April 27, 1965 N. A. GECEWICZ 3,180,343

COIN DISPENSING DEVICE

Filed May 22, 1961 4 Sheets-Sheet 1

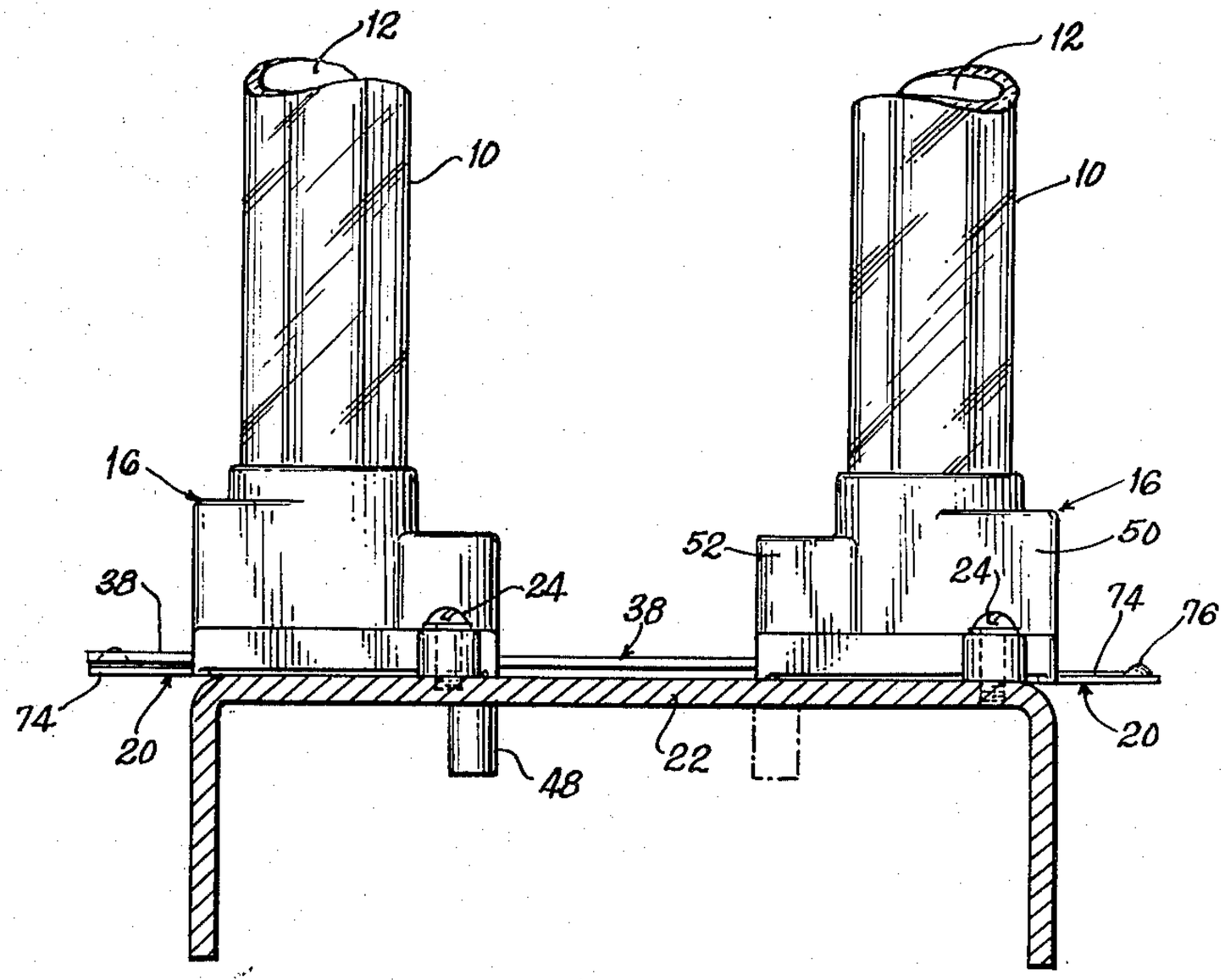

FIG. 1

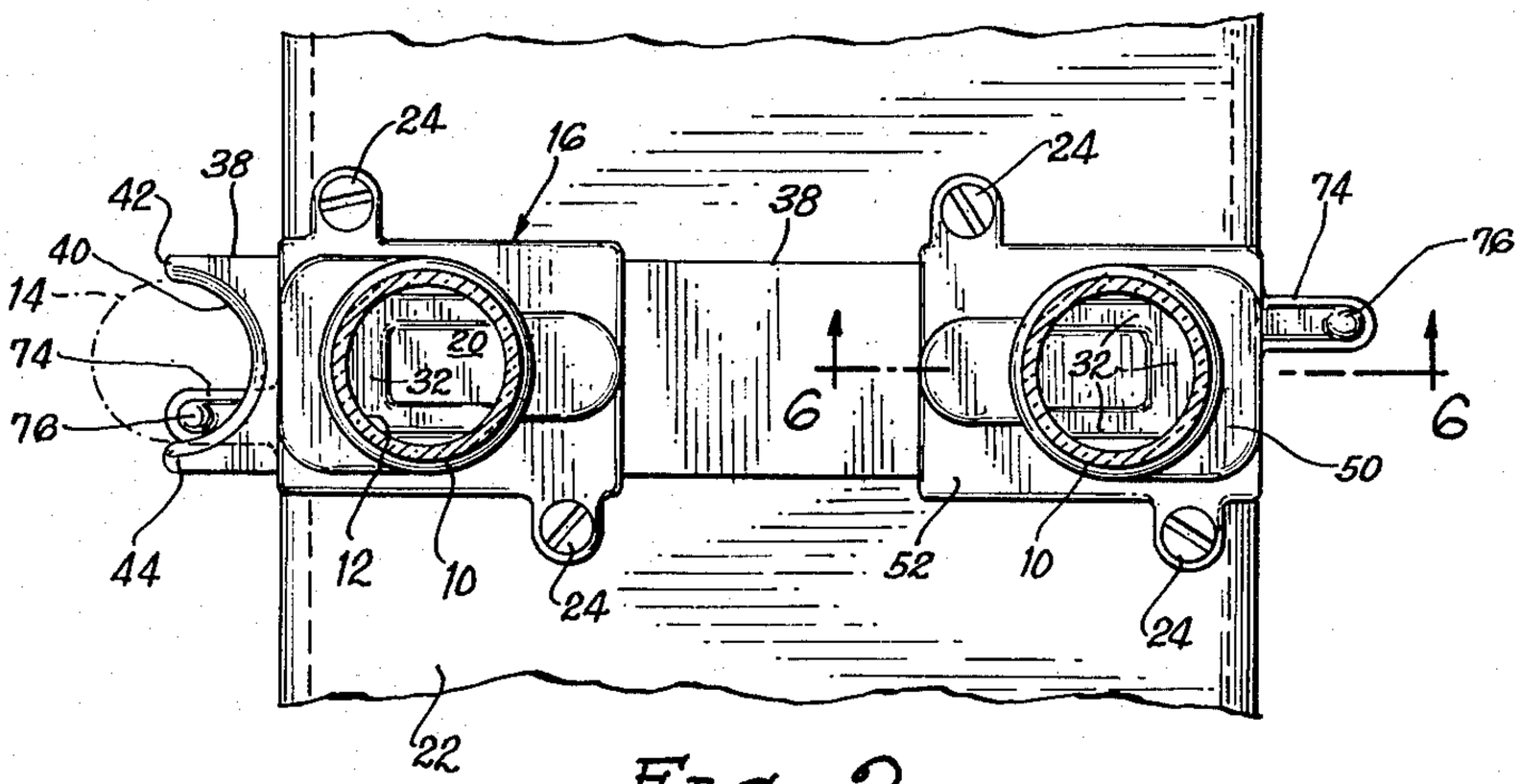

FIG. 2

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COIN DISPENSING DEVICE

Filed May 22, 1961 4 Sheets-Sheet 2

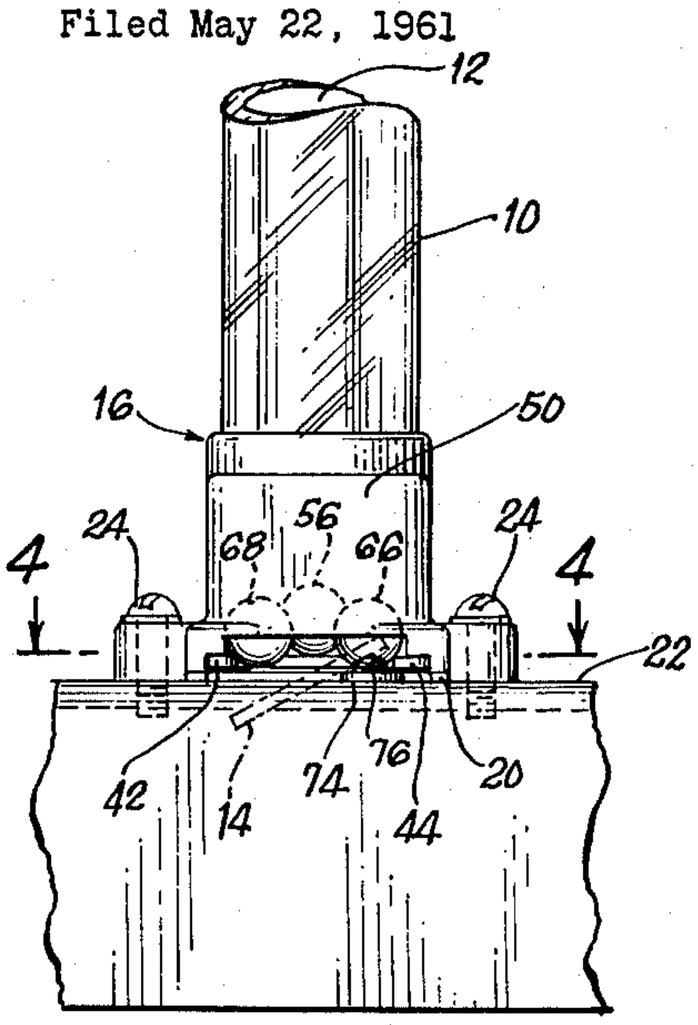
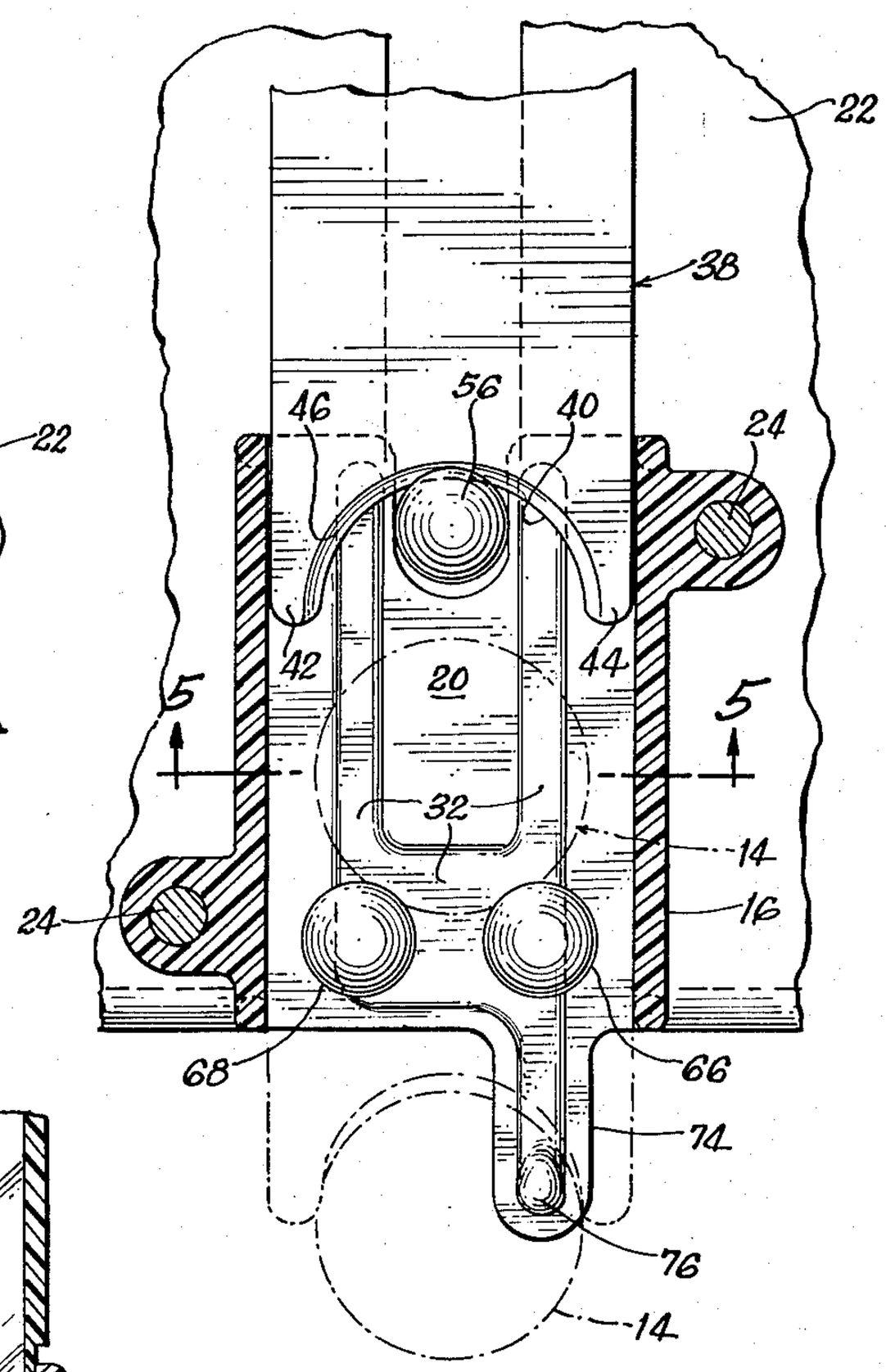


FIG. 3



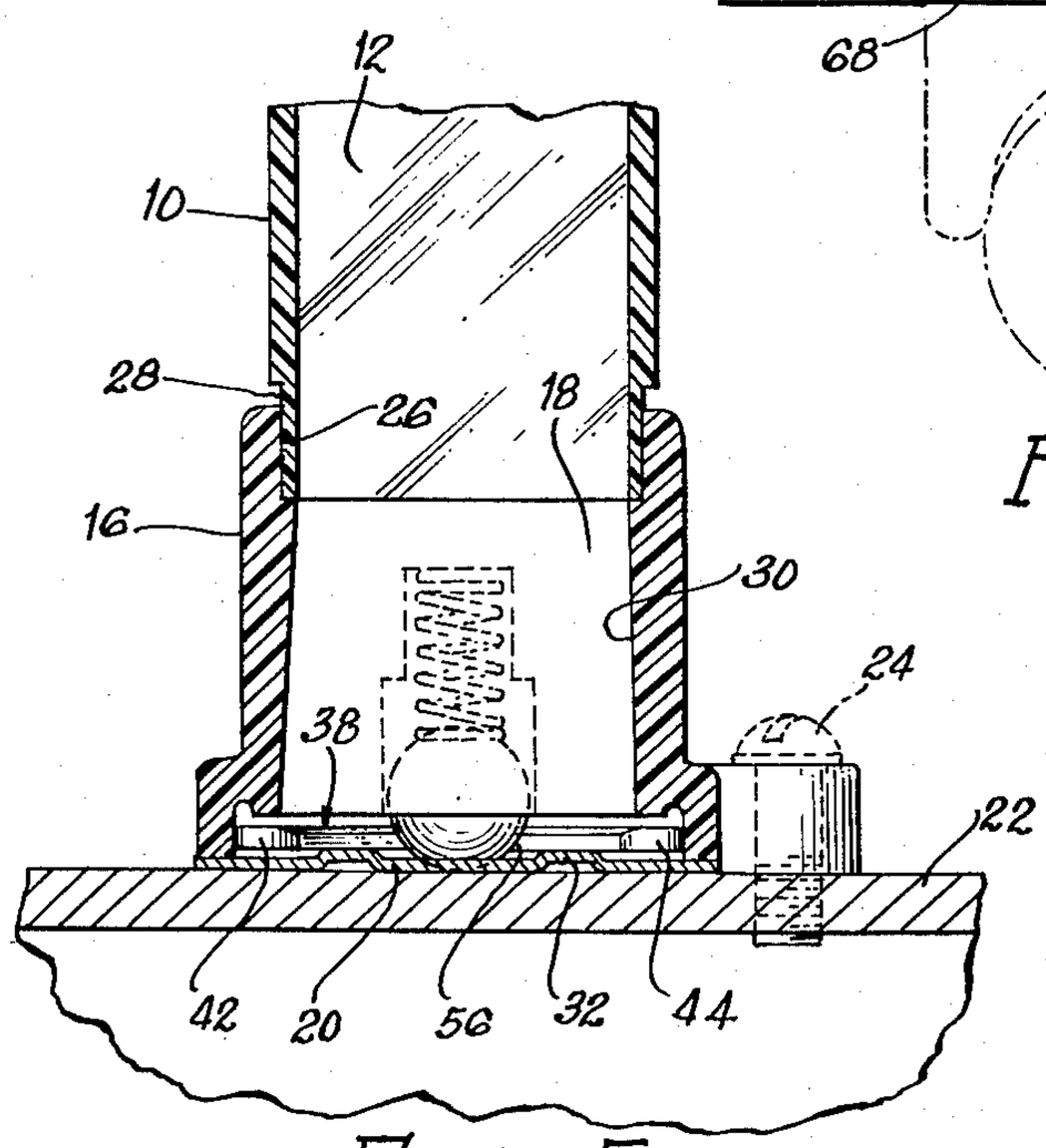


FIG. 4

FIG. 5

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COIN DISPENSING DEVICE

Filed May 22, 1961 4 Sheets-Sheet 3

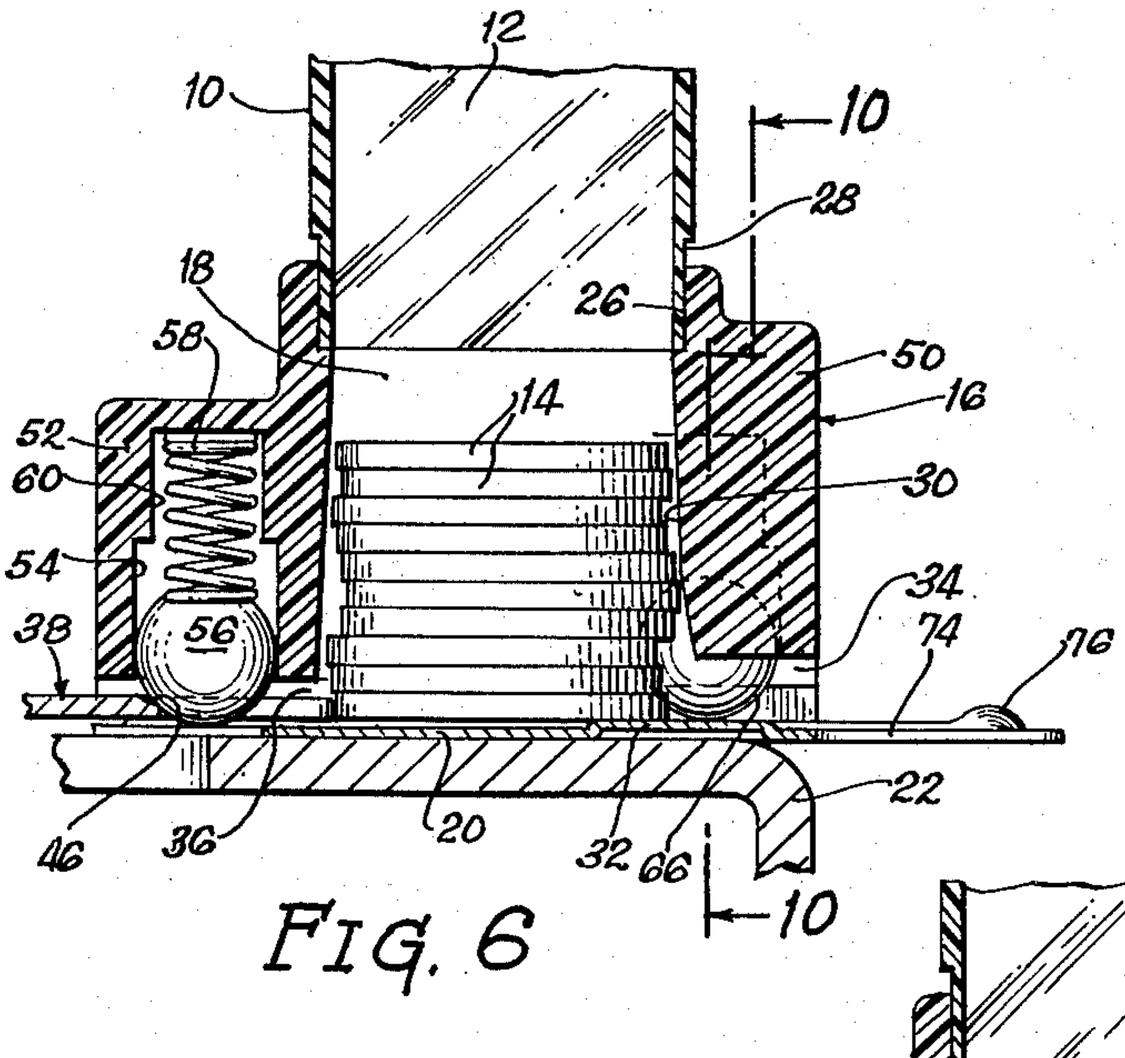

FIG. 6

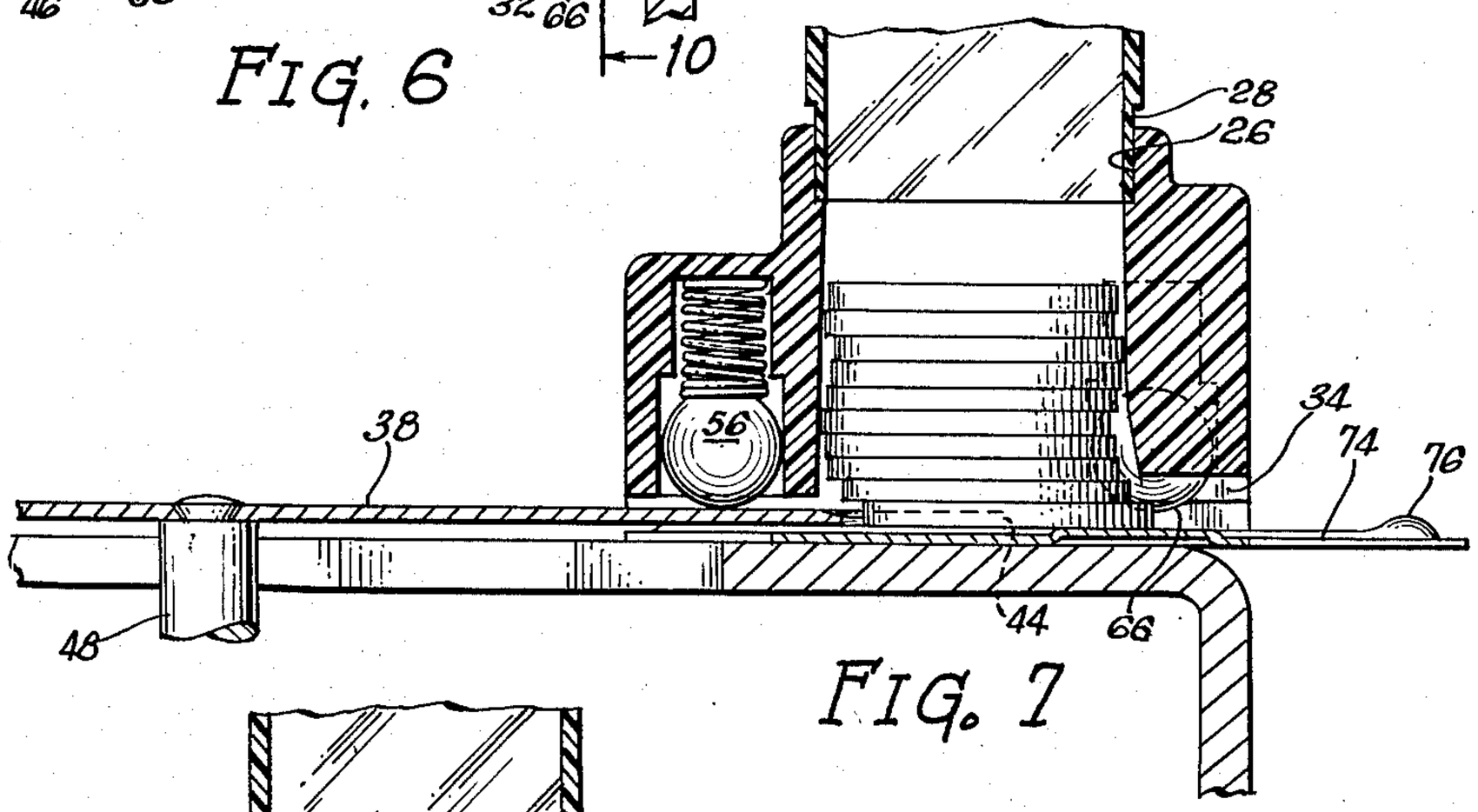

FIG. 7

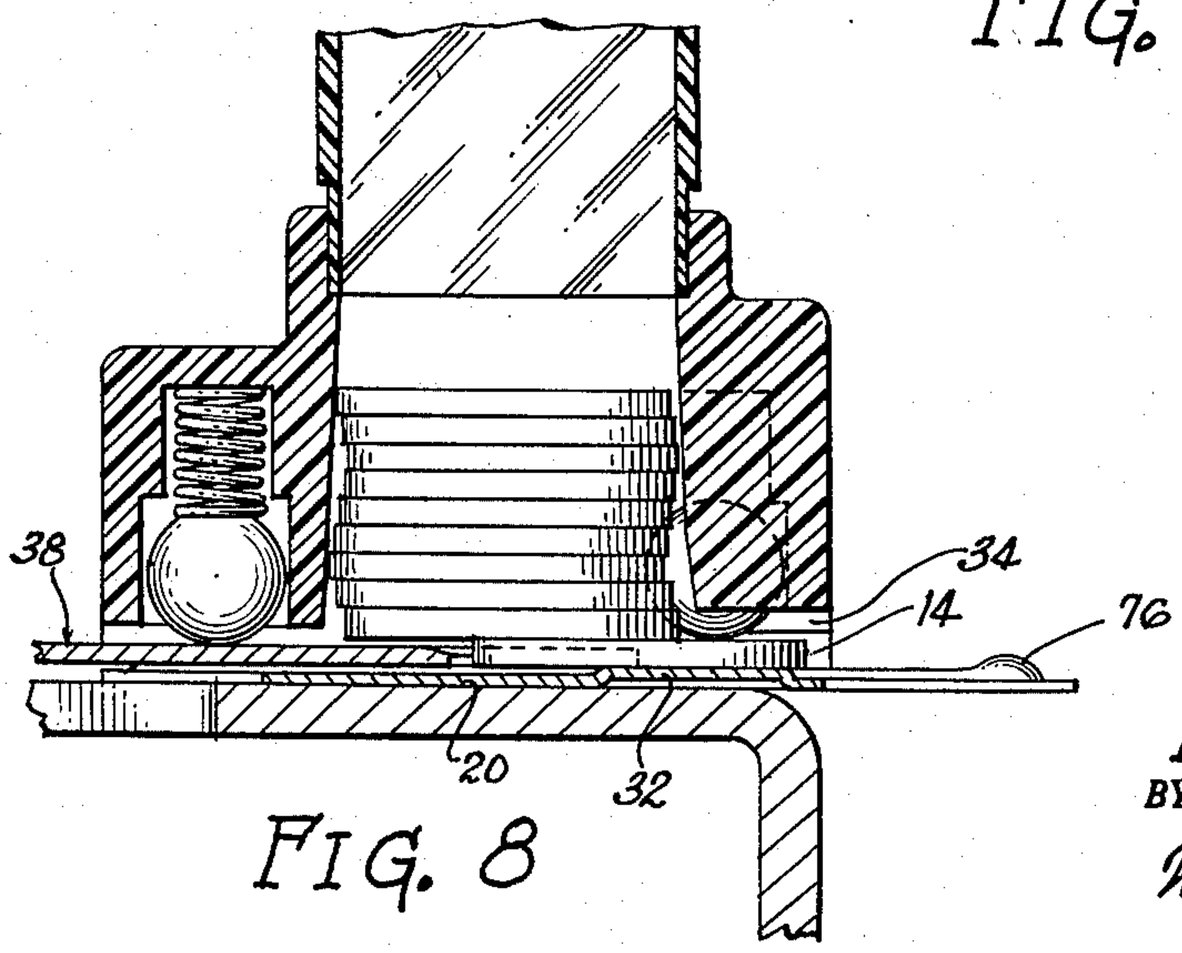

FIG. 8

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COIN DISPENSING DEVICE

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4 Sheets-Sheet 4

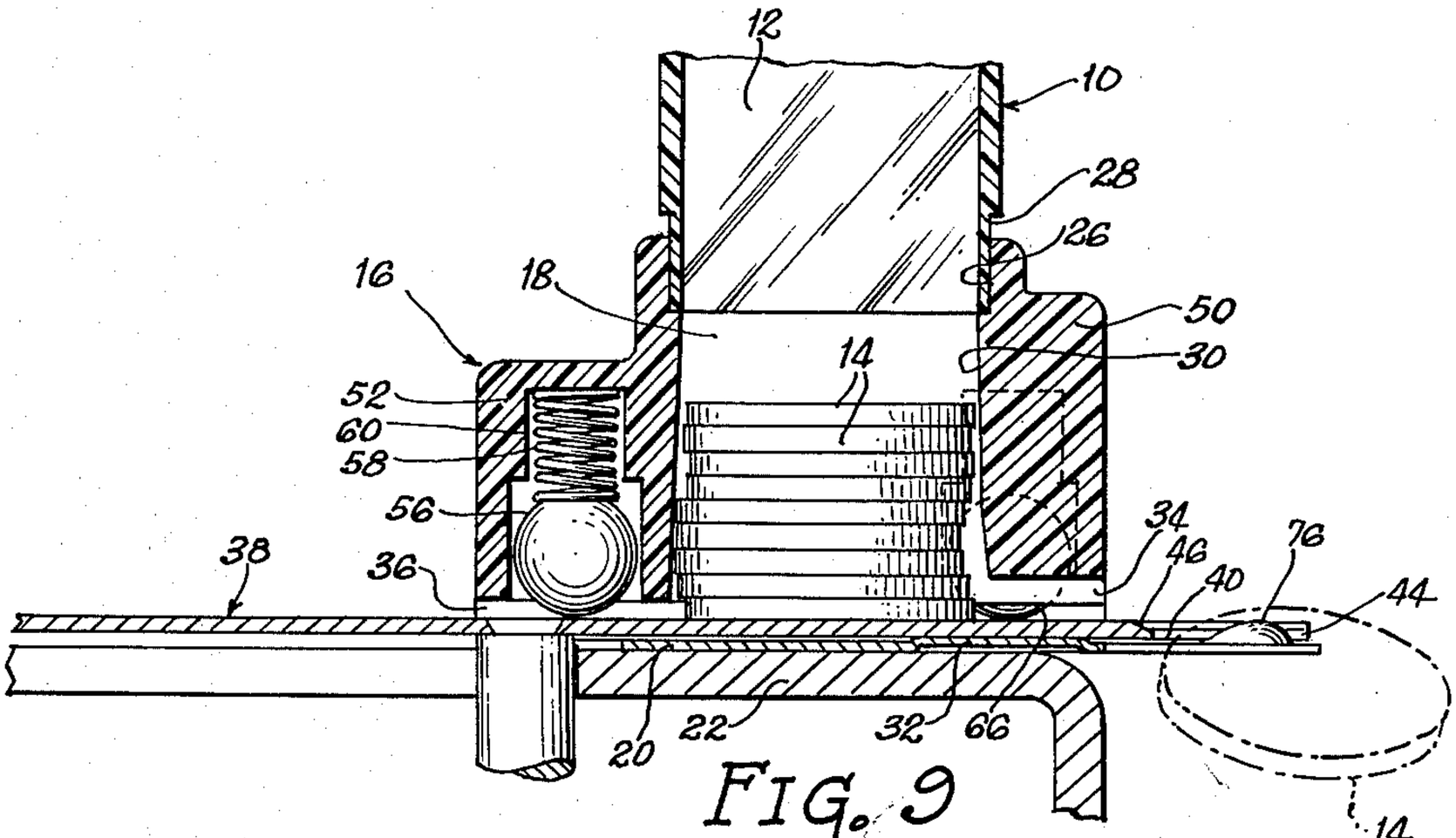

FIG. 9

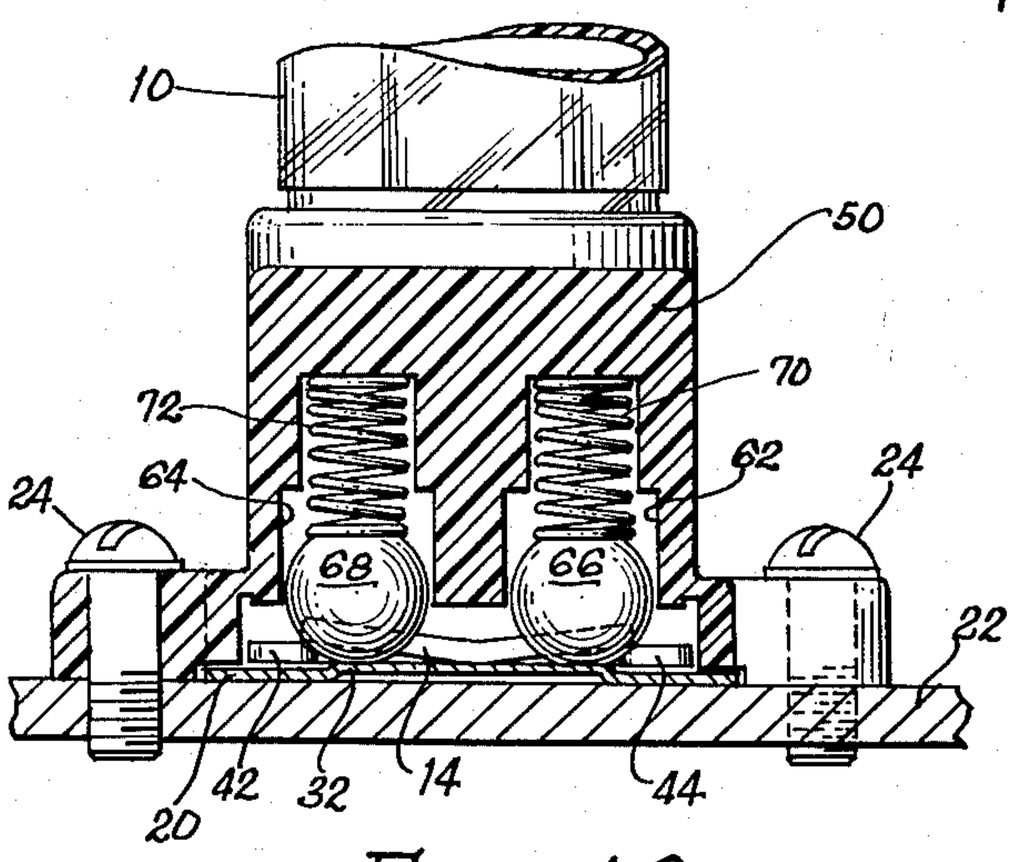

FIG. 10

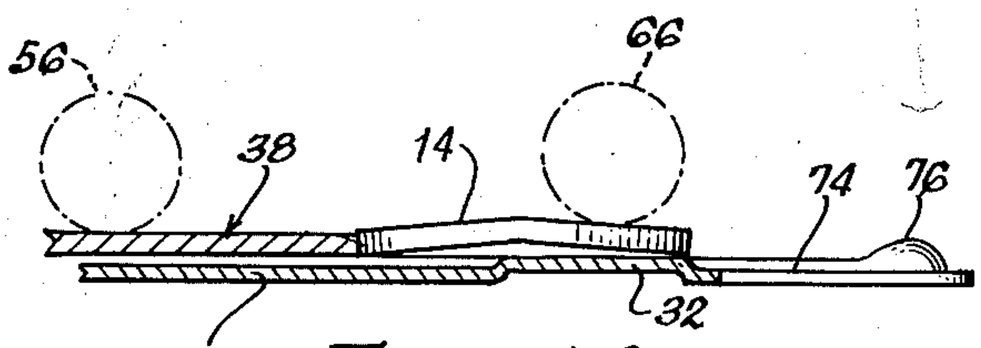

FIG. 12

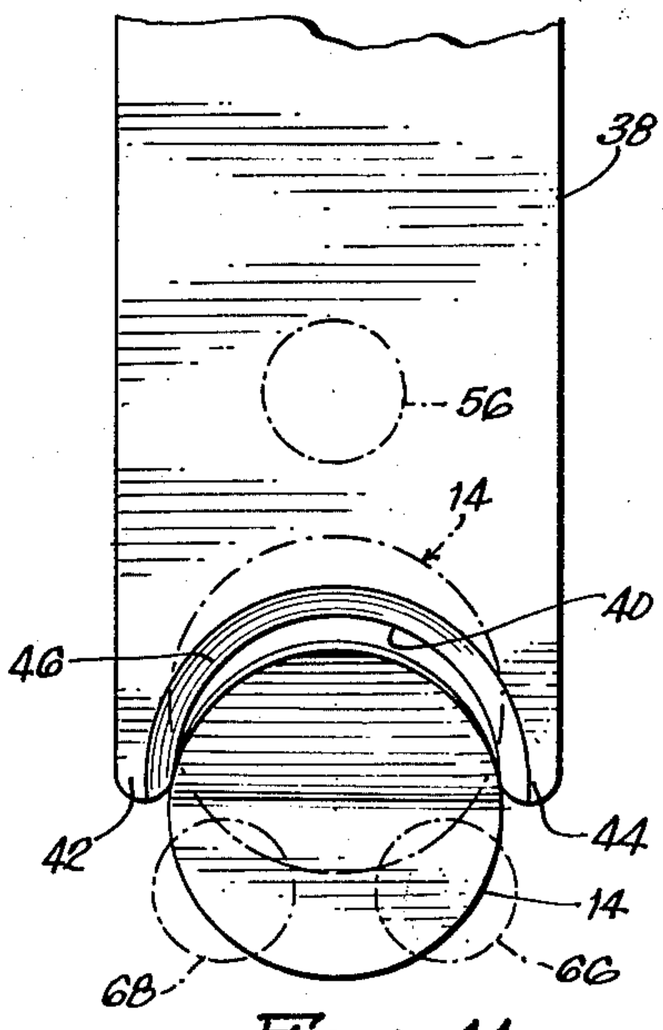

FIG. 11

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Patented Apr. 27, 1965

3,180,343

COIN DISPENSING DEVICE

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Filed May 22, 1961, Ser. No. 111,835
10 Claims. (Cl. 133—5)

This invention relates to a dispensing device and more particularly to a device for dispensing units individually and without jamming because of dimension, shape or condition of the units being dispensed.

The invention will be described with reference to a coin dispensing device wherein single coins are adapted to be dispensed in payout, change making or the like, but it will be understood that the device described can be adapted for dispensing other flat items, such as discs, wafers, checks, washers, tubular members, sleeves, pills, capsules, cans, etc., of circular, rectangular or other curvilinear or polygonal shapes.

A number of problems arise in the design of coin dispensers adapted to pay out coins individually from a coin supply. Some of these problems arise from the differences in the effective thicknesses of coins of the same denomination due either to wear, to the presence of burrs, or to bends in the coins. Others arise because of the bonding of one coin onto another or because the coins become bent in use.

With coins that have been worn thin, it becomes possible for two thin coins to be dispensed together during a single payout, especially where the payout opening is dimensioned to permit the payout of a bent coin without jamming. With the proper combination of two thin coins or a thin coin and a bent coin, it becomes possible to cause the coins to become wedged in the payout opening thereby to jam the dispensing device.

With bent coins, a bent coin can become wedged in the payout opening to jam the device if the payout opening is dimensioned to have a height less than two thin coins but greater than a normal coin to prevent payout of two badly worn coins together. If the form line of the bent coin is crosswise of the coin slide, it will become possible for the coin slide to pass under the upraised edge of the coin whereby payout might not occur. If the payout opening is adequate for displacement of a badly bent coin, then it becomes possible for a combination of two coins worn thin to be dispensed together or for the combination of a bent and thin coin to become wedged in the payout opening and jam the device.

With coins having burrs or greater effective thickness than calculated for a new or conventional coin of a particular denomination, it becomes possible for the burred coin to either jam the payout opening if the opening is small enough to prevent payout of the pair of coins or to pick up the next coin in the stack for either a double payout or else to jam the payout opening. The foregoing sets forth various difficulties which arise in payout devices of the type heretofore employed.

It is an object of this invention to produce a dispensing device of the type described which is free of the problems and the difficulties heretofore described.

Another object is to produce a dispensing device of the type described from which individual units may be dispensed responsive to each cycle of operation of the device notwithstanding the presence of thin, thick, burred or bent units.

More specifically, it is an object of this invention to produce a coin dispensing device from which individual coins can be dispensed per cycle of operation; which avoids being jammed by the presence of thin, thick or bent coins; which permits the passage of more than one coin where two coins stick together thereby to avoid jamming

the device; and which operates to effect positive displacement of a coin upon each cycle of operation notwithstanding the presence of bent coins having their form lines extending crosswise of the coin displacement slide. And it is a related object to produce a dispensing device of the type described which is simple in construction, and easy in operation; which is easily fabricated of readily available and inexpensive parts; which can be adapted for use with coins or units of various denominations, thickness, dimensions, etc., to effect payout of a single unit during each cycle of operation of the machine.

These and other objects and advantages of this invention will hereinafter appear and for purposes of illustration, but not of limitation, an embodiment of the invention is shown in the accompanying drawings in which:

FIG. 1 is a sectional elevational view of a portion of a dispensing device embodying the features of this invention;

FIG. 2 is a view taken from the top side of the dispensing device shown in FIG. 1;

FIG. 3 is an elevational view taken from the left side of the dispensing device shown in FIGS. 1 and 2;

FIG. 4 is a sectional view taken along the line **4—4** of FIG. 3;

FIG. 5 is a sectional view taken along the line **5—5** of FIG. 4;

FIG. 6 is a sectional view taken along the line **6—6** of FIG. 2 showing the elements in their normal starting position;

FIG. 7 is a sectional view similar to that of FIG. 6 showing the arrangement of elements in an early stage of the dispensing cycle;

FIG. 8 is a sectional view similar to that of FIGS. 6 and 7 showing the arrangement of elements in a still further stage of the dispensing cycle;

FIG. 9 is a sectional view similar to that of FIGS. 6, 7 and 8 showing the arrangement of elements upon completion of the dispensing stroke;

FIG. 10 is a sectional view taken along line **10—10** of FIG. 6 showing a bent coin having its form line parallel with the center of the coin slide;

FIG. 11 is a schematic top plan view of the coin and coin slide showing the relationship when the coin is a bent coin having its form line crosswise of the center of the coin slide; and

FIG. 12 is a sectional view of the coin and coin slide illustrating the relationship when the coin is a bent coin having its form line crosswise of the coin slide but with the form line in a raised position.

Referring now to the drawings for a description of the coin dispensing device, **10** represents a coin tube having an opening **12** extending therethrough which is dimensioned to correspond to the shape and dimension of coins **14** of the particular denomination adapted to be housed flatwise therein for stacking a plurality of such coins to be dispensed. The lower end portion of the coin tube is received in fitting relationship within a housing **16** having a vertically disposed opening **18** in endwise alignment with the opening **12** through the coin tube to form a continuation thereof so that the stack of coins **14** in the tube will extend into the opening **18** and come to rest upon a base plate **20** secured to a supporting frame **22**, as by bolt members **24**. The base plate is in vertical alignment with the contiguous openings **12** and **18** and it is dimensioned to extend from the backside to beyond the frontside of the housing. The upper end portion of the housing about the opening is formed with an annular recess **26** and the outer wall of the coin tube is similarly recessed at **28** to enable the lower end portion of the tubular member to be received in fitting relationship within the housing with the inner walls defining the contiguous openings being substantially flush one with the other to avoid any obstruction to the free passage of the stacked

coins from the coin tube into the housing. In the preferred practice of this invention, the inner walls 30 defining the openings in the housing are tapered gradually to increase the cross-sectional dimension of the opening from the upper edge portion to the base.

The base plate 20 can be a flat plate but, for purposes which will hereinafter be defined, it is preferred to provide embossments 32 in the forward end portion of the base plate having a portion which extends into the opening and a continuous portion which extends into the payout opening 34. In the preferred practice of the invention, the embossments comprise a pair of laterally spaced apart parallel ribs extending lengthwise through the described portion of the base plate with the ribs being spaced crosswise one from the other by an amount less than the crosswise dimension of the coins to be dispensed and preferably with the ribs equally spaced from the center so that the lowermost coins in the stack will rest, at least in part, upon the upper edge of the ribs in a slightly vertically spaced apart relation from the surface of the base plate.

Slidable lengthwise over the surface of the base plate through a slot 36 in the backside of the housing and the payout opening 34 in the frontside of the housing between a retracted position and a dispensing position is a slide plate 38 which is formed with a curvilinear cutout 40 at the forward edge portion defining spaced ends 42 and 44 in the form of tongs spaced one from the other by an amount slightly less than the crosswise dimension of the coins adapted to be dispensed. A bevel 46 from the upper surface is provided in the edge portion of the slide plate lining the curvilinear cutout and the plate is dimensioned to have a thickness at the bevel which is less than the thickness of the thickest of the coins adapted to be dispensed and the plate is adapted to have a width greater than the width of coins adapted to be dispensed, the slide plate can be actuated by conventional means (not shown) for displacement from retracted to dispensing position and back during a cycle of operation. The element 48 in FIG. 7 is representative of an actuator rod mounted for lengthwise sliding movement to effect displacement of the dispensing plate 38 between a pair of longitudinally aligned spaced apart coin dispensing units of the type embodying the features of this invention, as illustrated in FIGS. 1 and 2.

The housing 16 is formed with a forward extension 50 and a rearward extension 52. The rearward extension is provided with an opening 54 in the bottom side in lengthwise alignment with the center portion of the coin opening 18 for housing a roller bearing 56 which is constantly urged in the downward direction towards the base plate 20, as by means of a coil spring 58 confined under tension within a contiguous opening 60 with one end of the coil spring bearing against the roof of the housing while the lower end bears against the topside of the ball bearing 56 thereby constantly to urge the ball bearing in the downward direction.

The forward extension 50 is provided with a pair of openings 62 and 64 in the bottom and crosswise alignment and equally spaced from the lengthwise center line of the coin opening with the spacing between the openings being more than one-half but less than the crosswise dimension of the coins to be dispensed and preferably corresponding to the spacing between the underlying ribs 32 on the base plate vertically to align the openings so that the ball bearings 66 and 68, housed within the openings 62 and 64 respectively, will be in vertical alignment with the ribs to ride thereon. The ball bearings are constantly urged in the downward direction towards the base plate by means of compressed coil springs 70 and 72 housed within openings contiguous with the upper ends of the openings 62 and 64 with the upper ends of the coil springs bearing against the roof of the housing and the lower ends bearing against the topsides of the ball bearings.

In the retracted position, shown in FIG. 6, the forward end portion of the slide plate 38 is adapted to be positioned rearwardly of the coin opening 18 of the housing and preferably rearwardly of the guide ball bearing 56. In the dispensing position, the slide plate is adapted to be displaced forwardly over the base plate to beyond the payout opening 34 through the forward portion of the housing and during which the forward end portion of the slide plate engages the lowermost coin in the stack to displace the coin from the stack through the payout opening 34 for delivery. It is desirable positively to displace the delivered coin from between the prongs of the slide plate when the coin has been forwarded to dispensnig position to make certain of the release of the coin for delivery. For this purpose, the base plate 20 is provided with an arm 74 which extends forwardly beyond the housing with a knob 76 projecting upwardly in the path of the coin and in position to engage the leading edge of the coin when the latter is displaced by the slide plate upon movement to dispensing position. Thus the coin is cammed upwardly out of the grip of the prongs and tipped to one side to free the coin of the slide plate for delivery, as illustrated in FIGS. 3 and 9.

The height of the slot 36 through the rearward portion of the housing is not critical since it is only necessary for the slot to have a height greater than the thickness of the slide plate 38 to enable displacement of the slide plate therethrough but not so high as to enable the escape of the bearing member 56. The height of the payout slot 34 is dimensioned to be greater than the maximum thickness of two coins and preferably greater than the maximum thickness of two bent coins so that, if the two lowermost coins in the stack become inseparable, such bonded coins can be displaced through the payout opening for delivery without becoming wedged in the opening or otherwise jamming the device by reason of their failure to pass through the opening.

In practice, the lowermost coin 14 in the stack will rest upon the base plate 20 in endwise alignment with the curvilinear forward edge portion of the payout slide plate 38.

As the slide plate 38 is advanced forwardly from normal position, in FIG. 6, rearwardly of the bearing member 56, the tapered leading edge portion of the slide plate will engage the curvilinear surface of the ball bearing 56 to cam the latter upwardly from the path thereof. Thus the bearing will ride over the surface of the advancing slide plate constantly to urge the slide plate to its lowermost position on the base plate, and thereby to steady the slide plate, as illustrated in FIG. 7.

As the slide plate continues its forward displacement, the tapered forward edge portion of the slide engages the peripheral edge portion of the lowermost coin in the stack to cause the lowermost coin to become displaced forwardly from beneath the stack. If the coin is of normal construction, engagement between the coin and the slide plate will be effected between the prongs of the slide plate. However, if the coin is of such configuration as to clear the prongs, then the peripheral edge of the coin will be in position to be engaged by a curvilinear edge of the slide plate to effect displacement, as will hereinafter be pointed out.

The stack of coins is confronted by the pair of laterally spaced apart resilient restraining members 66 and 68 whereby all but the positively displaced lowermost coin is held back against forward displacement. Positive displacement of the lowermost coin will bring the forward edge portion of the coin into camming engagement with the curvilinear surfaces of the ball bearings 66 and 68 whereby the bearings are cammed upwardly out of the path of the lowermost positively displaced coin but with the bearing still remaining in the path of other coins which, unless positively displaced, are restrained by the bearing to prevent payout of more than one coin.

It should be pointed out that the distance that the bearing members are raised can be variable depending upon the thickness of the coins or bends in the coin that is

positively displaced. If the next to the lowermost coin happens to become bonded to the lowermost coin by reason of adhesions, burrs or the like so that the two coins are displaced together, the device will not become jammed since the two coins can act as a unit under positive displacement to cam the bearings out of their path. Even though this will amount to a double payout, it is preferred, on these few occasions, to pay out two coins rather than to jam the machine. For this purpose, the payout opening 34 is dimensioned to have a height greater than the thickness of two coins to permit the passage of two coins without jamming, even though one or both of the coins may be bent.

While the restraining means is illustrated as comprising a pair of laterally spaced apart bearing members 66 and 68, it will be apparent that the desired restraint against the passage of coins other than the one positively displaced by the slide can be achieved by a single bearing which would preferably be centrally located. It is preferred, however, to make use of a pair of laterally spaced apart restraining members adapted simultaneously to be engaged by the leading edge of the displaced coin since such space restraining members would tend to center the coin and to steady the coin during passage thereunder, whereas only one restraining member may cause lateral displacement of the coin and/or tipping of the coin about the edge portion bearing the forces of the restraining member.

Continued displacement of the slide to dispensing position will cause advancement of the lowermost coin in the stack through the payout opening 34 to the portion of the base plate extending outwardly beyond the housing. This will bring the leading edge portion of the displaced coin into camming engagement with the knob 76 on the end of the base plate positively to disengage the coin from the slide plate and for tipping the coin for delivery, as illustrated in FIG. 9.

Return of the slide plate to starting position will enable the bearing members to return to their normal lowered position at rest on the base plate. As the slide plate clears the underside of the stack of coins, the stack will drop onto the base plate to bring the lowermost coin in the stack into the path of the leading edge of the slide for subsequent payout during the next cycle of operation.

Having described the basic construction and operation, illustration will now be made of the features whereby the difficulties heretofore encountered with conventional construction have been overcome. Illustration has already been made of the flexibility in operation whereby two joined coins can be eliminated from the device without breaking the machine or jamming the machine, the only loss being the infrequent double payout where such strong adhesions exist. Description also has been made of the centering means and the restraining means whereby full control is maintained for a single payout notwithstanding the availability of a payout opening sufficient to pass more than one coin.

In FIG. 10, illustration is made of the payout of a bent coin having its form line running lengthwise along the center of the coin so that the center of the coin will sit down between the ribs in the path of the slide plate while the lateral edges of the coin remain free of the prongs, as illustrated in FIG. 10. Under such circumstances, reliance cannot be had upon the prongs for engagement of the coin for displacement. Instead, the center of the slide plate will be in position to engage the coin positively to displace the bent coin from its lowermost position in the stack. The restraining members 66 and 68 operate to steady the coin during actuation thereby to provide for smooth and positive displacement. If the form line is uppermost, it will be apparent that the lateral edges of the coin will lie on the ribs and in the path of the prongs for engagement.

When the form line of the bent coin is crosswise of the slide plate so that the forward edge of the coin slide might pass under the rearward edge of the coin, reliance is had on the prongs to engage the lateral edges of the bent coin to effect positive displacement, as in FIG. 11. The gripping relation established between the prongs on the end of the slide and the edges of the coin by reason of the coin having a width greater than the spaced relationship between the prongs often requires external means to disengage the coin from the prongs. It is in such situation where the knob or abutment 76 functions positively to effect disengagement as the coin is advanced to its forward position. It will be noted that where engagement is effected by the prongs, the intervening portion of the peripheral edge of the coin will be free of the slide, as in FIG. 11, whereby the coin is carried by the prongs.

Where the form line is crosswise but raised, as in FIG. 12, then the rearward edge of the coin is lowermost and will thus lie in the path of the slide to be engaged by the tapered edge for positive displacement.

It will be apparent from the foregoing that I have provided a simple and efficient means for stabilizing the elements for coin displacement and payout whereby but a single coin is paid out by the device and whereby jamming of the device is substantially completely avoided. As previously pointed out, the concepts of this invention have application to the payout of other disc members for various purposes and that numerous changes may be made in the details of construction, arrangement and operation without departing from the spirit of the invention, especially as defined in the following claims.

I claim:

1. A coin payout device having a slide shiftable lengthwise through a housing for engagement with the lowermost coin in a stack for positive displacement of the lowermost coin from the stack through a payout opening in the housing in endwise alignment with the stack, a blocking means shiftable vertically between blocking and unblocking position in the path of the coin during passage from the stack through the payout opening comprising a pair of laterally spaced apart curvilinear members, means constantly urging said members towards a blocking position in the path of the coins whereby said curvilinear members confront the coins to limit passage thereof to coins positively displaced by the slide, said coins operating responsive to positive displacement to cam the curvilinear members out of the path of the coins to permit the positively displaced coins to pass through the payout opening.

2. A coin payout device having a slide shiftable lengthwise through a housing for engagement with the lowermost coin in a stack for positive displacement of the lowermost coin from the stack through a payout opening in the housing in endwise alignment with the stack, a blocking means shiftable vertically between blocking and unblocking position in the path of the coin during passage from the stack through the payout opening comprising a pair of bearing members shiftable vertically within the housing between a blocking position in the path of the coins and an unblocking position out of the path of the coins, resilient means constantly urging said blocking means towards blocking position to block passage of the coins through the payout opening, said coins operating responsive to engagement between the leading edge of the coin and the bearing members to cam the bearing members out of the path of the coin to permit coins positively displaced to pass under the bearing members through the payout opening.

3. A coin payout device as claimed in claim 2 in which the bearing members are laterally spaced apart in equal distance from the center line of the slide and laterally spaced apart one from the other by an amount less than the crosswise dimension of the coin but more than one-half the crosswise dimension.

4. A disc member payout device having a slide shiftable lengthwise through a housing for engagement with the lowermost disc member in a stack within the housing for positive displacement of the lowermost disc mem-

ber through a payout opening in the housing in endwise alignment with the stack, a stabilizing means shiftable in the direction toward and away from the slide plate for engagement with the top surface of the slide plate prior to engagement between the slide plate and the stacked disc member, and means constantly urging said stabilizing means towards the slide plate resiliently to engage the top side of the slide plate during engagement to stabilize the position of the slide plate.

5. A payout device of the type described comprising a housing having a vertically disposed opening dimensioned to receive a plurality of objects to be dispensed in stacked relation therein and having a base plate on which the lowermost of the objects in the stack comes to rest, a payout slide plate mounted for shifting movement across the bottom side of the opening between a retracted position to one side of the opening and a payout position on the other side of the opening and dimensioned to have a thickness less than the thickness of the object to be dispensed, a payout opening extending through the housing from the bottom side of the vertical opening in alignment with the direction of movement of the payout slide from retracted to payout position and in which the payout opening is dimensioned to have a height greater than the thickness of two of the objects to be dispensed, and laterally spaced apart vertically displaceable means within the payout opening obstructing the path of travel of the objects through the payout opening for delivery, and means constantly urging said laterally spaced apart vertically displaceable means downwardly into the path of the objects displaced wherein said laterally spaced apart vertically displaceable means are displaced upwardly by the objects positively displaced by the slide plate, the combination of said payout opening and said laterally spaced apart vertically displaceable means being normally adapted to allow delivery of an object of standard thickness but being capable of allowing delivery of an object of super standard effective thickness or more than a single object to thereby prevent jamming and accompanying device inactivation.

6. A payout device as claimed in claim 5 in which the payout slide plate comprises an elongate plate having a curvilinear cutout in the leading edge portion in endwise alignment with the stack of objects, said cutout at the leading edge having a crosswise dimension less than the crosswise dimension of the objects whereby the objects will normally be engaged only along the opposite lateral edges by the slide during displacement.

7. A payout device as claimed in claim 6 in which the cutout is curvilinear with the edge portion about the cutout having a downward taper.

8. A coin payout device comprising a housing having a vertically disposed opening dimensioned to receive a stack of coins and a horizontally disposed slot contiguous with the bottom side of said opening and extending forwardly therefrom through the housing to define a payout opening, said payout opening being dimensioned to have a width at least as great as the crosswise dimension of the coin and a height at least twice the thickness of the coin, a slide plate mounted for reciprocal movement between normal retracted position having its leading edge rearwardly of the opening and payout position with its leading edge displaced at least part way across the opening and in which the slide plate is dimensioned to have a thickness less than the thickness of a coil to engage the lowermost coin in the stack for displacement through the payout opening when the slide plate is actuated from retracted toward payout position, a pair of laterally spaced apart vertically shiftable means equally spaced from the center of the slot and spaced one from the other by an amount less than the cross-sectional dimension of the coin, resilient means associated with said pair of means to urge said pair of means downwardly into the path of the coin positively displaced by the slide from its lowermost position in the stack to normally cause said pair of means to block displacement of coins from the stack other than the coin positively displaced by the slide plate through the payout opening, said pair of means being displaced from the path of said positively displaced coin responsive to engagement of said coin during positive displacement to enable passage of said coin from the stack to payout position, the combination of said payout opening, said resilient means and said pair of means being adapted to normally allow delivery of a single coin but being capable of allowing delivery of a bent coin or more than a single coin to thereby prevent jamming of the payout device.

9. A coin payout device as claimed in claim 8 in which said pair of means comprise ball bearings and in which the means resiliently urging the ball bearings towards their lowermost position comprise spring members.

10. A coin payout device as claimed in claim 8 which includes vertically shiftable means within the housing rearwardly of the opening and in lengthwise alignment therewith, and means constantly urging said means towards its lowermost position resiliently to engage the top side of the payout slide during displacement from retracted to payout position.

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