, and time-control means for displacing said closure member to obturate said coin insert slot.

2. In a vending machine or automatic dispensing of a selected article from an assortment of stored articles, particularly for dispensing a selected thread spool from an assortment of stored thread spools, after insertion of the proper coin amount and for returning the correct change, the improvement comprising a coin insert slot, a displaceable closure member normally closing said coin insert slot and movable into an ineffectual position where said coin insert slot is open, adjustable selector mechanism for enabling selection of a desired article from the assortment of stored articles, an electric circuit for controlling operation of the vending machine operably coupling said adjustable selector mechanism with said closure member, said electric circuit including time-delay means responsive to actuation of said adjustable selector mechanism for displacing said closure member with a certain time-delay from its position normally closing said coin insert slot into said ineffectual position, and time-control means for displacing said closure member to obturate said coin insert slot.

3. In a vending machine for automatic dispensing of a selected article from an assortment of stored articles as defined in claim **2**, wherein said time-control means incorporates mechanism for displacing said closure member into its normal closing position in response to insertion of the proper coin amount in said coin insert slot.

4. In a vending machine for automatic dispensing of a selected article from an assortment of stored articles as defined in claim **2** wherein said time-control means incorporates mechanism for closing said closure member in response to actuation of said adjustable selector mechanism.

5. In a vending machine for automatic dispensing of a selected article from an assortment of stored articles as defined in claim **2**, further including article storage means, dispensing means for dispensing a selected article from said article storage means upon insertion of the proper coin amount, coin tester means for checking the coins inserted through said coin insert slot, a coin receiving container and a coin return container cooperating with said coin tester means, closure means for selectively blocking said coin receiving container and coin return container, said coin tester means including mechanism for controlling said electric circuit to displace siad closure member into its ineffectual position only when said selector mechanism is properly adjusted and the proper coin amount is inserted, and simultaneously to dispense the selected article via said dispensing means and for actuating said closure means for freeing said coin receiving container for the receipt of the inserted proper coin amount.

6. In a vending machine for automatic dispensing of a selected article from an assortment of stored articles as defined in claim **5** wherein said adjustable selector mechanism incorporates blocking means controllable by said coin tester means for arresting said selector mechanism in its adjusted position after coin insertion through said coin insert slot.

7. In a vending machine for automatic dispensing of a selected article from an assortment of stored articles as defined in claim **6** wherein said adjustable selector mechanism includes a plate member provided with a plurality of spaced holes, said blocking means including a tripping pin actuatable via said coin tester means for engaging in a given hole of said plate member for arresting the temporary correct selected position to which said adjustable selector mechanism has been adjusted.

8. In a vending machine for automatic dispensing of a selected article from an assortment of stored articles as defined in claim **7** wherein said tripping pin is provided at one end with a substantially conically tapering tip, each of said holes of said plate member possessing a diameter of sufficient size so that when said tripping pin is actuated said conically tapering tip can enter a hole of said plate member to thus correct for inexact adjustment of said adjustable selector mechanism.

9. In a vending machine for automatic dispensing of a selected article from an assortment of stored articles as defined in claim 6 further including return-setting mechanism operably associated with said adjustable selector mechanism for returning the latter into its starting position, said coin tester means, said blocking means and said time-control means being operably coupled with said return-setting mechanism for controlling the latter.

10. In a vending machine for automatic dispensing of a selected article from an assortment of stored articles as defined in claim 1 further including article storage means for storing an assortment of articles which are to be dispensed, said article storage means comprising a plurality of storage channels each of which contains a stack of one type of article to be dispensed, each storage channel including a discharge end through which the stacked articles leave the associated storage channel, dispensing means cooperating with each storage channel, said dispensing means for each storage channel including at least one pair of movable wing members spaced axially from one another at a distance substantially corresponding to the length of each article and mounted at said discharge end, said wing members being angularly offset with respect to one another so that they alternately engage beneath a given article within the associated storage channel.

11. In a vending machine for automatic dispensing of a selected article from an assortment of stored articles as defined in claim 10, said dispensing means further including a rod member rotatably mounted in each storage channel and extending substantially parallel to the lengthwise axis of its storage channel, said wing members being connected to said rotatable rod member.

12. In a vending machine for automatic dispensing of a selected article from an assortment of stored articles as defined in claim 11 wherein each storage channel possesses a substantially hexagonal cross-sectional configuration having six corners, said rotatable rod member being arranged in one of said corners.

13. In a vending machine for automatic dispensing of a selected article from an assortment of stored articles as defined in claim 12 wherein said plurality of storage channels of said article storage means are assembled into a substantially honeycomb configured unit.

14. In a vending machine for automatic dispensing of a selected article from an assortment of stored articles as defined in claim 10 further including coin-change means cooperating with each storage channel for returning correct change corresponding to the difference between the inserted coin amount and the price of the article in the corresponding storage channel.

15. In a vending machine for automatic dispensing of a selected article from an assortment of stored articles as defined in claim 14 wherein said coin-change means comprises a group of change-money tubes each of which stores a given coin denomination, and means operably coupling different combinations of said coin-change tubes with said storage channels so that proper change is given and corresponding to the difference between the inserted coin amount and the price of the article in each respective storage channel.

16. In a vending machine for automatic dispending of a selected article from an assortment of stored articles as defined in claim 9 further including article storage means for storing an assortment of articles which are to be dispensed, said article storage means comprising a plurality of storage channels each of which contains one type of article to be dispensed, each storage channel including a discharge end through which the stored articles leave the associated storage channel, dispensing means cooperating with each storage channel, said dispensing means for each storage channel including at least one pair of movable wing members spaced axially from one another at a distance substantially corresponding to the length of each article and arranged in proximity to said discharge end, said wing members being angularly offset with respect to one another so that they alternately engage beneath a given article within the associated storage channel, a rod member rotatably mounted in each storage channel and extending substantially parallel to the lengthwise axis of its storage channel, said wing members being connected to said rotatable rod member, and coin-change means cooperating with each storage channel for returning correct change corresponding to the difference between the inserted coin amount and the price of the article in the corresponding storage channel.

17. In a vending machine for automatic dispensing of a selected article from an assortment of stored articles as defined in claim 16 wherein said electric circuit incorporates electromagnet means and switch means for controlling said electromagnet means, said electromagnet means controlling actuation of said displaceable closure member for said coin insert slot, said rotatable rod member for dispensing of articles, said closure means for said coin-receiving container, said blocking means for said adjustable selector mechanism, said return-setting mechanism for said adjustable selector mechanism, and said coin-change means.

18. In a vending machine for automatic dispensing of a selected article from an assortment of stored articles as defined in claim 17, said coin-change means comprising a group of change-money tubes each of which stores a given coin denomination, said coin-change means further including co-ordination mechanism for coupling different combinations of said coin-change tubes with said storage channels so that the proper change is given and corresponding to the difference between the inserted coin amount and the price of the article in each respective storage channel, each of said coin-change tubes being provided with one of said electromagnet means operated by said co-ordination mechanism, said adjustable selector mechanism including selector switch means operably coupled with said co-ordination mechanism.

19. In a vending mechine for automatic dispensing of a selected article from an assortment of stored articles as defined in claim 18 wherein said co-ordination mechanism comprises a plurality of conductor blocks insulated from one another and arranged in a row, each of said conductor blocks being electrically coupled with said electromagnet means of a given coin-change tube, said selector switch means including a plurality of separate contacts, conductor strip means cooperating with said conductor blocks and selectively coupled with each of said contacts, and conductive plug means for providing a circuit connection between a given contact of said selector switch means and a given conductor block and its associated electromagnet means.

20. In a vending machine for automatic dispensing of a selected article from an assortment of stored articles as defined in claim 17, said electric circuit including a switch member actuated upon adjustment of said adjustable selector mechanism, said electric circuit further including impulse generator means actuated by said switch member for operating said electromagnet means controlling actuation of said displaceable closure member for said coin insert slot, whereby said closure member is brought into its ineffectual position where said coin insert slot is open, said time-delay means being operably coupled between said switch member and said electromagnet means for said displaceable closure member.

21. In a vending machine for automatic dispensing of a selected article from an assortment of stored articles as defined in claim 17 wherein said time-control means incorporates mechanism for displacing said closure member into its normal closing position in response to actuation of said adjustable selector mechanism, said last-mentioned mechanism including a thermal-lag switch.

22. In a vending machine for automatic dispensing of a selected article from an assortment of stored articles as defined in claim 1 wherein said adjustable selector mechanism includes a plurality of samples of the assortment of

stored articles, said time-control means incorporating mechanism for displacing said closure member into its normal closing position in response to actuation of said adjustable selector mechanism, a photometric standard light source for illuminating said samples cooperating with said adjustable selector mechanism, said photometric light source becoming operative upon actuation of said adjustable selector mechanism and becoming inoperative upon response of said last-mentioned mechanism of said time-control means.

23. In a vending machine for automatic dispensing of a selected article from an assortment of stored articles as defined in claim **22** wherein said photometric standard light source is a daylight lamp.

24. In a vending machine for automatic dispensing of a selected article from an assortment of stored articles after insertion of proper coin amount, the combination, comprising a coin-insert slot, a displaceable closure member normally closing said coin insert slot and movable into an ineffectual position where said coin insert slot is opened, adjustable selector mechanism for carrying out selection of a desired article from the assortment of stored articles, means responsive to setting of said adjustable selector mechanism for moving with a certain time-delay said closure member into its ineffectual position.

25. In a vending machine for automatic dispensing of a selected article from an assortment of stored articles after insertion of proper coin amount, the combination including a coin-insert slot, a displaceable closure member normally closing said coin insert slot and movable into an ineffectual position where said coin insert slot is opened, adjustable selector mechanism for carrying out selection of a desired article from the assortment of stored articles, means responsive to setting of said adjustable selector mechanism for moving with a certain time-delay said closure member into its ineffectual position, and means for again moving said closure member into its normal position closing said coin insert slot after the expiration of a certain time.

References Cited by the Examiner

UNITED STATES PATENTS

2,223,146	11/1940	Yeomans.	
3,155,211	11/1964	Morris et al.	194—1

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