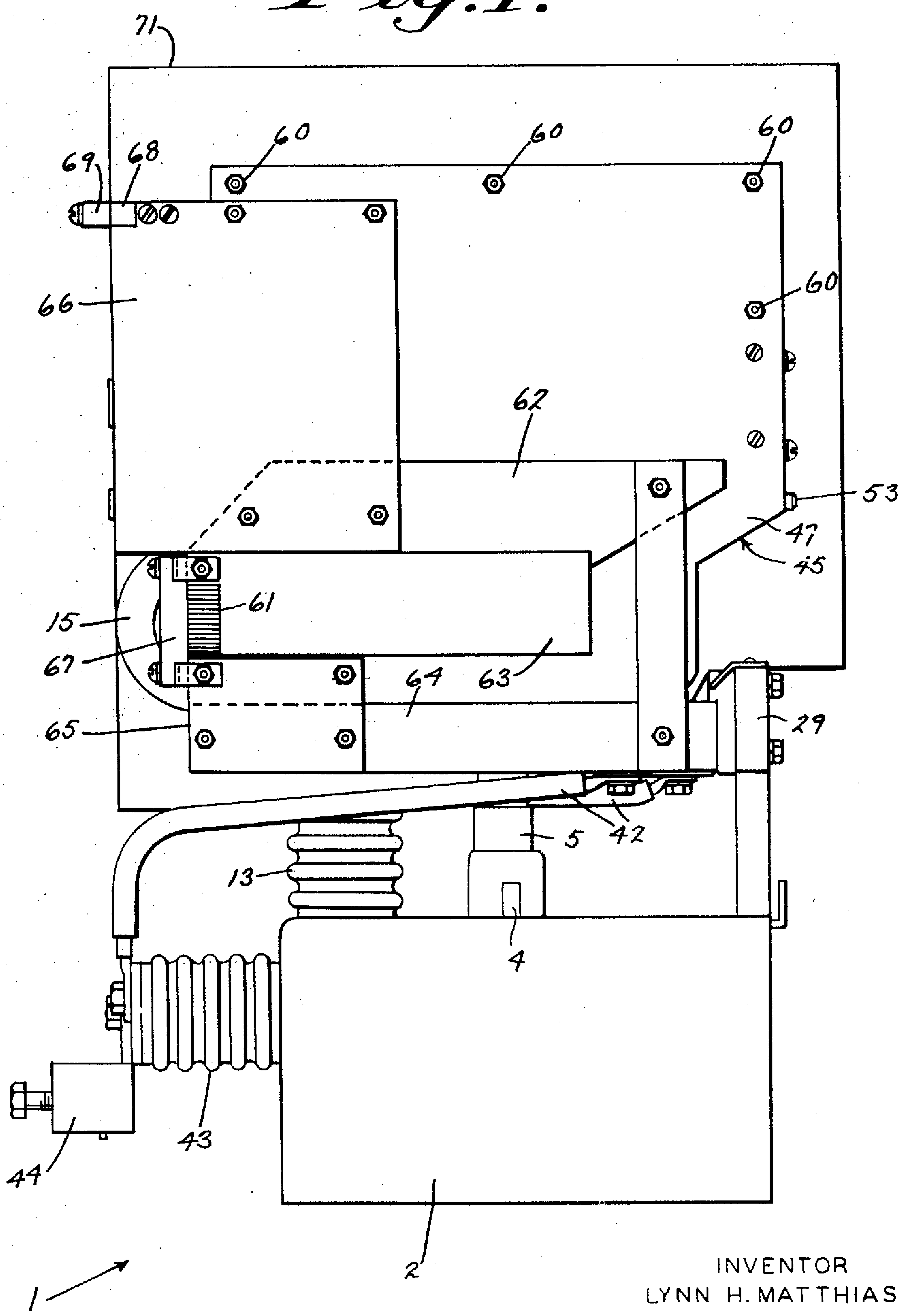
Sept. 20, 1960 L. H. MATTHIAS 2,953,666

HIGH VOLTAGE AIR BREAK SWITCH

Filed Dec. 31, 1956 5 Sheets-Sheet 1

Fig. 1.



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HIGH VOLTAGE AIR BREAK SWITCH

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Fig. 2.

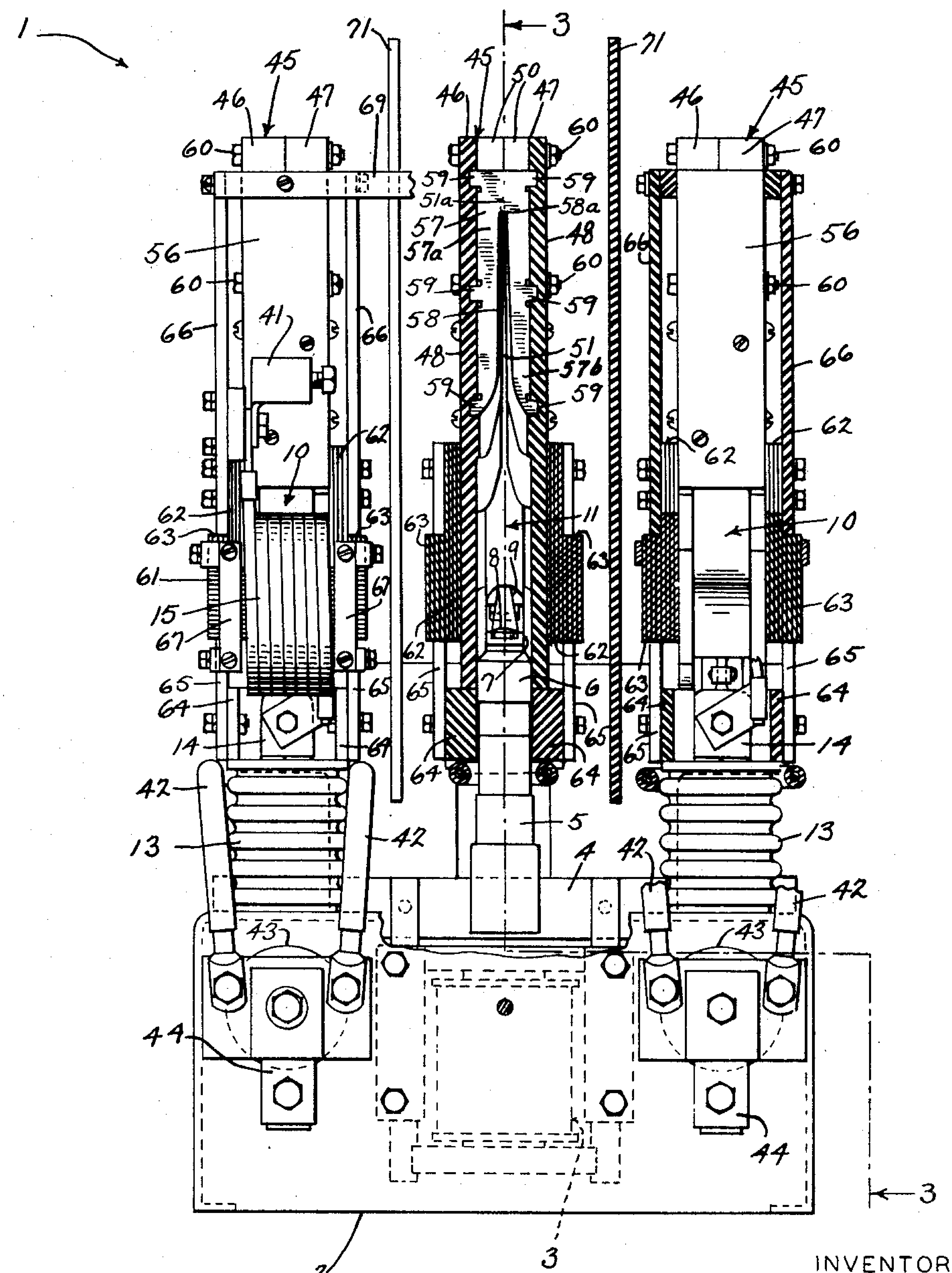

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Fig. 3.

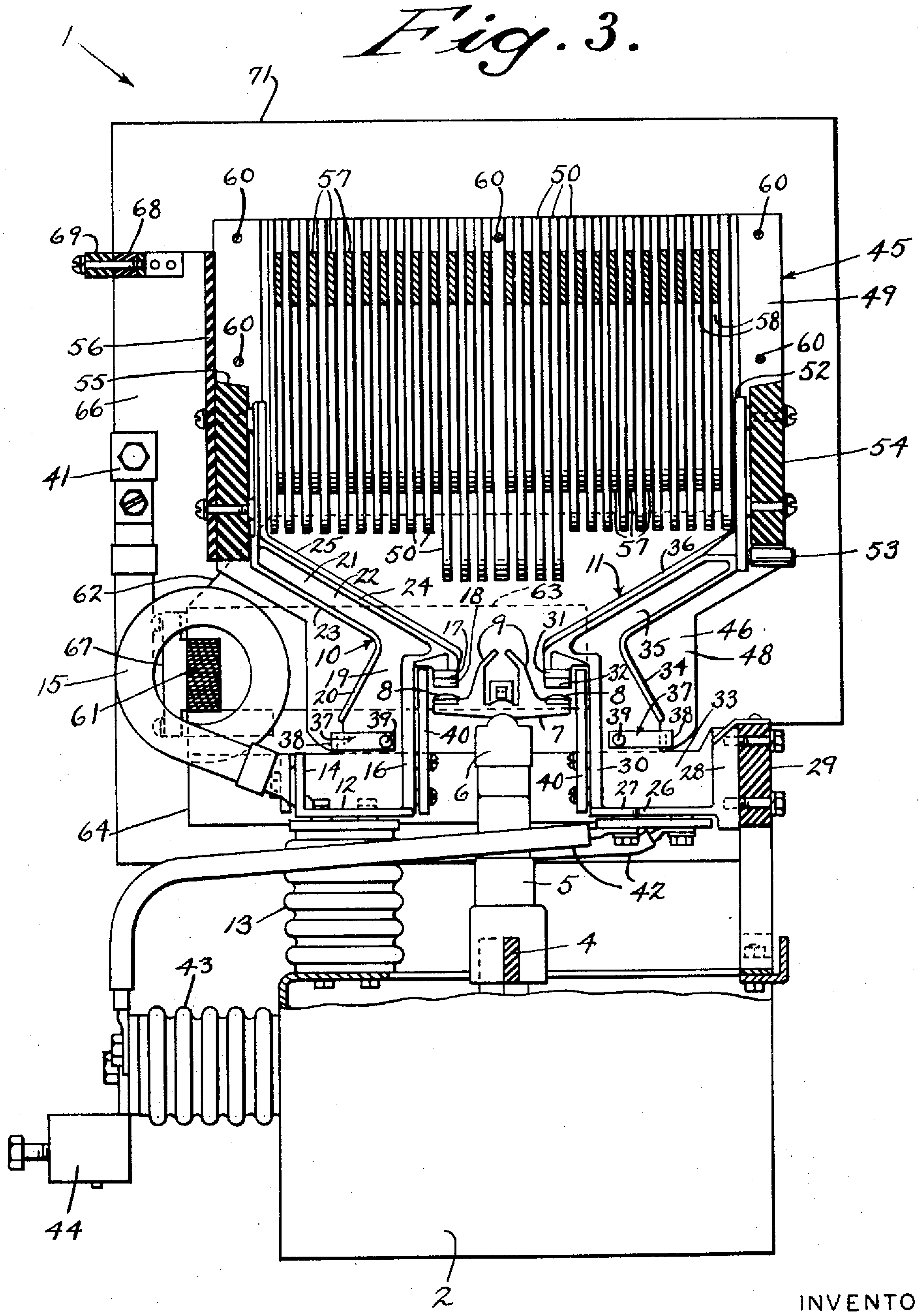

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Fig. 4.

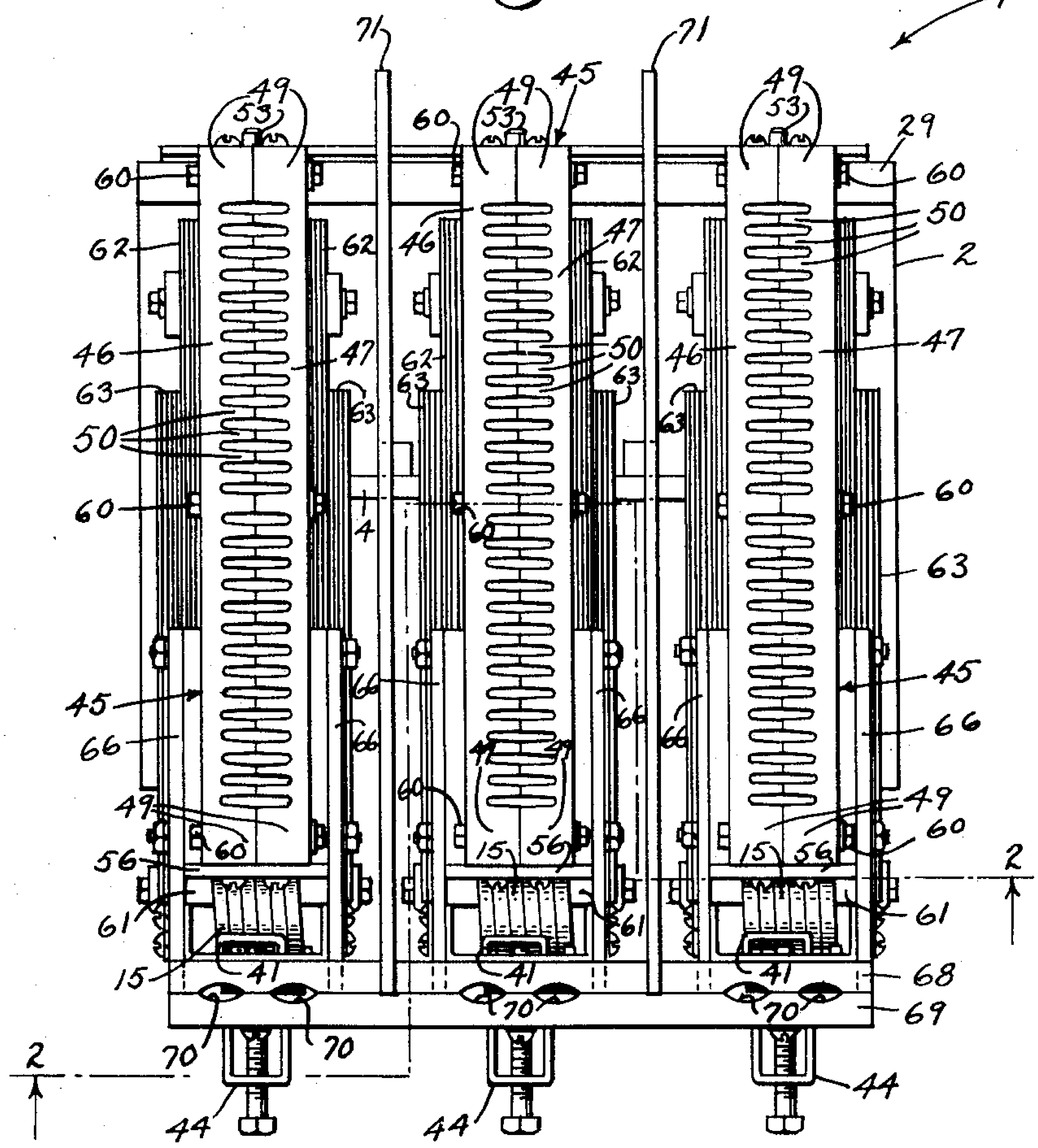

Fig. 5.

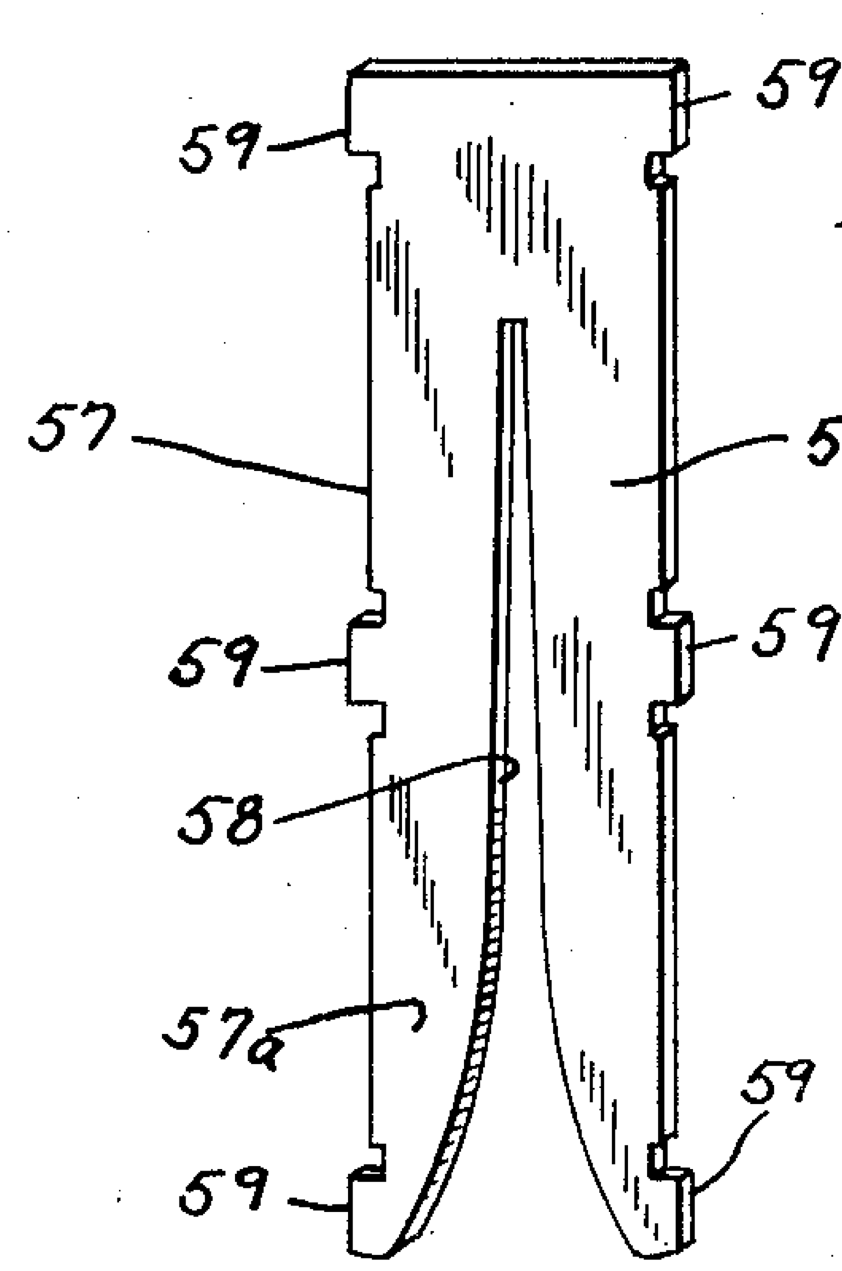

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Fig. 6.

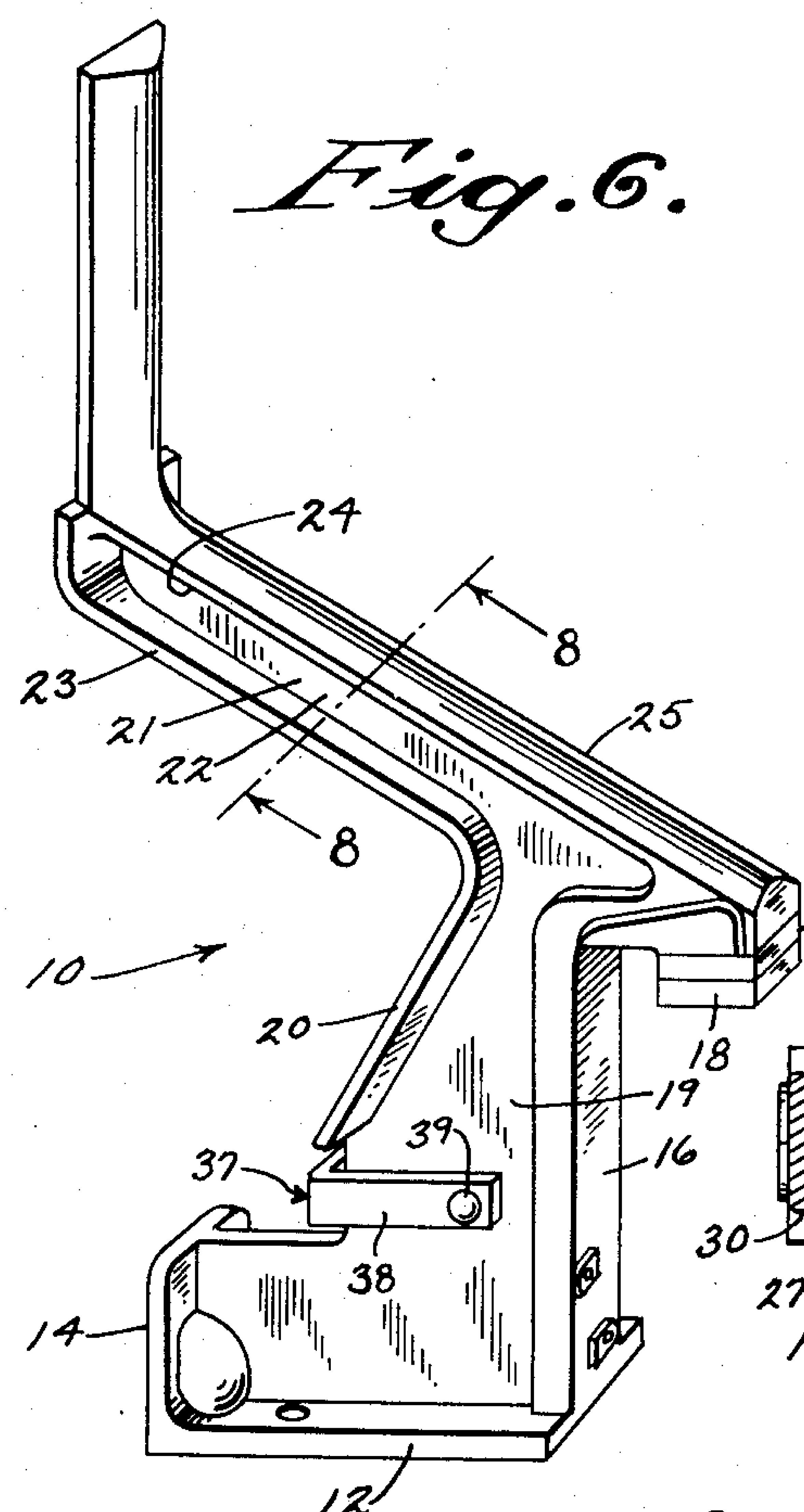


Fig. 7.

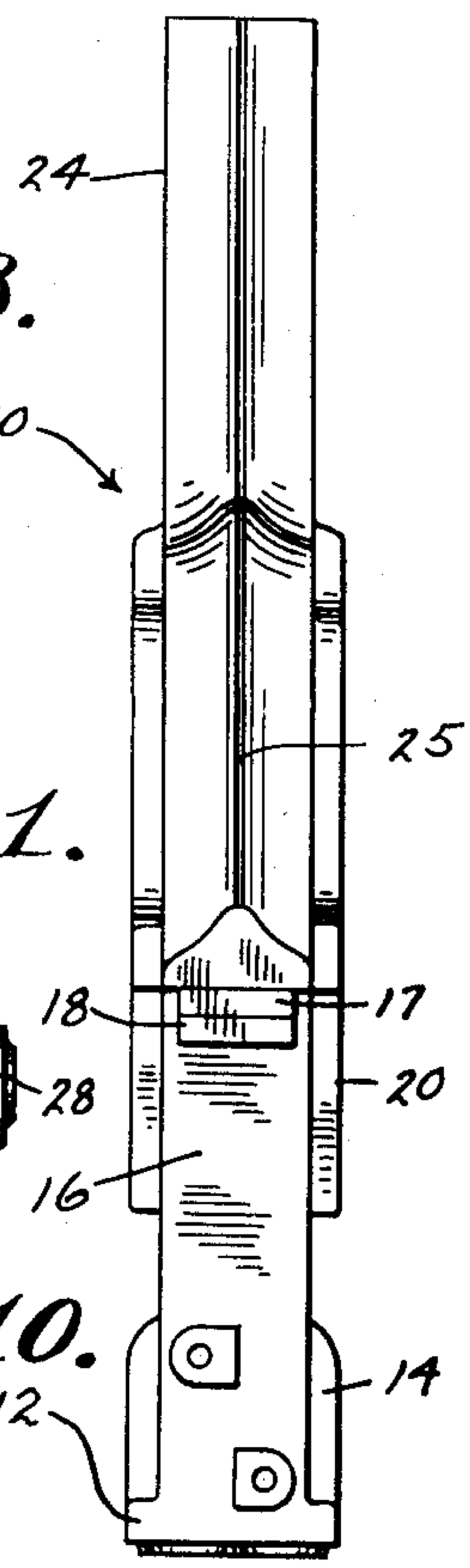


Fig. 8.

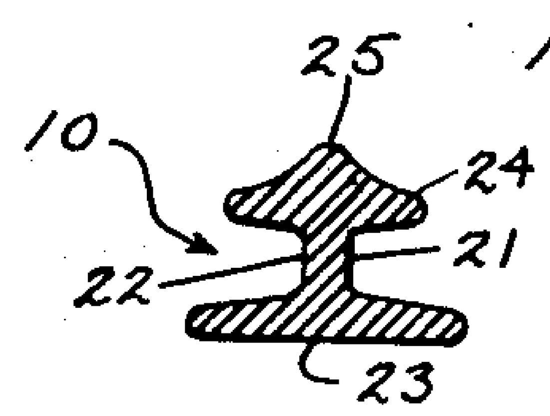


Fig. 11.

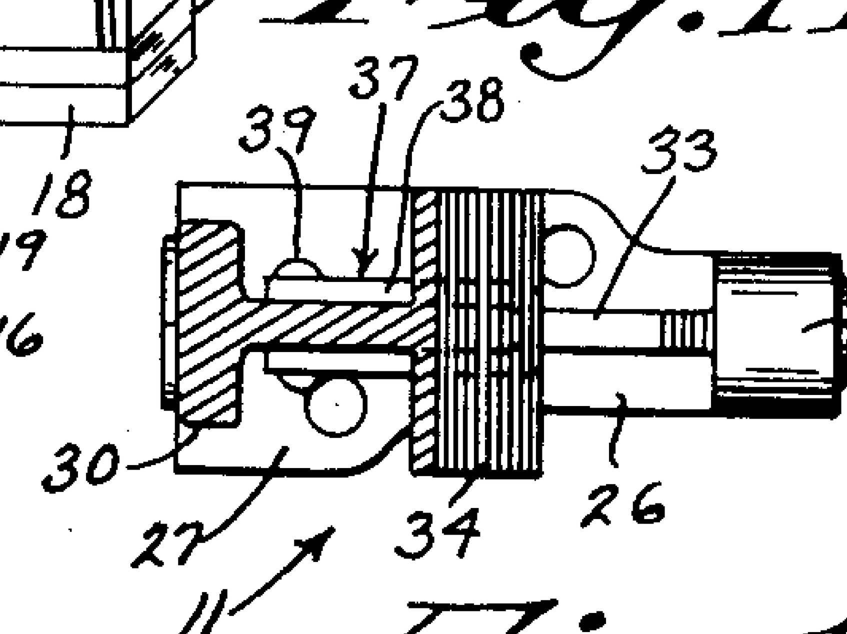
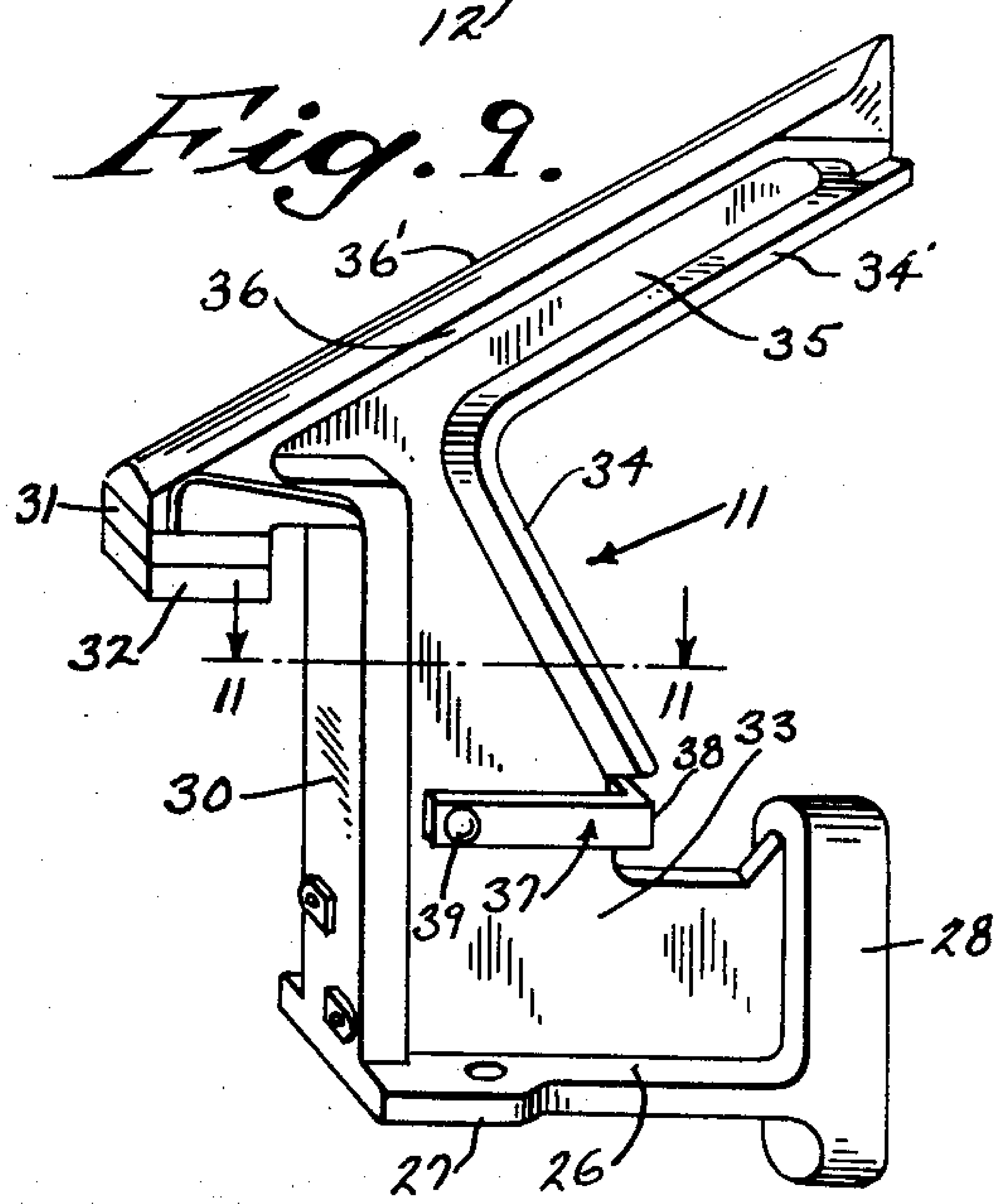
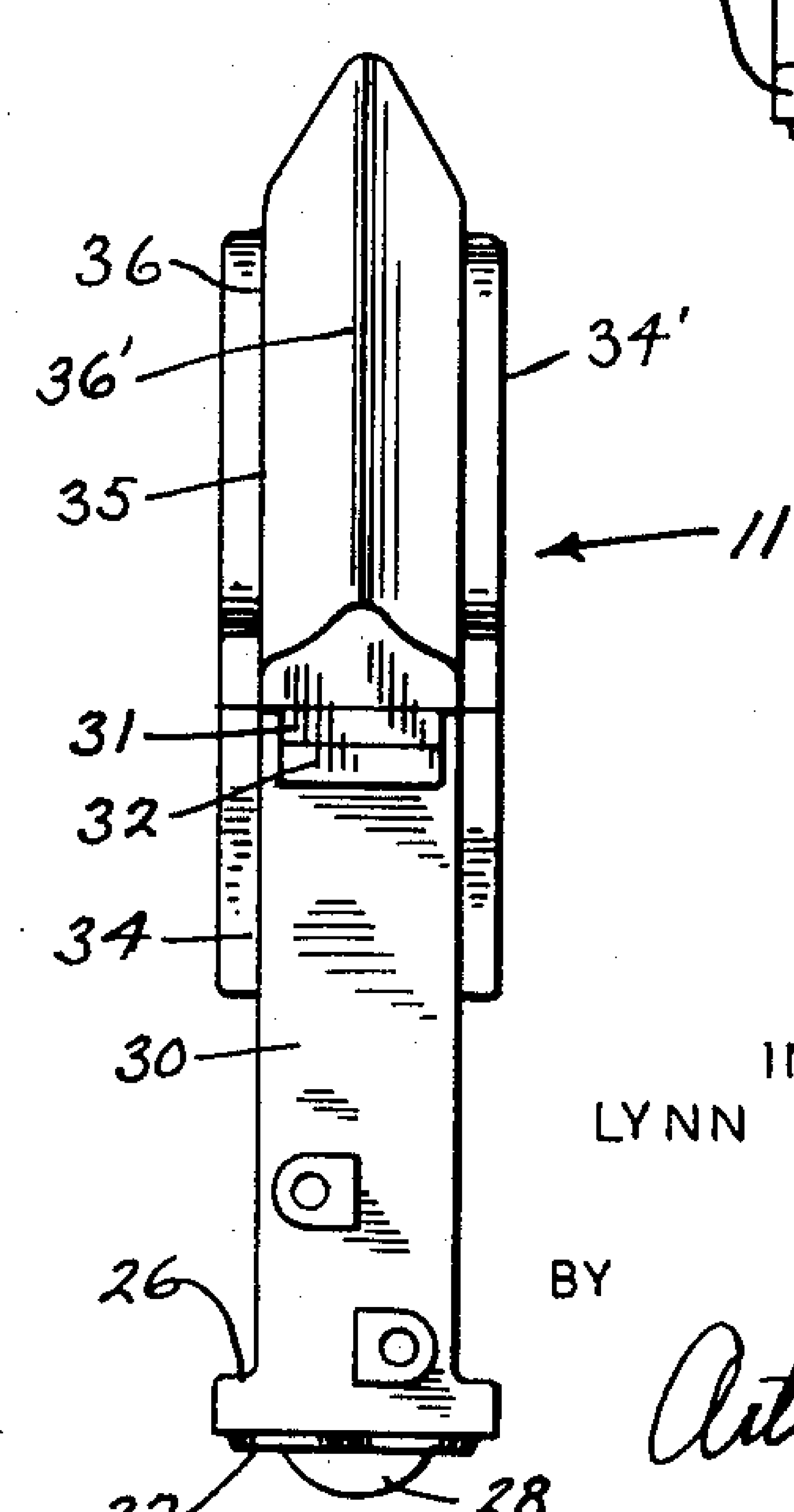


Fig. 10.

Fig. 9.





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HIGH VOLTAGE AIR BREAK SWITCH

Lynn H. Matthias, Fox Point, Wis., assignor to Allen-Bradley Co., Milwaukee, Wis., a corporation of Wisconsin

Filed Dec. 31, 1956, Ser. No. 631,907

6 Claims. (Cl. 200—147)

This invention relates to electric switches for interrupting large currents at high voltages, and it more particularly resides in an air break type circuit interrupter having a double break movable contact with current paths and associated magnetic members to cause arcs drawn upon opening of the interrupter to be merged, then lengthened, and drawn into an arc extinguishing chute for rapid extinction of the arc.

Considerable work has been done in the design and construction of air break switches that include arc extinguishing chutes having a plurality of slotted grids and magnetic means in which arcs are extended and moved upward to accomplish arc extinction. Such switches are utilized for the interruption of large currents at high voltages. Oil immersed switches also find favor in applications requiring high interrupting capacity. Where contact operation is infrequent the oil immersed switch is quite satisfactory, but where switching becomes frequent, as in the case of the control of mill motors and the like, the oil immersed switch exhibits serious limitations. Arcing occurring between immersed contacts upon circuit interruption carbonizes some of the oil, and the resulting electrically conductive particles become suspended within the oil. Also, metallic particles evaporated from the contacts during arcing become dispersed in the oil. The dielectric strength of the oil in the switch is impaired and the arc interrupting capacity of the oil immersed switch is adversely affected. As a consequence considerable maintenance is required of the oil switch when operation is frequent.

The air break switch does ont require the maintenance and upkeep of the oil switch, and the present invention provides an air break switch of large current interrupting capacity adapted for the control of high voltage motors and circuits requiring frequent switching. In the form of the invention illustrated herein double break movable contacts are employed, with current paths leading to and from the contacts which give rise to magnetic fields that urge initially drawn arcs toward one another to thereby merge and form a single arc spanning a pair of diverging arc horns. The arc is then subjected to a magnetic field that accelerates the arc upwardly along the horns. This magnetic field is defined by two magnetic plates ranged alongside the divergent portions of the arc horns and extends between the plates thereby traversing the space between the horns. The plates are connected at the rear of the switch by a magnetic bridging core around which is wound a coil connected in series with the contacts. A grouping of magnetic grids within an arc extinguishing chute extend above the arc horns and are adapted to establish a strong magnetic field derived from the arc current. These grids are spaced above the magnetic plates at a distance that is adequate to prohibit the grids from forming a magnetic by-pass for the field of the plates. Three magnetic fields are thus provided. The first field is localized about the current conductors and double break contacts to impart a particular motion to the two initial arcs, the second field extends across the space between the diverging arc horns to rapidly accelerate the arc upwardly, and the third field is in the upper portions of an arc chute to assist a continuation of the upward arc travel.

The magnetic grids are interleaved with grids of insulating material comprising a part of the arc extinguishing chute. The chute and its grids may be comprised of a material such as a mineral dielectric exhibiting arc extinguishing characteristics, by virtue of an ability to deionize and cool gases forming an arc path. The magnetic and insulating grids both have a central slot narrowing in width, similarly as in other structures of this kind. In the present invention the slot of the magnetic grids terminates at a lower level, to extend across the slots of the insulating grids. This relationship causes an upwardly traveling arc to be extinguished before the entire length of the slots is traversed.

It is an object of this invention to provide a switch of the air break type having a large current interrupting capacity at high voltages.

It is another object of this invention to provide a switch of the air break type having improved means to cause arc movement which enhance arc interruption.

It is another object of this invention to provide a switch of the air break type having current conducting members of configurations imparting strength and rigidity to the switch for withstanding forces to which they are subjected.

It is another object of this invention to provide a switch of the air break type in which magnetic fields are established, by the configuration of the current conductors, that interact with the magnetic fields of the current traversing the contacts to urge the movable contacts toward the closed position, to thereby augment the force of the switch actuator.

It is another object of this invention to provide a switch of the air break type that quickly accelerates an arc into an arc extinguishing chute which also decelerates the arc when it reaches the upper limits of the chute.

The foregoing and other objects and advantages of this invention will appear from the description to follow. In the description reference is made to the accompanying drawings, which form a part hereof, and in which there is shown by way of illustration and not of limitation a specific form in which this invention may be embodied.

In the drawings:

Fig. 1 is a side view in elevation of a circuit interrupting switch of the air break type embodying the invention,

Fig. 2 is a rear view in elevation with parts broken away and in section of the circuit interrupting switch shown in Fig. 1,

Fig. 3 is a side view in elevation and in section of the switch taken on the plane 3—3 shown in Fig. 2.

Fig. 4 is a plan view of the switch shown in Fig. 1,

Fig. 5 is a view in perspective of a magnetic grid forming a part of the circuit interrupting switch,

Fig. 6 is a view in perspective of a current conductor forming a part of the circuit interrupting switch,

Fig. 7 is an end view in elevation of the current conductor of Fig. 6,

Fig. 8 is a view in section of the current conductor of Fig. 6 taken on the plane 8—8,

Fig. 9 is a view in perspective of a second current conductor forming a part of the circuit interrupting switch,

Fig. 10 is an end view in elevation of the current conductor of Fig. 9, and

Fig. 11 is a view in section of the current conductor of Fig. 9 taken on the plane 11—11.

Referring now to the drawings, there is shown a three phase circuit interrupting switch 1 having a base 2 that houses an electromagnetic actuator 3, shown by dotted outline in Fig. 2. Above the actuator 3 is a cross bar 4 moved upwardly and downwardly in response to energization and deenergization of the actuator 3. A set of three spaced vertical contact mounts 5 of insulating material extend upwardly from the cross bar 4, and each contact mount 5 supports an inverted cup 6 at its upper end that houses a contact bias spring, not shown. On the crowned top of each inverted cup 6 is a bridging contact member 7, one of which is clearly shown in Fig. 3. Each bridging contact member 7 has, at each of its ends, an upwardly facing movable contact 8, and a pair of upwardly extending converging supplementary arc horns 9 complete each bridging contact member 7.

A rear stationary current conductor 10, on the left-hand side as viewed in Fig. 3, and a front stationary current conductor 11, on the right in Fig. 3, is associated with each bridging contact member 7. Each conductor 10 stands upon an upright insulator 13, mounted upon the base 2, and each of the conductors 11 is secured to an insulating rail 29 extending across the front of the switch.

Reference is now made to Figs. 6 through 8, which are of a rear stationary current conductor 10. A base 12 for the conductor 10 is adapted to be secured to one of the upright insulators 13 and includes an attachment bus 14 for electrical connection with an associated blow-out coil 15. A current path in the form of a flange 16 of substantial cross-section merges with and extends vertically upward from the base 12. The flange 16 is turned to the horizontal at the upper end and carries a downwardly extending end piece 17 of relatively short length that loops back upon the vertical portion of the flange 16 in an overhanging fashion. A downwardly facing stationary contact 18 is mounted on the end piece 17 in a position directly above a movable contact 8 of a bridging contact member 7, to be engaged thereby upon upward movement in response to the actuator 3.

A reinforcing web 19 merges with the side of the current conducting flange 16 that is opposite the overhanging stationary contact 18, and extends downwardly to merge with the base 12 and its attachment bus 14. The web 19 thus imparts substantial rigidity and strength to adequately withstand the forces developed during both arc interruption and normal switching. A gas confining flange 20 is formed along the rear margin of the web 19, which is of substantially greater width than the conducting flange 16, as shown in Fig. 7.

Extending upwardly, at an incline, from the horizontal end of the flange 16 is an arc horn 21 of I-shaped cross-section, as shown in Fig. 8. A central web 22 of the arc horn 21 is an integral extension of the reinforcing web 19 and a gas confining flange 23 of the arc horn 21 is an integral extension of the flange 20. An upper flange 24 of the arc horn 21 includes a raised longitudinally extending central rib 25 that forms an arc runner. The flange 24 and rib 25 continue upwardly beyond the web 22 and flange 23 in a vertical rise to complete the arc horn 21.

A front current conductor 11 is shown in Figs. 9–11, and is of a configuration similar to that of the conductor 10. A base 26 for the conductor 11 comprises a connection bus 27 and a vertical portion 28 adapted for mounting the conductor 11 to the insulating rail 29. The conductor 11 includes a vertical conducting flange 30 to form a current path like that afforded by the conducting flange 16 of the conductor 10. The conducting flange 30 has a horizontal upper end carrying an overhanging end piece 31, to which is mounted a downwardly facing stationary contact 32. The contact 32 is disposed in vertical alignment with a bridging contact 8 for contact engagement upon an upward movement of the associated bridging contact member 7. A reinforcing web 33 is merged with the conducting flange 30 and extends downwardly to join with the base 26 and its vertical portion 28. At the margin of the web 33 opposite the conducting flange 30 there is a gas confining flange 34 similar to the flange 20 of the conductor 10.

Merged with and extending upwardly at an incline from the top of the conducting flange 30 is an arc horn 35 having an upper flange 36 with a raised central rib 36' which forms an arc runner. The arc horn 35 also includes a gas confining flange 34' which is an integral extension of the flange 34. The configuration of the arc horn 35 is similar to that of the arc horn 21, with the exception that there is no vertical continuation of the flange 36.

Each current conductor 10, 11 is formed of a conducting material, preferably cast, to present a unitary structure that is rugged and strong to withstand forces encountered. As such, current may flow through any part of the material comprising the conductors 10, 11, and to restrict current flow within desired cross-section areas each conductor 10, 11 includes a magnetic link 37. Each link 37 comprises a U-shaped member 38 of magnetic material extending about a portion of a web 19, 33 and a rivet 39 also of magnetic material that extends through the respective web 19, 33 and connects with the ends of the U-shaped member 38. Each link 37 presents a closed magnetic circuit encircling a major cross-sectional area of each web 19, 33, as shown for example in Fig. 11. The impedance of the conductive path enclosed by a link 37 is very large in comparison to the parallel unenclosed path through the adjacent conducting flange 16, 30, and thus the major current flow of consequence is through the flanges 16, 30. The low impedance current path of each conductor 10, 11, and hence the direction of current flow, therefore, has a definite directional relation to the current flow through the associated bridging contact member 7.

As shown in Fig. 3, each pair of current conductors 10, 11 is placed in longitudinal alignment with the associated bridging contact member 7, and an insulating block 40 is fastened to each flange 16, 30 in a position between the flange 16, 30 and the associated bridging contact member 7. Each blow-out coil 15 comprises a number of tight turns with one end joined to a bus 14 of a conductor 10 and the opposite end joined to a terminal load 41. For the switch shown in the drawings, a pair of heavy conductor cables 42 is connected to each bus 27 of a conductor 11 and extends to a stand-off insulator 43 at the rear, where connection is made with a line terminal 44.

The circuit interrupting switch 1 includes a set of three arc extinguishing chutes 45, each of which arc chutes 45 encloses a set of stationary current conductors 10, 11 and an associated bridging contact member 7. Each arc chute 45 is composed of materials that aid arc extinction, and materials that may be selected are known in the art. In the form of the invention shown in the drawings, the arc chutes 45 are of a molded dielectric material that exhibits the characteristics of deionizing and cooling gases in an arc path. Each arc chute 45 comprises two identical half sections 46, 47 that abut one another along a central division extending lengthwise of the chute 45. Each half section 46, 47 has a side wall 48 of thin cross-section as is clearly shown in the central arc chute assembly 45 of Fig. 2. As is shown in Fig. 3, the bottom edge of each side wall 48 is beneath the lowermost position of the associated bridging contact member 7. Each side wall 48 extends upwardly and increases in length to range alongside the associated diverging arc horns 21, 35 which it covers. The upper extent of the walls 48 is considerably above the upper ends of the conductors 10, 11, and the ends of each arc chute 45, formed by the upwardly extending walls 48, are partially closed by end walls 49.

A plurality of spaced insulation grids 50 are molded with the side walls 48 as an integral part of the chutes 45. The grids 50 are of a configuration as shown in the central arc chute 45 of Fig. 2, and with the two halves **46**, **47** of an arc chute **45** assembled each insulation grid **50** has a central vertical slot **51** formed with a wide throat at the bottom and a converging taper that narrows with vertical ascent. The slots **51** terminate at a level below the upper edges of the grids **50**, and are aligned to present arc paths through the chutes **45** that become more constricted with vertical ascent. The spacing between the grids **50** provides a plurality of openings at the top of each arc chute **45** for the exit of hot gases created during the interrupting of an arc. A central group of grids **50**, in each arc chute **45**, as clearly shown in Figs. 2 and 3, extends downwardly to a greater depth than the grids to either side. In this fashion the grids **50** are positioned immediately above the entire sloping length of the inclined arc horns **21**, **35**, to receive an arc before it is fully elongated. For low current arcs extinction may be accomplished by the deionizing effect of this central group of grids **50**.

At the front of each arc chute **45**, that is, on the right-hand side as seen in Fig. 3, an arc runner extension **52** is secured by a bolt **53** to the upper end of the associated arc horn **35**, so as to have a vertical extension for the flange **36** and its arc runner **36'** which corresponds to the vertical extension of the oppositely disposed flange **24** and its arc runner **25**. An insulating block **54** is secured to the front side of each arc runner extension **52** which forms lower continuations of the end walls **49**, to enclose the front of each arc chute **45**. At the rear of each arc chute **45**, or on the left-hand side as seen in Fig. 3, an insulating block **55** is secured to the vertical extension of each flange **24** to close the opening in each arc chute **45** beneath the rear end walls **49**. Behind each insulating block **55** is placed an insulating sheath **56**.

Interleaved with the insulation grids **50** is a plurality of metallic grids **57**, one of which is shown in Fig. 5. Each metallic grid **57** has a tapered central slot **58** having a wide throat at the bottom from which it narrows with vertical ascent. Each grid **57** is thus formed with two legs **57*a*** and **57*b*** that join at their upper ends. The slots **58** of the metallic grids **57** are similar to the slots **51** of the insulation grids **50**, with the principal distinction that over the major length of the slots **58** the width is greater than for the corresponding widths of the slots **51** of the insulation grids **50**. In this fashion, the edges of the slots **58** of the metallic grids **57** are set back from the edges of the slots **51** in the insulation grids **50**. The slots **58** of the metallic grids **57** also terminate at a lower level than the slots **51** of the insulation grids **50**, so that near the top of the slots **51** the magnetic material of the grids **57** is interposed in the arc path afforded by the grids **50**. The upper terminations of the slots **51** and **58** are shown in Fig. 2, wherein the slot **58** of the metallic grid **57** terminates at **58*a***, and the slot **51** of the adjacent grid **50** continues upwardly, as shown in dotted lines, to its apex at **51*a***.

To retain the metallic grids **57** in place a plurality of ears **59** is provided on each. The ears **59** engage mating recesses provided in the side walls **48** of the arc chutes **45**, and to retain the grids **57** and arc chute halves **46**, **47** assembled, a plurality of assembly bolts **60** are passed through the halves **46**, **47**. As will be seen in Figs. 2 and 3, a uniform metallic grid size is employed across the entire length of each chute **45**, and where the central insulation grids **50** are of increased vertical length, at the region above the movable contact members **7**, the metallic grids **57** do not correspondingly increase in length. The reason for retaining the lowermost extent of each grid **57** at a particular level will be discussed hereinafter.

A laminated magnetic bridging core **61** extends through each blow-out coil **15**. Each core **61** extends beyond the end of its coil **15** and abuts a magnetic side plate **62** that extends rearwardly along the outside of the associated arc chute side wall **48**. The general configuration of a side plate **62** is shown in Figs. 1 and 3. Each plate **62** rises diagonally from the top of a core **61** toward the upper extent of the inclined portion of an arc horn **21**, and hence horizontally forwardly across the entire gap between the diverging arc horns **21**, **35**. From this point the plate **62** descends on an incline paralleling the associated arc horn **35** to a point just to the front of the bridging contact member **7**. The plate **62** then follows a vertical descent to beneath the lower position of the associated contacts **8**, and hence horizontally rearward to the lower side of the magnetic core **61**. With a plate **62** being located on each side of a set of current conductors **10**, **11** a magnetic field is established by current in the associated blow-out coil **15** that passes across the entire area between the divergent arc horns **21**, **35**. Laminated supplementary magnetic plates **63** lie alongside portions of each of the side plates **62** to provide for uniform flux densities in the plates **62**, **63** and for a field of substantially uniform density between the plates **62**.

Each of the arc chutes **45** has its lower edges resting upon a joist **64**. At the rear of each joist **64** is a rectangular piece of insulation **65** that supports the rear end of a magnetic plate **62**, and extending above each supplementary side plate **63** is a large rectangle of insulation **66** which lends support to the associated arc chute **45**. To retain the blow-out coils **15** and magnetic cores **61** in place brackets of insulation **67** extend across the rear of the cores **61**. Across the upper rear edges of the large rectangular insulation blocks **66** extends two insulation strips **68** and **69** which, as shown in Fig. 4, have a number of recesses **70** through which cables may be extended that are to be connected to the terminals **41**. A pair of large insulating partitions **71** are disposed between adjacent arc chutes **45** to isolate one from the other.

The current path presented by each pair of current conductors **10**, **11** extend from the attachment bus **14** of a rear stationary conductor **10** across the lower portion of a web **19** and a base **12** to a vertical conducting flange **16**. The current path then travels vertically upward through the flange **16** and loops at the upper end of the flange **16** to turn downwardly through a stationary contact **18**. The current path then passes horizontally through a bridging contact member **7**, and hence upwardly through a stationary contact **32** to loop back down through a flange **30** of a front stationary conductor **11**. From the vertical descent through the flange **30** the current path passes to the base **26**, and hence from the conductor **11**.

The current paths through each set of conductors **10**, **11** are of a configuration such that current being conducted will establish magnetic fields interacting with the field produced by the current flow through the associated bridging contact member **7** to create forces urging the contacts **8** upward toward closed position. Magnetic flux established by current flow in the vertical current conducting flanges **16** and **30** presents a field between the members **10**, **11** that includes the movable bridging contact member **7**. This flux is normal to the current flow in the member **7** and is in direction that develops forces urging the member **7** upwardly. Such forces aid the contact closing forces of the electromagnetic actuator **3**. To derive effective values of this magnetic force the current flow through the flanges **16** and **30** should follow a substantially vertical path for a substantial distance, so as to provide a magnetic field having sufficient direction orientated flux. By placement of the magnetic links **37** at a level beneath the open circuit position of the bridging contact members **7** adequate vertical extent is provided for the current flow in the flanges **16**, **30**. By the provision of the vertical current paths of flanges **16**, **30** the invention also advantageously utilizes surges in load current. Such surges increase the contact holding force, and this augmentation of the closing force occurs at the very time it is most essential that the switch apparatus not interrupt the circuit.

By turning the upper ends of the flanges **16**, **30** horizontally and then downwardly to terminate in the stationary contacts **18**, **32** a partial loop is established in the current path of each conductor **10**, **11**, at the top of each flange **16**, **30**. In each such current path loop the center of the loop is between the contact **18**, or **32**, and the respective flange **16**, **30**, and the resulting magnetic fields that are established in the vicinity of the current path loops upon current flow play a specific role in arc interruption. Upon deenergizing the actuator **3** the bridging contact members **7** will drop, and for each member **7** an arc will be drawn between each contact **8** and its associated stationary contact **18**, **32**. The magnetic field established by current passing through a loop urges the arc toward the center of the bridging member **7**. Thus, the two arcs drawn at the opposite ends of a member **7** each have the lower terminus moved from the contact **8** along the member **7**. The lower end of each arc will then move along a supplementary arc horn **9**, and as the supplementary arc horns **9** drop downwardly the lower arc ends will travel along the descending horns **9** to meet and form a single arc spanning the lower ends of the respective arc horns **21**, **35**.

Current flow through the blow-out coils **15** causes a strong magnetic field to be established between each pair of magnetic plates **62**, at right angles to the direction of the arcs drawn between the arc horns **21**, **35**. The interaction of the field of each blow-out coil **15** with the field of the associated arc current causes each arc to move rapidly upwardly along the associated diverging arc horns **21** and **35**. Each arc then enters the slots **51** of a set of insulation grids **50**, to be extinguished by cooling and deionization of the arc path.

As an arc moves above the upper edge of the magnetic plates **62** it enters within the slots of magnetic grids **57**. The magnetic grids **57** provide low reluctance flux paths. This magnetic flux path for an arc extends up one leg of a grid, across the top, and down the opposite leg to beneath the arc, where it crosses the grid slot. The effect of the resulting magnetic path is to urge the arc upwardly, as a further aid in extinguishing the arc.

In some instances arc interruption will not be achieved by the time the arc reaches the upper extent of the arc chute **45**. To retain the arc within the chute **45**, rather than to allow flashing from the top, the slot **58** of each magnetic grid **57** is terminated at a level beneath the termination of the insulation grid slots **51**. When an arc then moves above the slots **58** and between the magnetic grids **57**, so as to extend from magnetic grid to magnetic grid the magnetic material of each grid **57** is on all sides of the arc. The magnetic field of the arc will consequently be quite uniform and the magnetic field loses its effect as a propellant of the arc. In addition, the grids **57** cool the hot gases before they are emitted from the top of the chute **45**.

In order that an arc may be accelerated upwardly in a most rapid fashion the magnetic grids **57** are disposed wholly above the upper extent of the magnetic plates **62**. The grids **57** are spaced from the plates **62**, so as not to provide a shunt path for the flux passing between the plates **62**. It has been found that for a pair of plates **62** the distance between one plate **62** and the lower end of the closest leg of a grid **57** plus the distance between the other plate **62** and the lower end of the adjacent grid leg should be no less than two-thirds the distance between the two plates **62**.

The invention provides an air break switch for alternating current circuits to interrupt large currents at high voltages. It utilizes the double break contact and disposes the current paths and magnetic members in particular fashion, as described, to facilitate arc interruption, and thereby enhance the operation of the air break switch.

I claim:

1. In an arc extinguishing circuit interrupting switch the combination comprising a double break movable elongated bridging contact including spaced contact surfaces at opposite ends and a pair of supplementary elongated arc horns each rising from the bridging contact from a position adjacent a contact surface to a height above the contacts and sloping away from the respective contact surface to thereby provide converging arcing surfaces; a switch actuator supporting said bridging contact adapted to move the bridging contact from a position of rest to a circuit closing position; a first stationary conductor having a current path that extends substantially parallel alongside the entire path of travel of one end of said bridging contact as it moves from the position of rest to a circuit closing position, which current path continues beyond the circuit closing position and then turns upon itself to reverse the direction of the current path, the turned portion terminating with a stationary contact in facing relation to the contact surface at the end of the movable bridging contact alongside which the current path extends to be engaged thereby and also being disposed beneath the upper extent of the supplementary arc horn when the contact surfaces are in engagement; a second stationary conductor having a second current path that extends substantially parallel alongside the entire path of travel of the other end of said bridging contact as it moves from the position of rest to a circuit closing position, which current path continues beyond the circuit closing position and then turns upon itself to reverse the direction of the current path, the turned portion terminating with a stationary contact in facing relation to the contact surface at the end of the movable bridging contact alongside which the second current path extends to be engaged thereby and also being disposed beneath the upper extent of the supplementary arc horn when the contact surfaces are in engagement; a pair of divergent arc horns each extending from a turned portion of a stationary conductor at an incline receding from the other arc horn; a blow-out coil connected to the current path of one of said stationary conductors; and a pair of magnetic plates in flux conducting relation to the coil which extend at opposite sides alongside said divergent arc horns to produce a magnetic field traversing the space between the arc horns.

2. In an arc extinguishing circuit interrupting switch the combination comprising a pair of spaced stationary conducting members each having a lower attachment portion, a current conducting portion extending upward from the attachment portion which turns at its upper end to present an overhanging downwardly facing stationary contact, a strength imparting web of a thickness less than that of the current conducting portion which is integral with the side of the current conducting portion opposite the side which the contact overhangs and which lies in a plane substantially normal to and extends downwardly from the side of the conducting portion to the attachment portion to brace the current conducting portion, and a magnetic link encircling a major portion of a cross-section area of the web to minimize current flow within the web, an arc runner rising upwardly at an incline from the stationary contact, and an upper continuation of said web integral with the underside of said arc runner to impart strength to the structure; said stationary conducting members having the conducting portions thereof facing one another in parallel relation and the arc horns diverging upwardly from one another; and a movable bridging contact extending between the stationary contacts which is movable, in a path substantially parallel to said conducting portions, upwardly into and downwardly away from a position of engagement with the stationary contacts.

3. An apparatus in accordance with claim 2 having a pair of supplementary arc horns on said bridging contact that rise upwardly therefrom and converge toward one another with upward ascent.

4. In an arc extinguishing circuit interrupting switch

the combination comprising a double break movable bridging contact with contact surfaces at opposite ends; an actuator for the movable contact adapted to move the contact from a position of rest upwardly to a circuit closing position; and a pair of stationary conducting members spaced from opposite ends of the movable briding contact each having: a lower attachment portion, a current conductor of substantial cross-section extending upward from the attachment portion commencing at a point beneath the position of rest of said movable contact and paralleling the path of travel of an end of the movable contact which conductor turns at its upper end to present an overhanging downwardly facing stationary contact adapted to be engaged by said movable contact when moved into circuit closing position, a strength imparting web of a thickness less than said conductor which is integral with the conductor and which extends downwardly from the side of the conductor in a plane substantially normal to and opposite the side which the stationary contact overhangs to the attachment portion in bracing relation to the conductor, and a magnetic link encircling a major portion of a cross-section area of the web at a level beneath the position of rest of the movable bridging contact to minimize current flow within the web, and an arc runner rising upwardly at an incline from the stationary contact.

5. In a stationary conductor for an arc extinguishing circuit interrupting switch the combination comprising a base having a flange forming an attachment portion; an upright flange forming a current conductor extending from the base and having an upper horizontal end supporting an overhanging downwardly facing stationary contact spaced to the side of the upright portion of the flange; a strength imparting web integral with the upright flange extending from a side thereof in a plane substantially normal thereto and downwardly to the base; a magnetic link encircling a major portion of a cross-section area of the web adapted to minimize current flow within the web; and an arc horn rising upwardly at an incline from the stationary contact which overlies said web and includes an upwardly facing arc runner and a second web on the underside thereof that forms an upper continuation of said first web.

6. In a stationary conductor for an arc extinguishing circuit interrupting switch the combination comprising a base having a flange forming an attachment portion; an upright flange forming a current conductor extending from the base and having an upper horizontal end supporting an overhanging downwardly facing stationary contact spaced to the side of the upright portion of the flange; a strength imparting web integral with the upright flange extending from a side thereof in a plane substantially normal thereto and downwardly to the base; and a magnetic link encircling a major portion of a cross-section area of the web adapted to minimize current flow within the web.

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