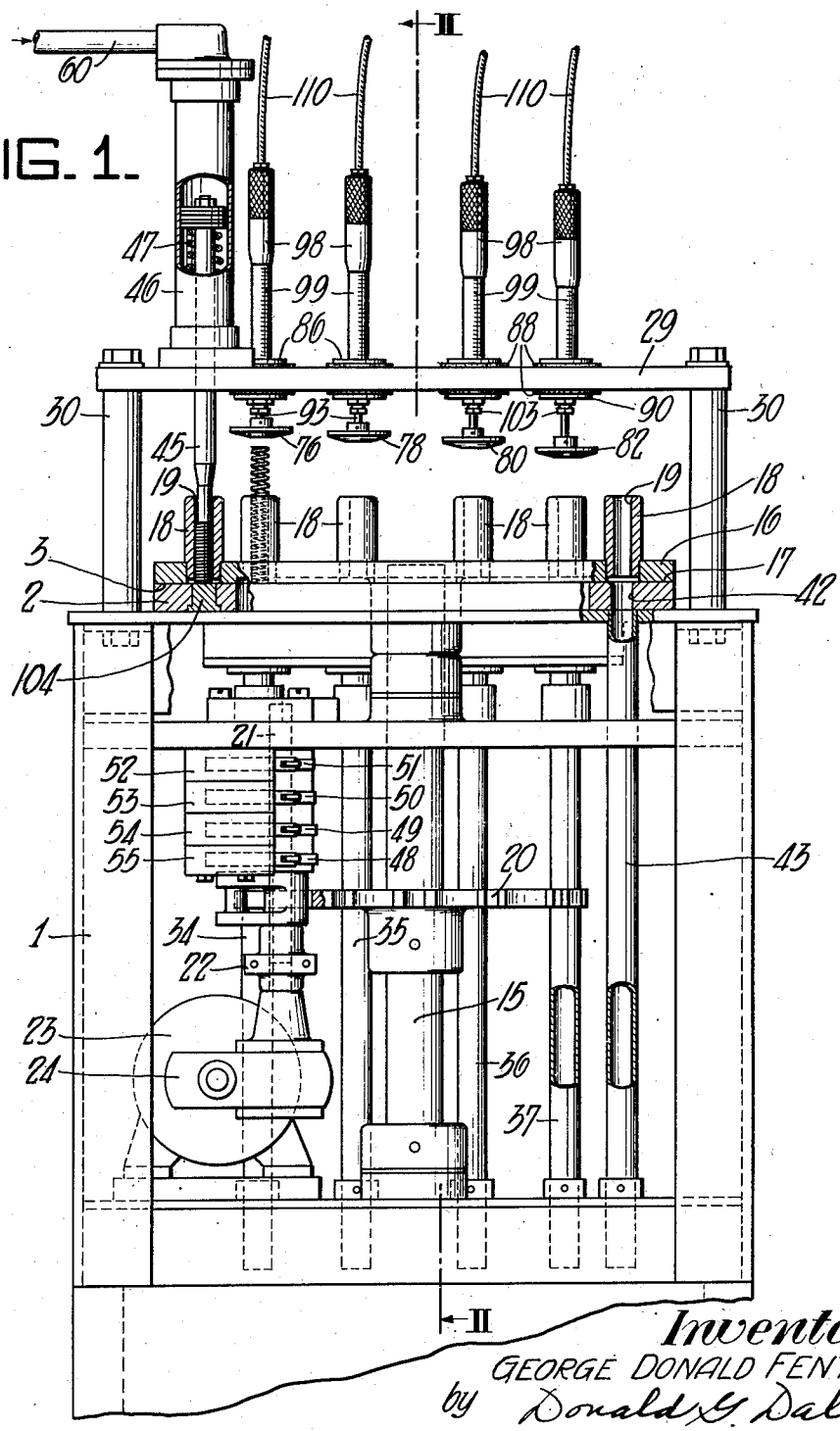
April 25, 1950 G. D. FENTON 2,505,283

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FIG. 1.



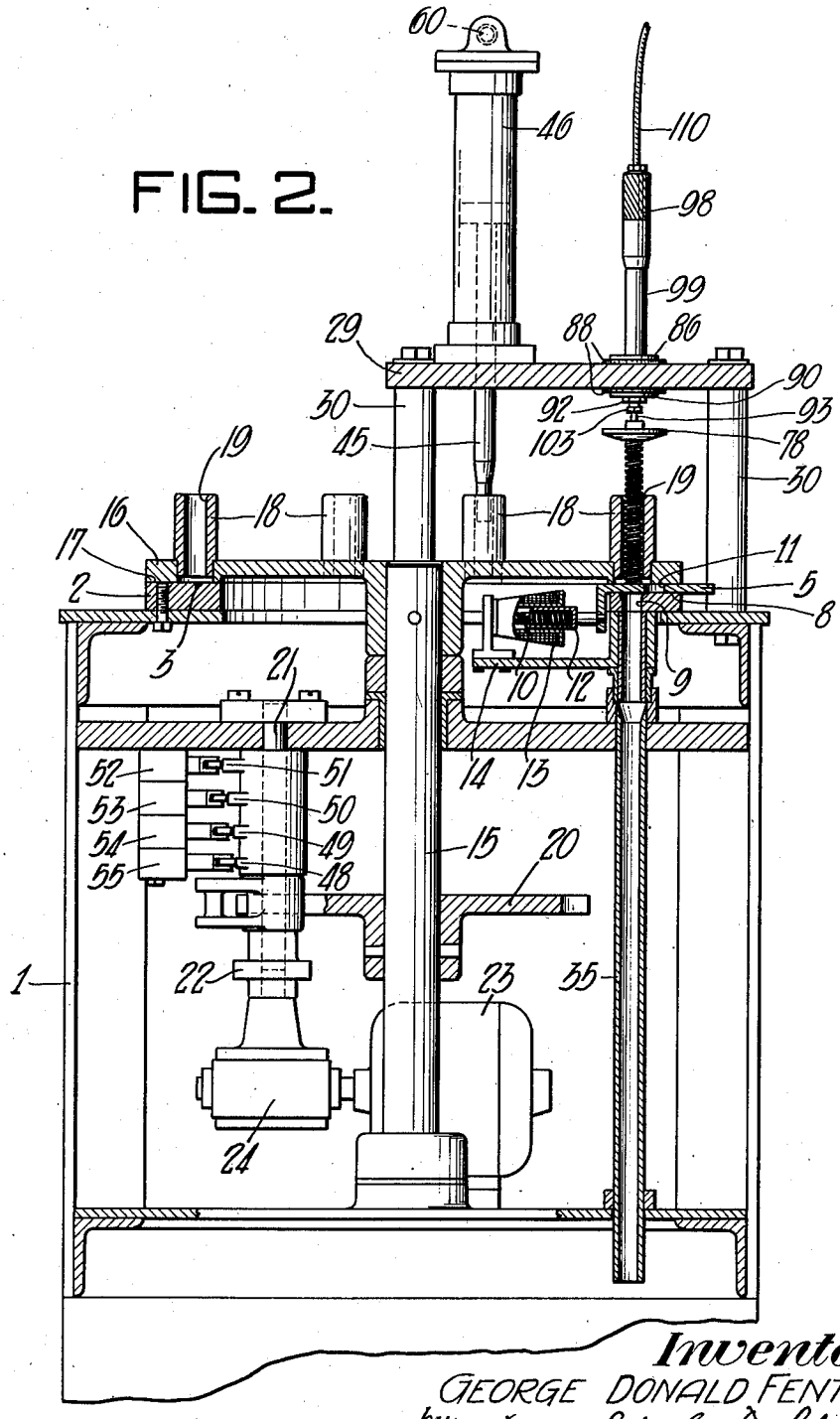
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FIG. 2.



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FIG. 3.

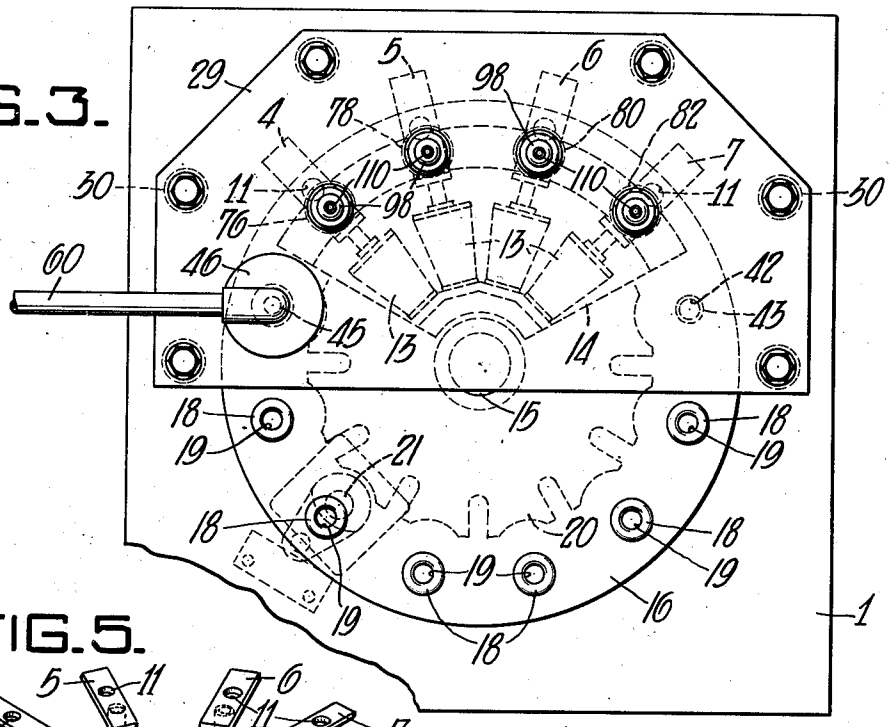


FIG. 5.

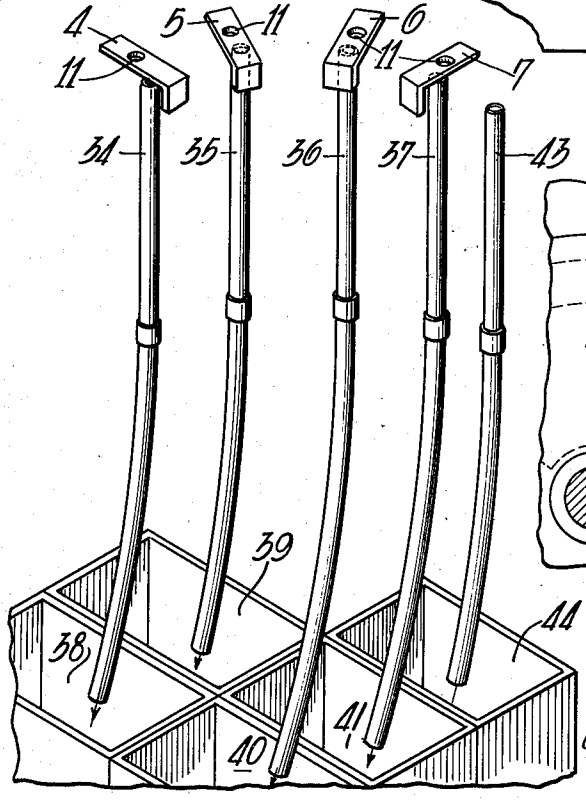
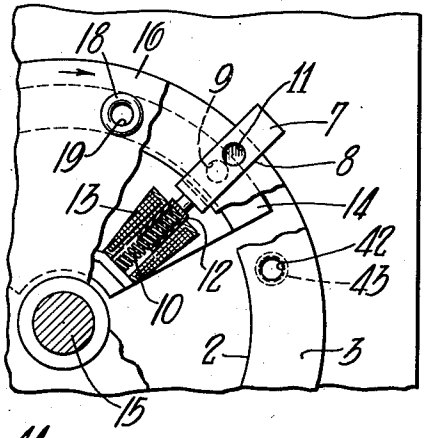


FIG. 4.



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April 25, 1950 G. D. FENTON 2,505,283

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FIG. 6.

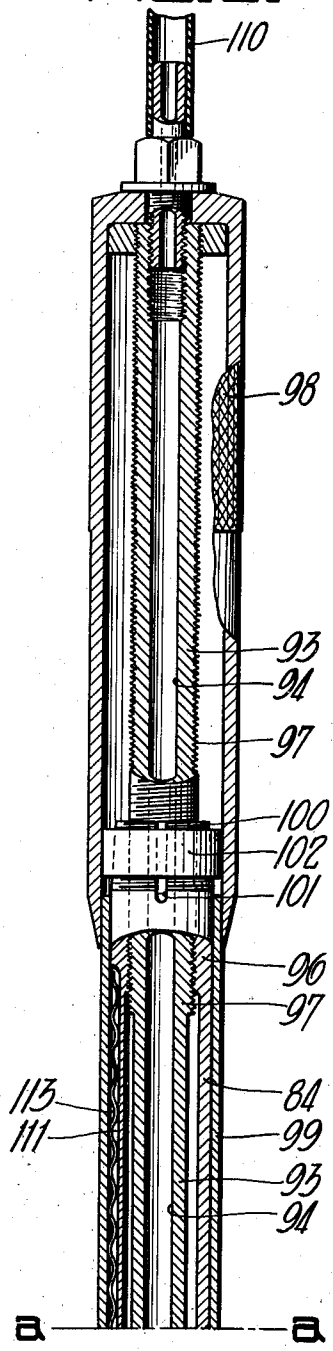
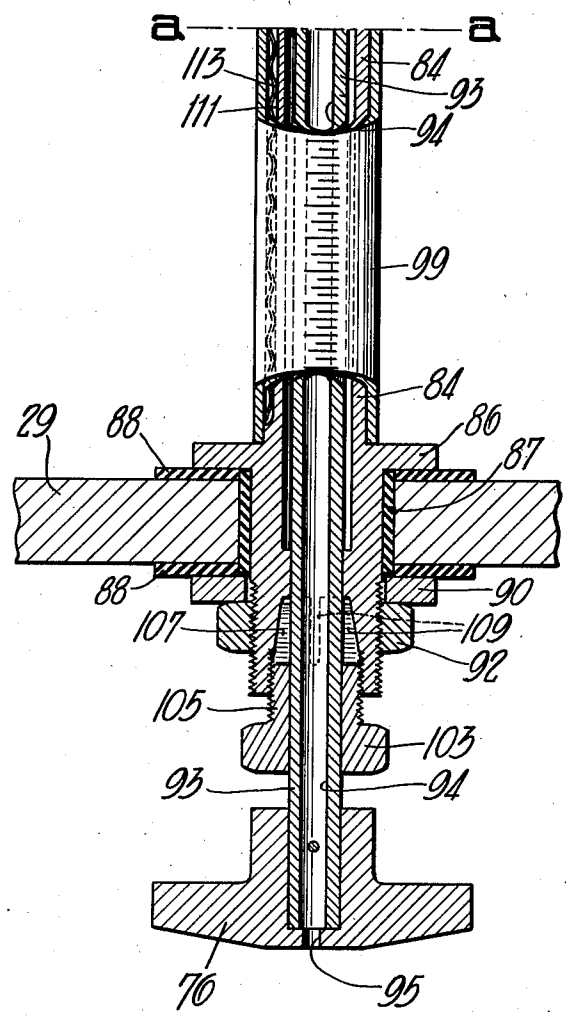


FIG. 6a.



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April 25, 1950 G. D. FENTON 2,505,283

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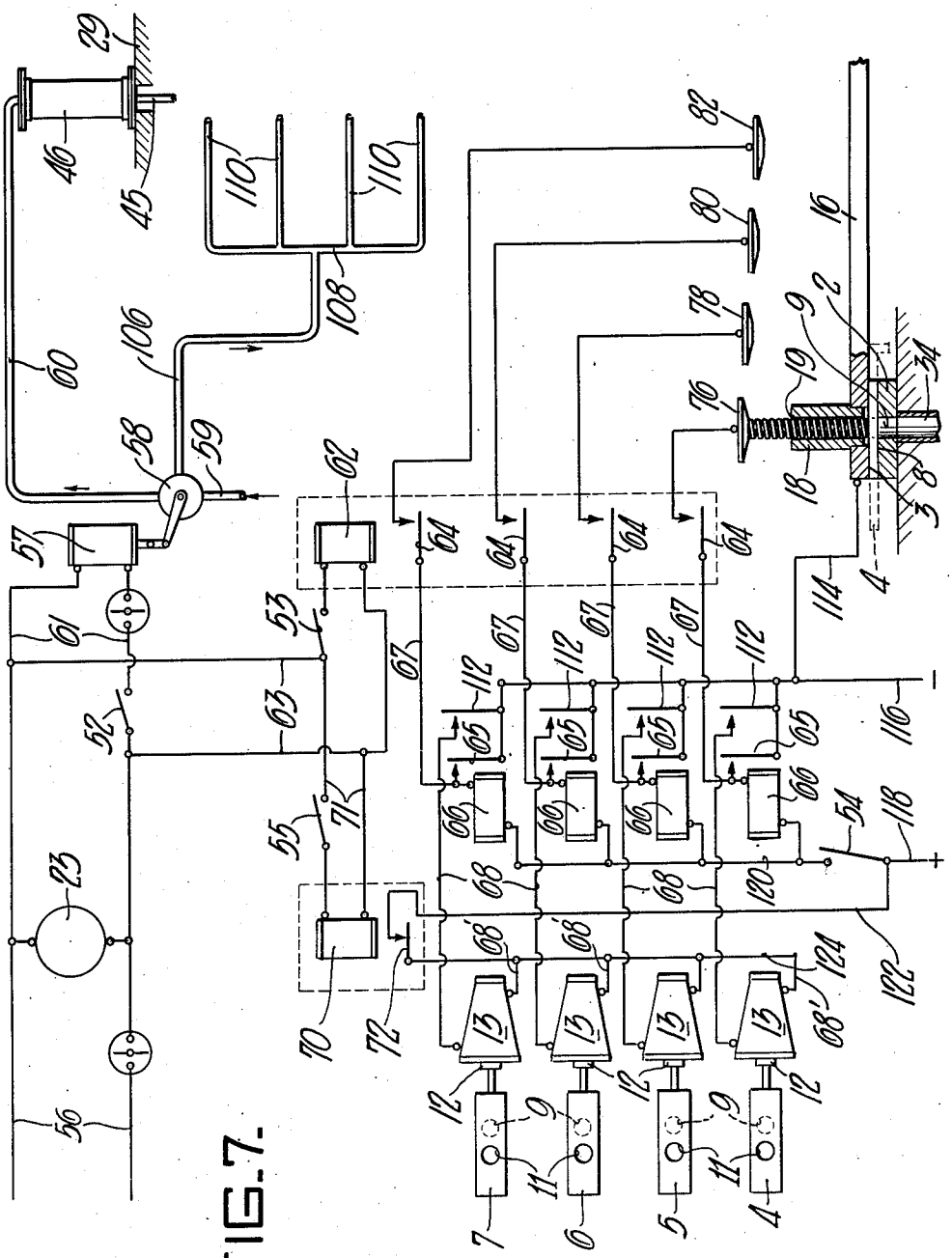


FIG. 7.

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Patented Apr. 25, 1950 2,505,283

UNITED STATES PATENT OFFICE

2,505,283

CLASSIFIER

George Donald Fenton, Worcester, Mass., assignor to The American Steel and Wire Company of New Jersey, a corporation of New Jersey

Application June 28, 1946, Serial No. 680,216

5 Claims. (Cl. 209—82)

1

This invention relates to a classifier of the type adapted to measure the sizes of articles and to classify them accordingly in an automatic manner, in its specific form the invention providing for automatically classifying coiled springs according to their lengths. This application is a continuation-in-part of application Serial No. 534,144, filed May 4, 1944, which issued as Patent No. 2,409,265, October 15, 1946.

The invention has among its objects the provision of an improved apparatus of the type disclosed and claimed in the above prior application.

Such improvements relate to a removable anvil beneath the coil setting station which may be replaced when worn, a precision means for adjusting the height of the electrodes at the various gauging stations, means for facilitating removal of the springs from the classifying and gauging device at appropriate stations, and an improved control circuit for the device.

The invention will be more readily understood by reference to the accompanying drawings, illustrating a preferred embodiment of the invention, in which:

Figure 1 is a partly sectioned side view;

Figure 2 is a vertical section on the line II—II in Figure 1;

Figure 3 is a top view;

Figure 4 is a partly sectioned portion of Figure 3;

Figure 5 is a perspective of details;

Figures 6 and 6a, taken together, constitute an enlarged view in side elevation, certain of the parts being partially broken away, of an electrode and its supporting and adjusting means; and

Figure 7 is a schematic view of the control circuit and associated control devices of the apparatus.

As indicated, the present invention is an improvement upon that disclosed and claimed in the prior application, Serial No. 534,144. The device of the present invention is essentially similar to that shown and disclosed in the previous application, but with various parts thereof improved to provide an apparatus which is faster and more accurate in its operation. In the following description there is described a preferred modification of the device embodying the improved adjustable electrode mounting, the wear-resisting insert and the ring support under the spring setting plunger, and the improved electrical control circuit for the device.

In the device shown the classifier is provided with a frame 1, mounting a horizontal metal ring

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2 having a top annulus providing a horizontal, smooth, flat, metal surface 3 having a series of flush, spaced, metal trap doors provided in the form of slides 4, 5, 6, and 7 fitting in radial grooves 8 formed in the surface 3 of the ring 2. The ring 2 is provided with vertical holes 9 closed by these slides when they are slid radially outwardly, in which directions they are biased by springs 10, the slides having vertical holes 11 which may be registered with the holes 9 by sliding the slides inwardly against the bias of their springs 10, the slides otherwise providing flush continuations of the surface 3 of the ring 2. Each of the slides is provided with its own electric motor for opening it, such motor being in the form of a soft iron plunger 12 working in electric solenoid 13, mounted by the frame 1 through a bracket 14. The solenoid, upon energization, pulls the plunger 12 against the bias of the spring 10 and thus pulls with it the slide to which it is connected so that its hole 11 registers with the hole 9 in the bottom of the groove 8 in which the slide is fitted. Preferably the ring 2 and the slides are made of steel and the surface 3 and the top surfaces of the slides, which ride flush with this surface 3, are all hardened by suitable treatment.

A vertical shaft 15 is journaled in the frame 1 by bearings and its upper end mounts a turntable 16 having a depending flange 17, riding lightly on the surface 3, this turntable providing a plurality of upstanding, spring embracements 18, whereby to mount these embracements so they repetitiously travel over the surface 3 in line with the series of trap doors, the trap door series being arcuate. These spring embracements 18 are provided with bores 19, in which the springs to be classified are placed, whereby the embracements, when moved over the surface 3 by rotation of the turntable 16, slide the springs over this surface 3 in upright positions, with the bottom-spring-ends riding over the trap door series so that opening of any trap door will permit the spring registered therewith to drop through the trap door, the springs being biased against the surface 3 by gravity.

Rotation of the turntable 16 is effected by rotation of the shaft 15 on which it is mounted, this being done intermittently through a Geneva drive 20, the continuously rotating cam of which is powered by a vertical shaft 21, journaled by the frame 1 in bearings, through a friction drive 22, by an electric motor 23 working through a speed reduction gearing 24. The arrangement is such that for each revolution of the shaft 21,

the intermittent drive 20 turns the shaft 15 just sufficiently to move the spring embracements 18 from one of the trap doors to the next so that each of the embracements is successively registered over each of the trap doors. Of course, the embracements 18 are located on a circle concentric with shaft 15, and have the same spacing as the trap doors.

The improved top-spring-end contactors 76, 78, 80, and 82 are mounted on the horizontal panel 29 spaced above the trap door series by means of columns 30, the arrangement being such that these contactors are over each trap door at spaced positions above the embracement tops at successively lower heights in the direction of travel of the embracements. Thus contactor 76 is directly above the trap door 4, contactor 78, is directly above the trap door 5, and so forth, it following that the top-spring-ends of the longest springs will contact the contactor 76, those of the next highest spring will contact the contactor 78, and so forth. Each contactor is made with a bottom face, as shown more clearly in Figure 6a, that has a centrally located flat portion joined to the side edges by a surface which is a frustum of a cone of large included angle. Such configuration of the bottom surfaces of the contactors makes it unnecessary to lock them in any particular angular position about their axes and insures that they will have the same action with respect to the top-spring-ends regardless of how they are positioned angularly.

The construction of the contactor mountings will be more readily appreciated by reference to Figures 6 and 6a in which the mount for contactor 76 is shown. Such mounting is essentially in the form of a micrometer having a main body or barrel 84 which is provided near the lower end thereof with an integral radial flange 86 and with a lower threaded end. The barrel is mounted through a hole in plate 29, as shown in Figure 6a, and is insulated from such plate by means of the insulating sleeve 87 and the insulating top and bottom washers 88. The contactor may conveniently be connected to the control circuit for the device by a wire (not shown) connected to flange 86. A further metal washer 90, roughly corresponding in shape to the flange 86, is interposed between the lower insulating washer 88 and the retaining nut 92 threaded on the lower end of the barrel.

The contactor 76 is rigidly mounted on the lower end of the adjustable spindle 93 as by being pinned thereto as shown. Such spindle has an axial bore 94 extending completely therethrough and communicating with the bore 95 through the center of the contactor to permit the discharge of compressed air from the contactor when springs are positioned therebelow, as will be more fully described later. Barrel 84 is provided with an accurate internal thread, in the upper portion 96, which receives the threaded upper portion 97 of the spindle. Rotation of the spindle thus allows an accurate axial adjustment of the contactor. Such rotation may be accomplished by means of the thimble 98 connected to the upper end of the spindle, the lower portion of such thimble extending over the sleeve 99 which telescopes the barrel 84. The sleeve 99 is provided with graduations to permit the adjustment of the spindle to be read.

The upper end of the barrel 84 is tapered and threaded at 100, such portion being slotted as shown at 101 to allow it to be sprung inwardly into tight engagement with the threaded portion of the spindle. Such springing of the upper end of the barrel may be accomplished by rotation of the conically threaded nut 102 embracing portion 100, and allows a firm accurate engagement to be maintained between the threads on the barrel and the spindle.

When suitably adjusted, spindle 93 may be locked in position by means of the nut 103 threaded into a bore coaxial of the spindle on the lower end of the barrel. The forward end 107 of the threaded portion 105 of such nut is conical, as shown, and sets into a correspondingly shaped conical seat in the barrel. Such conical portion is slotted at 109 so that when the nut is screwed into the barrel the conical forward end thereof is sprung into tight engagement with the spindle to lock it in place. For fixing sleeve 99 on barrel 84 a sinuous spring 113 is seated within the longitudinal keyway 111 on the lower end of the barrel, alternate high points of the spring engaging the inner cylindrical surface of the sleeve.

Generally speeaking, in the operation of the machine the motor 23 intermittently turns the shaft 15 so as to bring each of the embracements successively over each trap door and beneath each of the top-spring-end contactors, and the latter are connected in each instance with the solenoid 13 of the trap door above which it is positioned, whereby, depending upon their lengths, the various springs are dropped through various ones of the trap doors so as to be classified into four different length categories. The springs are manually loaded into the embracements 18 prior to the time the embracements start over the various trap doors and under the various contactors, the operation being otherwise automatic. For convenience, each trap door delivers the spring it passes to its own delivery tube, these tubes being shown at 34, 35, 36, and 37, respectively delivering to drawers 38, 39, 40, and 41 where the springs collect according to their classified lengths. Since some springs may be much too short, the surface 3 of the ring 2 is preferably provided with a vertical hole 42 that is always open and through which any spring that reaches this hole must drop, the hole 42 also having its spring conveying tube 43 delivering to a drawer 44. This hole 42 is spaced from the last of the trap door series to effect successive registrations of the various embracements therewith as the embracements are intermittently revolved by the intermittent rotation of the shaft 15.

At the first embracement-stopping position in advance of the trap door 4, the panel 29 mounts a top-spring-end depressor in the form of a plunger 45 worked by a pneumatic motor of which the cylinder 46 is shown mounted vertically by the panel 29, the depressor being biased to an upward, inoperative position by a spring 47 and the introduction of air to the top end of the cylinder 46 serving to drive the depressor downwardly so as to engage the top end of each spring, after it has been placed in the bore 19 of an embracement 18, so as to close the spring more or less and drive its bottom end into firm engagement with the surface 3 over which it thereafter slides. The use of the pneumatic motor has an advantage in that it provides for a somewhat retarded return stroke of the depressor 45, thus eliminating the possibility of sudden release of a seated spring with the consequent possibility of its becoming unseated which would lead to its inaccurate classification.

Because the ring 2 is subjected to considerable

wear at the location beneath the depressor, there is provided, as shown in Figure 1, a replaceable insert 104 in the ring at that place. The insert 104 may be made of hard material, such as sintered tungsten carbide, and is finished so that its top surface lies flush and continuous with the top surface 3 of ring 2. The insert may be inserted through the bottom of the ring, and retained therein by a shoulder on its bottom end received within a correspondingly shaped seat in the bottom of the ring 2.

The above described structure constitutes only some of the details which permit the classifier to operate accurately at high speeds, another being the manner in which the various contactors are connected with the various solenoids of the various trap doors, this being done in such a manner that during the earlier portions of the stops in the intermittent motion of the embracements, the determination is made as to whether a top-spring-end is in contact with the contactor below which it is registered, and so that subsequent contact during the latter portions of the stops, when there might be spring vibration, will have no effect, such subsequent contact failing to do anything in the way of opening the trap door beneath the contactor thus subsequently contacted. Then, during the latter portions of the stops, the electric motor working the trap doors is operated to momentarily open the trap doors only in those instances where the springs initially contacted the top-spring-end contactors. The manner in which all of this is accomplished will now be described.

The shaft 21, which is turned continuously by the motor 23, makes one complete rotation for each partial rotation of the shaft 15 effected by the Geneva drive 20 and the latter is designed so the shaft 21 turns about 120° for each of the partial rotations of the shaft 15 required to index the various spring embracements 18 with the various trap doors and contactors. The shaft 21 carries cams 48, 49, 50 and 51 working electric switches 52, 53, 54, and 55, this arrangement being such that the switch 52 closes when the shaft 21 has rotated about the 120° terminating the indexing motion it imparts the shaft 15, and opens after the shaft 21 turns about 270°. In this connection, 0° is taken as the position of the shaft 21 when it starts to turn the shaft 15 through the Geneva drive 20. The switch 53 also closes at about 120° but it opens at about 210°, the switch 54 closes at about 180° and opens at about 372° which means that it opens during about the first 12° of the next cycle, and the switch 55 closes at about 240° and opens at about 360°. This timing may be varied somewhat but the general sequence should be followed.

Referring now to the wiring diagram, the motor 23 is powered by the A. C. lines 56 which also power an electric thruster 57 working a three-way, compressed air control valve 58 supplied with compressed air by a pipe 59 and transmitting this air, through its control, by way of a pipe 60 to the top end of the cylinder 46 working the top-spring-end depressor 45. Exhaust air from cylinder 46 is delivered from valve 58 through pipe 106 to the manifold 108 where it flows through hoses 110 to the adjustable mounts for the contactors. When the thruster 57 is energized it sends air to the top of the cylinder 46, and when it is de-energized the valve 58 moves to connect the pipe 60 with the pipe 106 so that air exhausted from the top of the cylinder 46 by action of the spring 47 biasing the depressor to inoperative position acts to aid removal of the springs from the embracements, as described above. Therefore, as each spring embracement 18 registers with the depressor 45 and comes to a stop, the thruster 57 is energized by the switch 52, through lines 61, so that air is introduced to the top of the cylinder 46, this driving the depressor 45 downwardly so that it operates to perform its function, the switch 52 then opening so that the spring 47 returns the depressor to inoperative position. The switch closes at 120° turn of the shaft 21 and opens when the shaft 21 turns 270°, so that the shaft can continue to turn 90° more before it begins to again rotate the shaft 15, this allowing time for the spring 47 properly to perform its function. The operation is continuous and this means that all of the embracements beneath the various contactors 76 through 82 are successively loaded with springs which then have their bottom ends firmly seated on the surface 3.

At 120° rotation of shaft 21, switch 53 also closes and energizes a relay solenoid 62 via conductors 61 and 63. Energization of said solenoid closes four sets of relay contacts 64. Each of the four electric motors 13, which operate the four slides 4, 5, 6 and 7, has an actuating relay which includes a solenoid 66 and two sets of contacts 65 and 112. The circuit for energizing motors 13 and solenoids 66 includes conductors 116 and 118 which are connected to a source of low voltage potential. One terminal of each solenoid 66 is connected to conductor 118 via a conductor 120 and switch 54 (now open). The other terminal of each solenoid 66 is connected to one of relay contacts 64 via a conductor 67. Each of said relay contacts is also connected to one of the top-spring-end contactors 76, 78, 80 and 82. A conductor 114 connects conductor 116 and ring 2.

Therefore, when the four sets of contacts 64 close, they partially condition circuits to the four relay solenoids 66. At 180° rotation of shaft 21, switch 54 closes and completes the conditioning of these circuits. Now if springs touch one or more of the contactors 76, 78, 80 or 82, they complete the circuit to the corresponding relay solenoid, whereupon contacts 65 and 112 of that relay close. Contacts 65 seal in the circuit to their solenoid, so that this solenoid remains energized after switch 53 opens at 210° rotation of shaft 21.

It is not necessary for a spring to remain in contact with a contactor 76, 78, 80 or 82 for a solenoid 66 to remain energized, but the solenoid remains energized once the spring has touched the contactor during the period in which the circuit is conditioned (180° to 210° rotation of shaft 21). If a spring touches a contactor after switch 53 opens, it does not energize a solenoid 66, since the circuit to these solenoids no longer is conditioned. This arrangement eliminates inaccuracies which subsequent spring vibrations might cause.

Closing of a contact 112 conditions a circuit to the corresponding motor 13. This circuit includes conductor 116, contacts 112, a conductor 68, a motor 13, conductors 68' and 124, relay contacts 72 (now open) and conductors 122 and 118. At 240° rotation of shaft 21, switch 55 closes and energizes relay solenoid 70, via conductors 71, 63, 61, and 56, whereupon relay contacts 72 close. Closing of these contacts completes the circuit to a motor 13 and opens the corresponding slide 4, 5, 6 or 7.

At 270° rotation of shaft 21, while the slide is still open, switch 52 opens and de-energizes magnetic thruster 57, whereupon valve 58 releases the

air pressure from cylinder 46. The air discharges from this cylinder via pipe 60, valve 58, pipe 106, manifold 108, hoses 110 and spindles 93 and blows any spring which is over an open slide through the hole 9 beneath.

At 360° rotation of shaft 21, switch 55 opens and de-energizes solenoid 70, whereupon contacts 72 open and break the circuit to motors 13. Any of slides 4, 5, 6 or 7 which have been open now close. Shaft 15 commences to rotate and thus another cycle starts. At 372° rotation of shaft 21, or 12° after the start of the succeeding cycle, switch 54 opens and breaks the circuit to any of solenoids 66 which have been energized.

In operating the classifier above described the operator places a spring in the bore 19 of one of the embracements 18 during one of the stops in the intermittent motion of the turntable 16. This embracement then advances to beneath the top-spring-end depressor 45, this requiring the shaft 21 to rotate through 120°. At this time the switch 52 closes, air is admitted to the top of the cylinder 46 and the depressor 45 drives the top-spring-end down into the embracement and seats its bottom end firmly on the upper surface of insert 104, coextensive with surface 3 of the ring 2. The shaft 21 continues to turn while the shaft 15 remains stationary and when the shaft 21 has turned 270° the switch 52 opens and the spring 47 smoothly and evenly returns the depressor 45 to its inoperative position.

At 120° rotation of shaft 21, the embracement which carries the spring has moved to a position over slide 4, where it stops. If the spring is long enough, it touches contactor 76, which causes slide 4 to open and to discharge the spring to drawer 38. If the spring is too short to touch contactor 76, it advances to a position over slide 5, where if it is long enough, it touches contactor 78. This step-by-step advancement continues until the spring touches a contactor, which then opens a slide and discharges the spring to the appropriate drawer. Regardless of which contactors the spring ultimately contacts, the trap door over which it is then registered opens, providing the top end of the spring contacted the contactor during the first portions of the stops in registration therewith and not during the latter portions of these stops when the spring had begun to vibrate. If the spring is too short to touch any of the contactors it ultimately arrives over the hole 42 and it then falls from the embracement carrying it. As previously explained, the springs are conveyed from the various trap doors to appropriate collection points.

Having thus fully disclosed a preferred embodiment of the classifying device of the present invention, I desire to claim as new the following.

I claim:

1. A coil spring classifier including a member with a substantially horizontal, smooth, flat top surface having a series of flush trap doors, a plurality of upstanding spring embracements mounted to travel repetitiously over said top surface of the member in line with the series of trap doors, the embracements being so constructed and arranged as to hold the springs at right angles to the top surface of the member with the bottom ends of the springs supported on the top surface of the member, means for causing said embracements to travel intermittently, with stops while in registration with said trap doors, means for gauging the height of the springs at each trap door, means associated with each trap door operable in response to the gauging means above it to open the trap door when the spring above it is of a predetermined height, a top-spring-end depressor registered above an embracement-stopping position in advance of the series of trap doors, means for operating said depressor during said stops, said depressor operating means including an air cylinder connected to the depressor, a source of compressed air, and valve means between the source and the cylinder operated in timed relationship with the means for causing the embracements to travel to admit air to the cylinder to cause the depressor to contact the spring during stoppage of the embracements and later, during the same stoppage, to exhaust air from the cylinder to withdraw the depressor from contact with the spring, and means for assisting removal of springs from the embracements when the trap doors beneath such springs are open, said last named means comprising an air jet positioned above each embracement above a trap door, said jet being directed to discharge a stream of gas on top of each spring in such embracements, and conduits connecting said jets to the discharge port of the valve so that compressed air discharged from the depressor operating air cylinder is discharged through the jets.

2. A coil spring classifier including a member with a substantially horizontal, smooth, flat top surface having a series of flush trap doors, a plurality of upstanding spring embracements mounted to travel repetitiously over said top surface of the member in line with the series of trap doors, the embracements being so constructed and arranged as to hold the springs at right angles to the top surface of the member with the bottom ends of the springs supported on the top surface of the member, means for causing said embracements to travel intermittently, with stops while in registration with said trap doors, a top-spring-end contactor over each trap door above the embracement tops at differing heights, each of said contactors being mounted on a support above the member with the horizontal top surface by means of an adjustable micrometer mounting, said mounting including an internally threaded barrel mounted on the support and a spindle projecting therethrough and having threaded engagement therewith, the contactor being mounted on the lower end of the spindle, the spindle having a longitudinal passage therethrough and the contactor having a passage therethrough connecting with the passage through the spindle and emerging at the lower top-spring-end contacting surface of the contactor, means to supply compressed gas to the upper end of the passage through the spindle, valve means to allow passage of gas through the spindle and contactor to emerge as a stream on a top-spring-end in an embracement beneath the contactor and above a trap door, means to operate the valve to discharge gas from the contactor only when an embracement is beneath the contactor, means connected to each trap door selectively to open and close the doors, and means operated by the top-spring-end contactor for each trap door to actuate the trap door, the contactor over which is contacted by a top-spring-end momentarily, to open the door to allow the spring to escape from the embracement and to close it thereafter.

3. A coil spring classifier including a member with a substantially horizontal, smooth, flat top surface having a series of flush trap doors, a plurality of upstanding spring embracements

mounted to travel repetitiously over said top surface of the member in line with the series of trap doors, the embracements being so constructed and arranged as to hold the springs at right angles to the top surface of the member with the bottom ends of the springs supported on the top surface of the member, means for causing said embracements to travel intermittently, with stops while in registration with said trap doors, a top-spring-end contactor over each trap door above the embracement tops at differing heights, each of said contactors being mounted on a support above the member with the horizontal top surface by means of an adjustable micrometer mounting, said mounting including an internally threaded barrel mounted on the support and a spindle projecting therethrough and having threaded engagement therewith, the contactor being mounted on the lower end of the spindle, the contactor having a lower face with a flat centrally located circular zone located in a plane parallel to the top flat surface of the member and a zone surrounding the central zone in the form of a surface of revolution about the axis of the spindle, the distance from points on the outer zone of the contactor to the top surface of the member decreasing gradually in a direction approaching the central zone of the lower contactor surface, the spindle having a longitudinal passage therethrough and the contactor having a passage therethrough connecting with the passage through the spindle and emerging at the lower top-spring-end contacting surface of the contactor, means to supply compressed gas to the upper end of the passage through the spindle, valve means to allow passage of gas through the spindle and contactor to emerge as a stream on a top-spring-end in an embracement beneath the contactor and above a trap door, means to operate the valve to discharge gas from the contactor only when an embracement is beneath the contactor, means connected to each trap door selectively to open and close the doors, and means operated by the top-spring-end contactor for each trap door to actuate the trap door, the contactor over which is contacted by a top-spring-end momentarily, to open the door to allow the spring to escape from the embracement and to close it thereafter.

4. A classifier for coil springs comprising a metal plate having a smooth horizontal surface and containing a plurality of arcuately arranged spring discharge holes, slides normally closing said discharge holes, a rotatably supported turntable above said plate, a plurality of arcuately arranged spring embracements on said turntable, means for rotating said turntable in step-by-step fashion with embracements stopping in registry with said discharge holes, electric contactors of progressively decreasing height above said discharge holes, motors for operating said slides, and electric means for operating the corresponding motor when a spring which is positioned above a discharge hole touches the contactor above that hole, said electric means including a relay for each of said motors, a circuit which connects the solenoids of said relays, said contactors and said plate and which is conditioned after said turntable stops, said circuit closing and energizing the corresponding relay when a spring touches a contactor, a first set of contacts in each of said relays which closes when the relay is energized and seals in this relay, a second set of contacts in each of said relays which closes when the relay is energized, a circuit which connects said second sets of relay contacts and said motors, said last named circuit being conditioned for the corresponding motor when any of said second sets of contacts close, and a switch for completing the circuit to any of said motors while that circuit is conditioned.

5. A classifier for coil springs comprising a metal plate having a smooth horizontal surface and containing a plurality of arcuately arranged spring discharge holes, slides normally closing said discharge holes, a rotatably supported turntable above said plate, a plurality of arcuately arranged spring embracements on said turntable, means for rotating said turntable in step-by-step fashion with embracements stopping in registry with said discharge holes, electric contactors of progressively decreasing height above said discharge holes, motors for operating said slides, and electric means for operating the corresponding motor when a spring which is positioned above a discharge hole touches the contactor above that hole, said electric means including a relay for each of said motors, a circuit which connects the solenoids of said relays, said contactors and said plate and which is conditioned for an interval after said turntable stops, said circuit closing and energizing the corresponding relay when a spring touches a contactor during said interval, a first set of contacts in each of said relays connected to the solenoid of that relay and closing when the solenoid is energized for sealing in the relay, a second set of contacts in each of said relays free of connection with the solenoids and closing when the solenoid is energized, a circuit which connects said second sets of relay contacts and said motors, said last named circuit being conditioned for the corresponding motor when any of said second sets of contacts close, and a switch for completing the circuit to any of said motors while that circuit is conditioned.

GEORGE DONALD FENTON.

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