United States Patent [19]

Mortoly

[11] **3,771,779**

[45] **Nov. 13, 1973**

[54] **SURFACE ALIGNER FOR PANEL BOARDS**

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[52] **U.S. Cl.**..... **269/23,** 100/53, 100/232, 144/281 R, 156/566, 156/580, 269/25, 269/107

[51] **Int. Cl.**..... **B23q 3/08,** B27d 3/00, B30b 15/16, F16p 3/20, F16p 3/22

[58] **Field of Search**..... 269/23, 25, 104, 269/107, 289; 100/53, 232; 144/281 R, 281 A, 281 C, 288 R; 156/556, 558, 559, 566, 580

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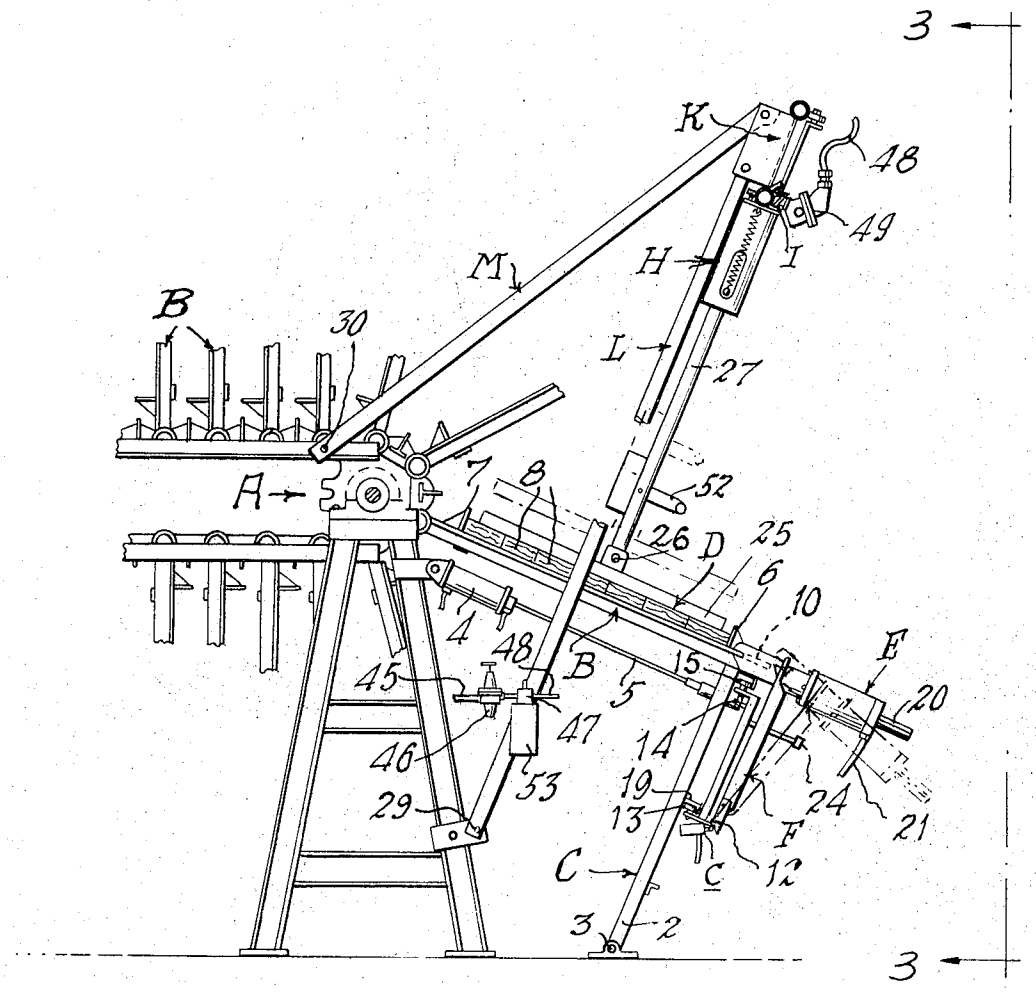
[57] **ABSTRACT**

Boards are arranged edge to edge to form a panel between the jaws of clamps which are actuated by a motor-operated wrench manipulated by one hand of the operator and the top surfaces of the boards are held in alignment by a hold-down element which is power actuated against the boards by a motor-driven apparatus the operation of which is controlled by either an electrical circuit having switches or a fluid (pneumatic or hydraulic) circuit having valves and including one switch or valve operated upon movement of the wrench by one hand of the operator and a control lever manipulated at the same time by the other hand of the operator to prevent injury of either hand between the hold-down element and the panel, said circuits including holding devices to permit the hold-down element to be retained in position to continue the exertion of the aligning pressure to the panel boards while the wrench is moved from one clamp to another clamp.

8 Claims, 11 Drawing Figures



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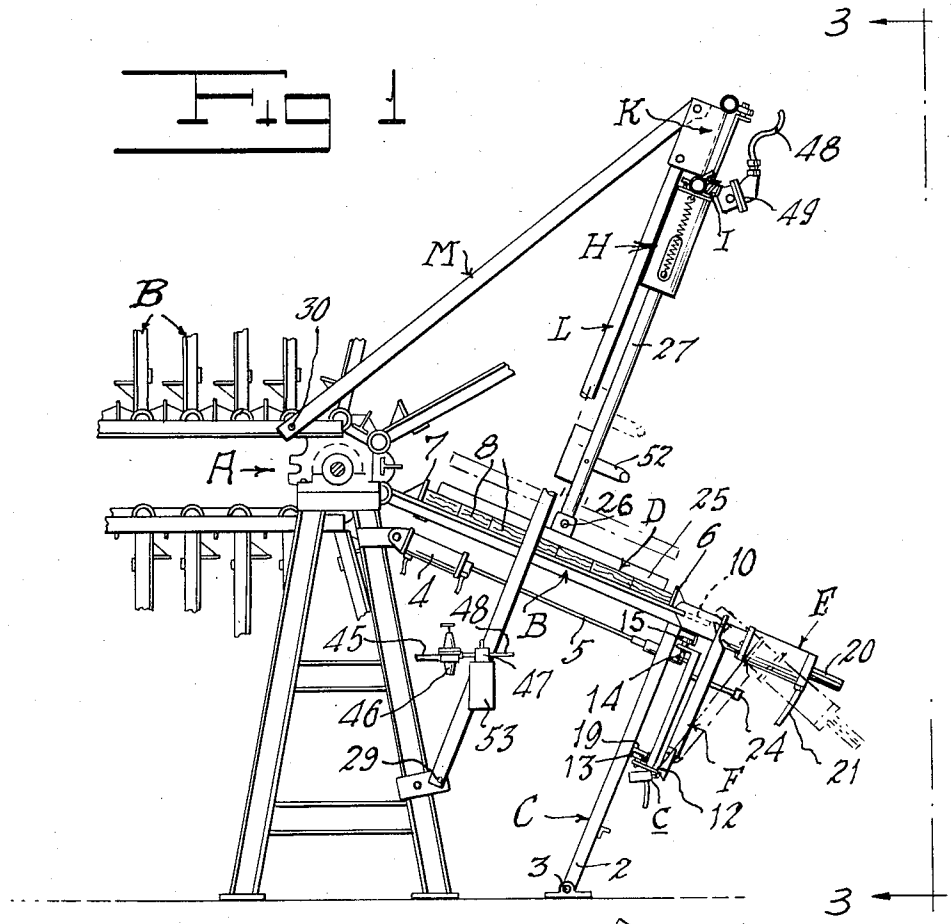

Fig 1

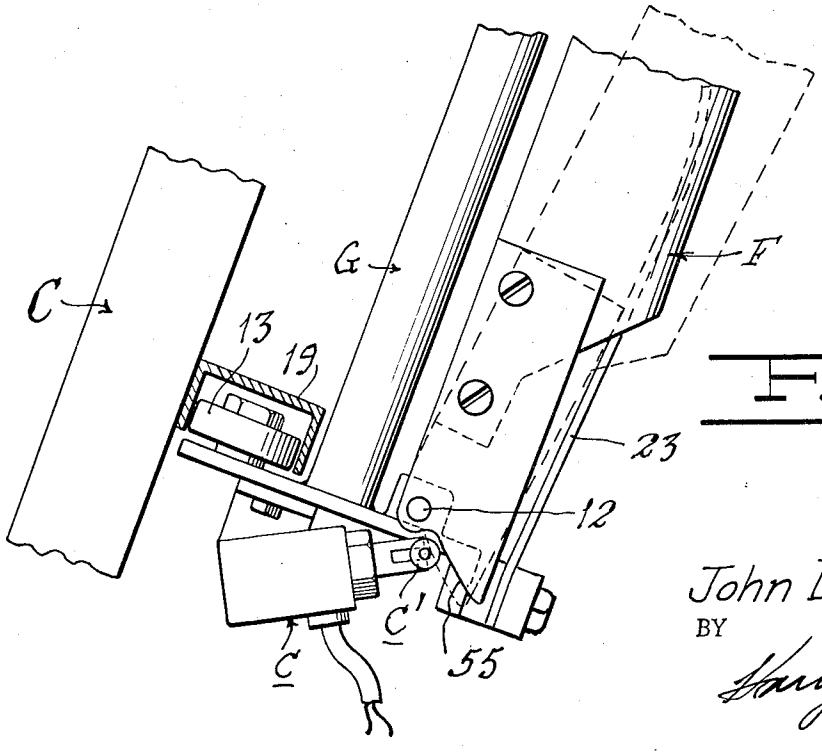

Fig 2

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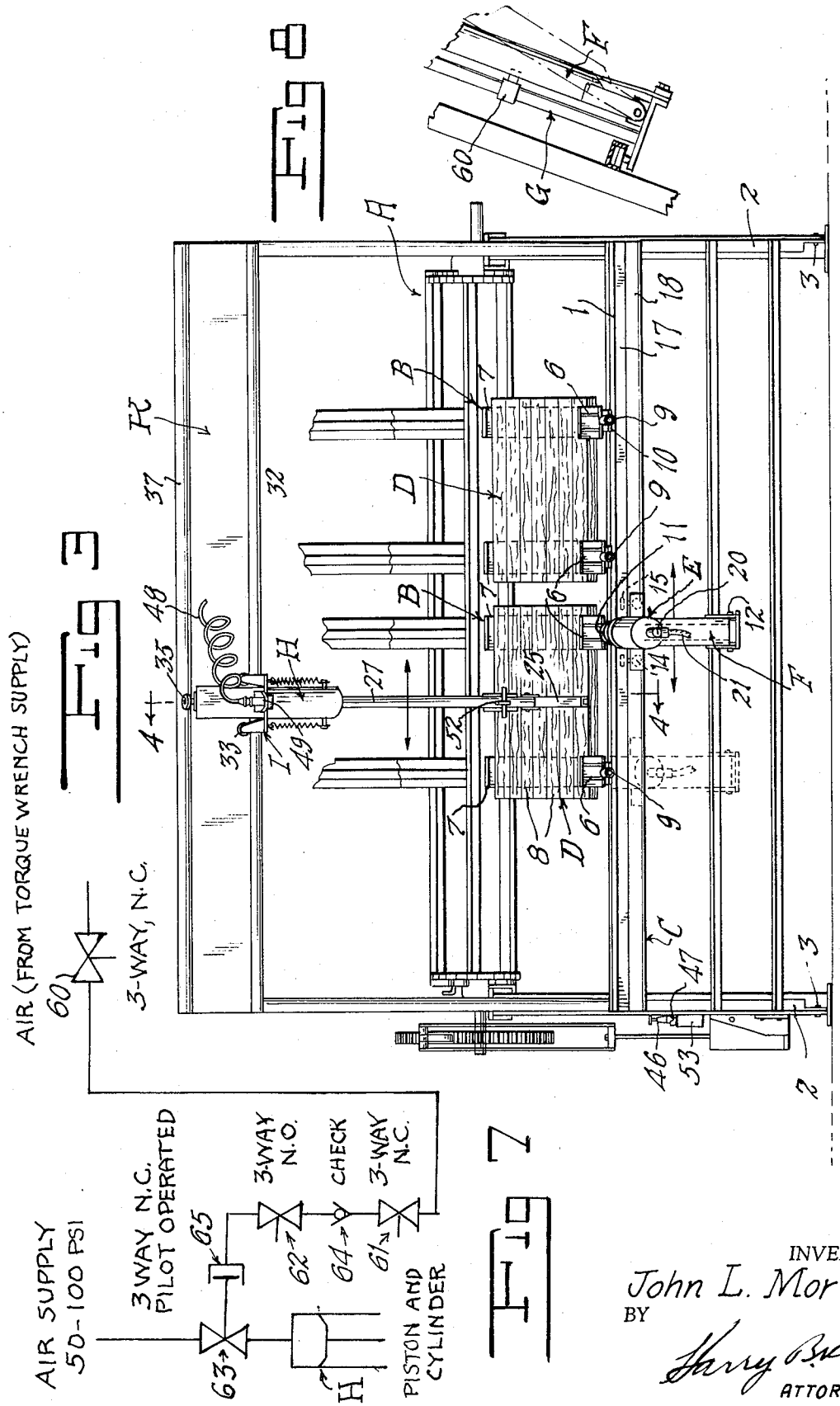

FIG. 7

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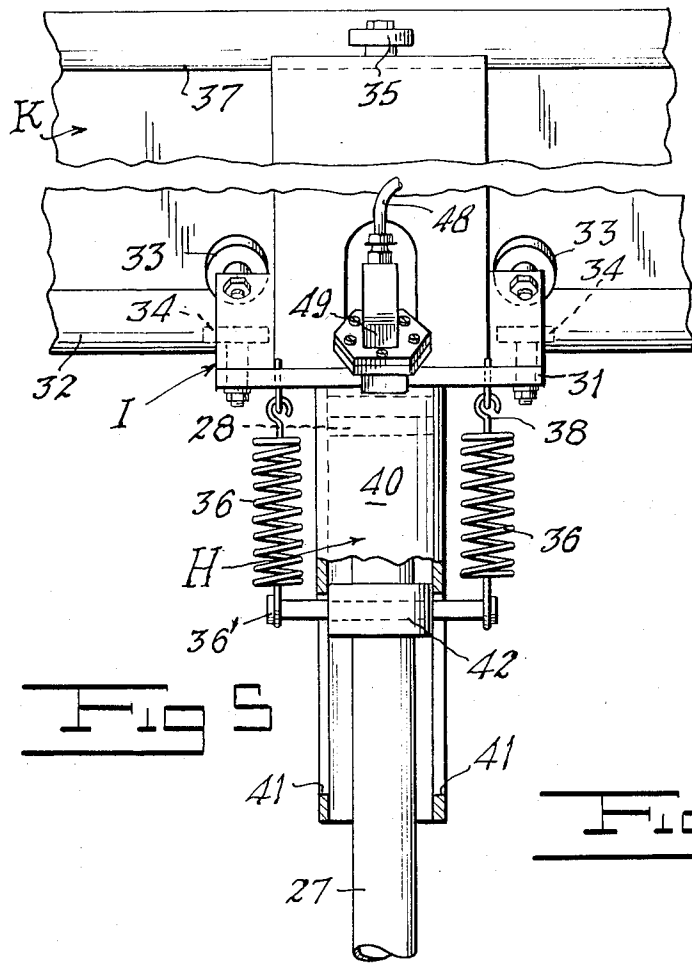


FIG 5

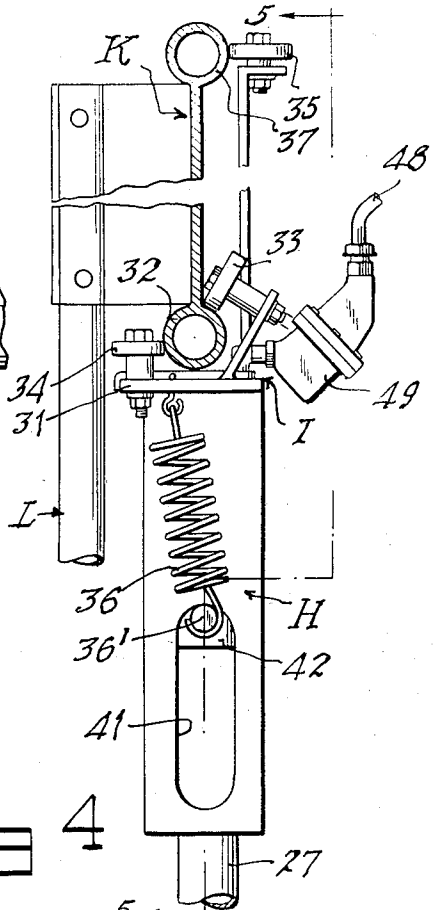


FIG 4

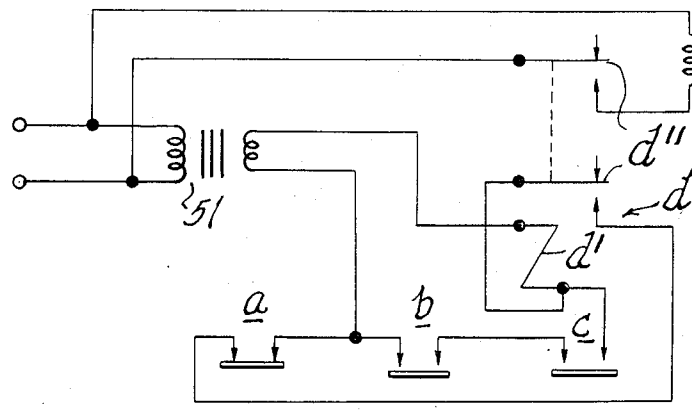
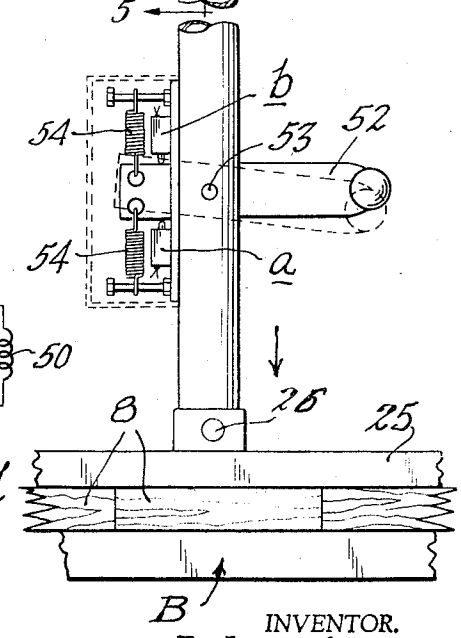


FIG 6



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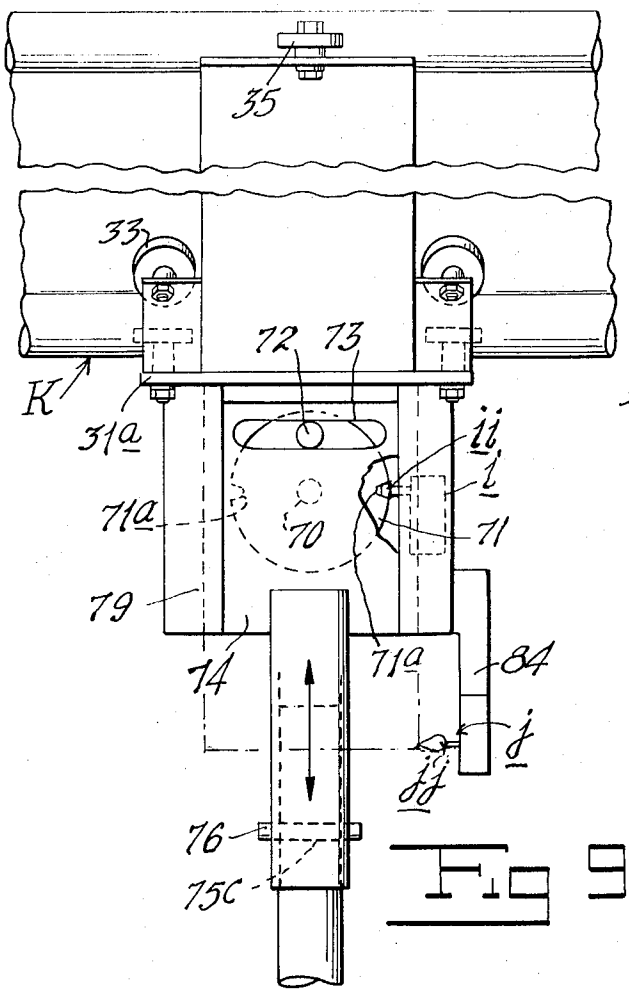


FIG 9

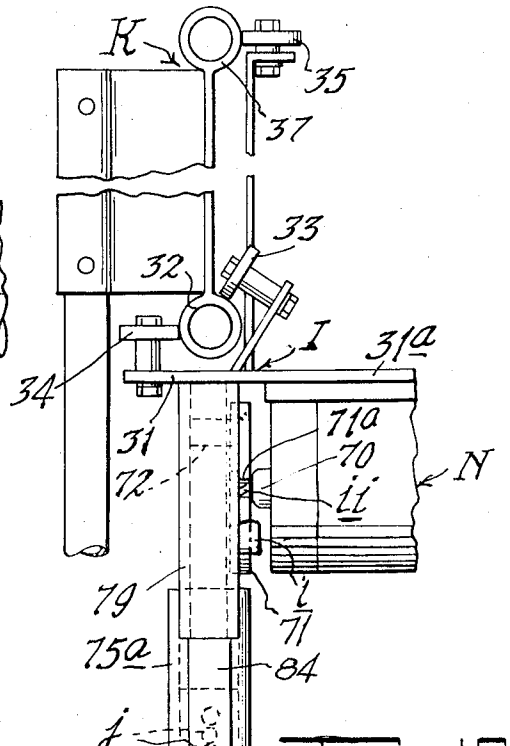


FIG 10

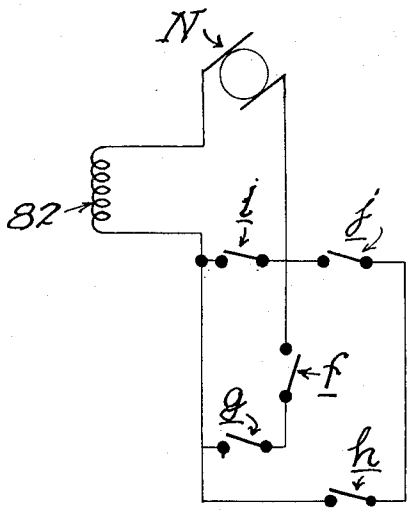
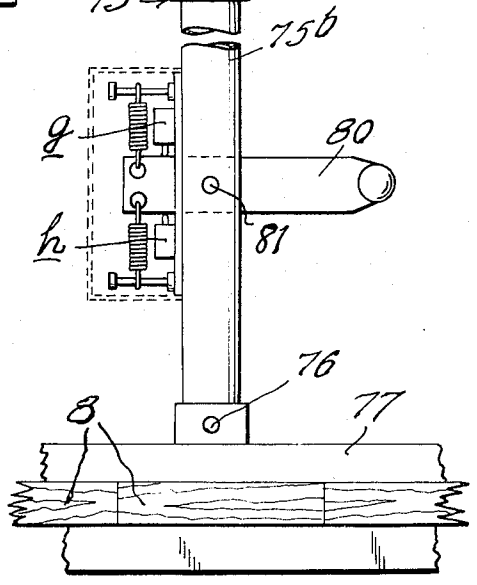


FIG 11



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SURFACE ALIGNER FOR PANEL BOARDS

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates in general to machines wherein a number of boards are glued together edge to edge under pressure between the jaws of a clamp and the boards tend to rise upwardly so that top surfaces of adjacent boards become misaligned or pushed upwardly out of a common plane.

2. The Prior Art:

Sometimes the panels are hammered flat with a heavy ram covering the panel surface or by a heavy mallet.

The prior art practices have disadvantages and objections in that the heavy ram and its operation is cumbersome and expensive in construction, slow in operation, and the wielding of a mallet requires excessive physical effort by the operator and is a slow tedious operation. Furthermore, in some machines there is danger that the operator's hand may be injured.

SUMMARY OF THE INVENTION

Important objects of the invention are to provide apparatus which will overcome the disadvantages of and objections to the prior art machines; and to provide such apparatus which is simple, relatively inexpensive and permits the boards of a panel to be more speedily aligned with less physical effort by the operator than have been possible heretofore and with a minimum of possibility of injury to the hand of the operator.

An important object of the invention is to provide such apparatus including a hold-down bar power-actuated, for example by a compressed air motor or by an electric motor, and novel and improved control mechanism therefor which shall require the use simultaneously of both hands of the operator during the hold-down stroke of the hold-down bar, thereby to prevent the operator from placing either hand between the hold-down bar and the boards to be aligned or flattened.

The invention also contemplates the provision of the apparatus for use with known types of clamp machines, particularly such a machine as shown in U.S. Pat. No. 3,488,046, which includes a plurality of clamps mounted on a common support at their inner ends and disposed approximately parallel to one another in a common plane each with one fixed jaw and one adjustable jaw to receive panel boards between them, and a clamp tightening attachment which includes a rotatable operating element at the outer end of the clamp for moving the adjustable jaw, a motor having a housing and a rotatable drive shaft engageable with and disengageable from said operating element, and a mounting for the motor providing for movement of the motor selectively from one operating element to another; and another object of the invention is to provide novel and improved means to permit movement of the motor from the operating element of one clamp to the operating element of another clamp while retaining the hold-down bar in position to continue the exertion of aligning pressure to the panel boards.

It is another object of the invention to provide a novel and improved simple and reliable means for mounting the hold-down bar and its actuating and control mechanism in proper operating relation to the clamping apparatus for the panel boards, for example, on the frame of a clamp machine.

BRIEF DESCRIPTION OF THE DRAWINGS

For a more complete understanding of the invention, reference should be had to the following description in conjunction with the accompanying drawings in which:

FIG. 1 is a side elevation of a preferred embodiment of the invention installed on a clamp carrier, the carrier being partially depicted, and showing the air-operated or pneumatic wrench in operative position in solid lines and in rest position by dot-and-dash lines;

FIG. 2 is a greatly enlarged fragmentary view of the pivotal connection of the wrench support leg to the mounting bracket and showing the relation of said leg to one of the switches of the control circuit;

FIG. 3 is a front elevational view, showing two panels each held by two clamps that are shown fragmentarily, the other clamps being omitted for clearness in illustration;

FIG. 4 is an enlarged fragmentary vertical sectional view approximately on the plane of the line 4—4 of FIG. 3 with portions omitted for clearness in illustration;

FIG. 5 is a combined front elevational view and vertical sectional view approximately from the plane of the line 5—5 of FIG. 4;

FIG. 6 is a wiring diagram of the control circuit;

FIG. 7 is a schematic view of a modified control mechanism utilizing air pressure instead of electricity.

FIG. 8 is a view similar to FIG. 2 on a reduced scale showing the mounting of one of the control valves of the air pressure operated or pneumatic control mechanism;

FIG. 9 is a fragmentary front elevation similar to FIG. 5 of the modification shown in FIG. 10, and

FIG. 10 is a view similar to FIG. 4 showing a modification of the invention;

FIG. 11 is a diagrammatic view of the control circuit embodied in said modification.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

For the purpose of illustrating the principles of the invention, the surface aligner for panel boards has been shown in connection with a generally known type of clamp carrier shown for example in U.S. Pat. Nos. 1,529,281 and 3,488,046. Referring to the drawings, the clamp carrier is generally designated A and comprises a plurality of clamps B arranged in rows transversely of the carrier. As may be seen from FIG. 3, there may be four or more clamps in a row of clamps on a carrier. The clamps are advanced by the carrier in a clockwise direction in FIG. 1, and the carrier will be stopped when clamps in a row rest on the top of a horizontal support bar 1 of clamp rest C with the ends of the clamps in a common plane along a line as shown in FIGS. 1 and 3. The bar 1 is supported from the floor or clamp carrier base by means of a pair of legs 2. When it is desired to advance a group of laterally aligned clamps past the support bar 1, the legs 2 are swung about pivot points 3, in a direction away from the clamp carrier, by means of a fluid-operated piston 4 and actuating rod 5.

While the exact construction of the clamps is not important, each of the clamps has been shown as including a pair of jaws 6 and 7, jaws 7 being adjustable and

jaws 6 being fixed, and it is between these jaws of one or more of the clamps that the boards 8 forming the panels D are clamped. The clamps may be of the same general type as shown in the above-mentioned patents and each of the clamps has a rotatable operating element 9 which extends outwardly past the fixed jaw 6. The rotating operating element of each clamp threadably engages a draw bar assembly (here not shown) which is connected to the movable jaw 7 of the clamp. Thus by driving the member 9 of the clamp in the proper direction, the adjustable jaw may be caused to move toward or away from the stationary jaw to clamp boards between the jaws or to release the boards, respectively. In accordance with the teachings of U.S. Pat. No. 3,488,046, each of the operating elements has a cylindrical portion and a pair of wings 10 extending from opposite sides thereof for engagement with a driving member 11 on the shaft of an air motor E, commonly denoted a torque wrench, for rotating the operating elements.

The specific construction of the air motor and wrench do not form a part of the present invention and for a more detailed understanding thereof reference should be had to U.S. Pat. No. 3,488,046. However, the torque wrench is desirably mounted so that it may be moved by the operator selectively into and out of engagement with the operating elements of different clamps. As shown, the air motor has an operating handle 20 and is rigidly mounted on one end of a support leg F which is pivotally mounted at its other end at 12 on a carriage G which is mounted on the clamp rest C to roll horizontally from one side to the other thereof, the carriage having rollers 13, 14 and 15 and the rollers 14 and 15 being mounted in tracks 17 and 18 respectively while the rollers 13 are mounted in a track 19. Compressed air is supplied to the motor through a hose 21 and a rotary valve operated by the handle 20 and the air is discharged from the motor through an exhaust port. The motor is normally biased away from the clamps by action of gravity into its rest position against a stop 24 as shown by broken lines in FIGS. 1 and 2, a leaf spring 23 preferably is secured at one end of the carriage (FIG. 2) and normally tends to swing the leg F in partially counterbalancing the motor.

The construction of the surface aligner for panels may be varied depending upon the intended place of use and the size and shape of the panel to be produced; but for the purpose of illustration the apparatus has been shown as including a hold-down element or foot in the form of a straight bar 25 which is pivotally connected intermediate its ends at 26 to one end of the piston rod 27 of a piston 28 of a piston and cylinder device H whose vertical cylinder 40 is rigidly supported on a trolley I mounted to roll selectively in either of opposite directions parallel to the row of clamps, along tracks on a horizontal support beam K which is rigidly supported at the upper ends of stanchions L and braces M whose other ends are connected at 29 and 30 respectively of the clamp carrier frame.

Desirably, the trolley has a main plate 31 closely underlying a cylindrical track 32 and rollably suspended thereon for limited vertical movement and limited lateral movement transversely of the track by rollers 33 at one side of the track and rollers 34 disposed oppositely to the rollers 33. Another roller 35 on the trolley engages a track 37 to hold the piston rod and cylinder approximately perpendicular to the plane of the panel that is held in the clamps. The piston 28 is energized by compressed air to force the hold-down foot into flattening or surface-aligning relation to the panel boards, and is elevated by tension springs 36 connected between a cross pin 36' on the piston rod and hooks 38 on the main plate 31, into normal position above the panels indicated by dot-and-dash lines in FIG. 1.

An extension of the cylinder 40 also has diametrically opposite longitudinal slots 41 in which slide the projecting ends of the cross pin 36 to prevent rotation of the piston rod and hold-down bar; and desirably the piston rod has a bearing sleeve 42 slidable in the cylinder extension.

Compressed air from a suitable source is supplied through a hose 45 and a pressure regulator 46 to a solenoid-operated valve 47 which controls the flow of compressed air through a hose 48 and a known type of quick-exhaust valve 49 into the cylinder and piston device H above the piston. The solenoid 50 of the valve 47 is connected in an electrical control circuit which is schematically shown in FIG. 6 and includes a transformer 51, switches *a* and *b* mounted on the piston rod and actuated selectively by a handle lever 52 pivoted intermediate its ends at 53 on the piston rod, a switch *c* mounted on the carriage G and actuated by movement of the wrench leg F, and a holding relay *d* housed in a relay box 53 which may be mounted in any convenient place but is shown near the solenoid valve on one of the stanchions.

The switches *a* and *b* are mounted with their actuating buttons in closely spaced apart relation with one end of the lever 52 normally held in neutral position between them by tension springs 54. The switch *a* is normally closed, while switch *b* is normally open. Switch *c* is mounted on the carriage (FIG. 2) with its actuating plunger *c'* coactive with a cam 55 secured on the wrench leg F, so that when the wrench is in normal rest position indicated by dot-and-dash lines in FIGS. 1 and 2 the switch is held in open position so as to prevent energization of the coil *d'* of relay *d*, while when the wrench is raised by the operator into position to engage the operating elements of the clamps as shown in solid lines in FIGS. 1 and 2, the switch *c* is allowed to close.

In operation of the apparatus, with the panel boards arranged edge to edge between the jaws of two adjacent clamps, as shown, the operator first grips the handle of the air-operated wrench with one hand and raises the wrench into operating engagement with the operating elements of one of the clamps and turns the rotary valve of the air motor to start the clamp-tightening operation. The switch *c* having been closed by the raising of the wrench, the operator with his other hand pushes down the handle lever 52 on the piston rod so as to close switch *b*, thus completing the circuit through the output of the low voltage transformer, through the relay coil *d'*, energizing the contacts *d''* of the relay *d* which in conjunction with the switch *a* creates a parallel path around switches *b* and *c*, thus making a hold circuit. Upon completion of the circuit, the solenoid valve is opened to admit compressed air into the cylinder so as to force the hold-down bar against the panel boards to flatten them so as to align their surfaces. As the cylinder and piston device H flattens the boards, the trolley is lifted to move its rollers off the tracks and to shoulder press the main plate firmly against the support beam K so the trolley cannot slide along the beam.

The hold-down bar is thus held firmly by virtue of the hold circuit in position to align the board surfaces, and the wrench can be moved to the next clamps, opening switch *c* which, however, has no effect on the hold circuit and allows the cylinder and piston device H to exert force to flatten the panel while the second clamp is being tightened. The operator can release the hold-down bar when desired by simply swinging the control lever **52** upward to open switch *a*, thereby breaking the hold circuit, deenergizing the solenoid valve thereby to allow the piston to be retracted by the springs **36** which action is expedited by the rapid exhaust permitted by the quick-exhaust valve **49.**

With this construction, one hand of the operator is required to operate the control lever **52** while the other hand is employed to operate the wrench, thus ensuring against either hand being caught and injured between the hold-down bar and the panel; and hold-down pressure on the panel is maintained while the wrench is moved from one clamp to another and until the operator breaks the hold circuit by pushing upwardly on the control lever to open the switch *a*.

The invention also contemplates complete pneumatic operation and control when desired instead of the combination air operation and electrical control hereinbefore described. As schematically shown in FIGS. **7** and **8,** a three-way valve **60** is mounted as shown in FIG. **8** on the carriage G and serves the same function as the switch *c*. A three-way normally closed valve **61** is mounted in the same location as the switch *b* and a three-way normally open valve **62** is mounted in the same place as switch *a* and serves the same function, a check valve **64** being connected between them. A three-way normally closed pilot-operated valve **63** serves the same functions as the relay *d* and the solenoid operated valve **47, 50** hereinbefore described in the electrical control circuit. Compressed air at a pressure of, for example, 50 to 100 pounds per square inch is supplied from a suitable source through the valve **63** to the piston and cylinder device, and compressed air for example from the air-motor wrench supply is admitted through valve **60** which is connected in series with the valves **61, 64** and **62** and the pilot **65** of the valve **63.**

The pilot operated valve performs the same function as the electric relay with its holding contacts in the electrical control circuit, since air is trapped in the pilot circuit by the check valve **64** holding the pilot operated valve energized until the three way valve **62** is manually opened, dumping the pilot pressure to atmosphere.

The three-way valves are used to prevent any leakage through valve **60** or **61** from prematurely energizing the pilot operated valve. The three-way valve **62** performs the previously mentioned function of exhausting the air in the pilot operated valve when it is manually energized.

The circuit in FIG. **7** would work equally as well with the elimination of valve **63,** if the output of valve **62** fed piston and cylinder H directly. It would require larger size valves, however, and the speed of operation would be somewhat slower.

In operation, the operator manipulates the air-operated wrench in the manner hereinbefore described, and also operates a control lever like the lever **52** to actuate the actuating buttons of the valves **61** and **62.** The advantages of the air controlled circuit are that no electrical power is required, it comprises fewer components and is less expensive to manufacture.

Another form of the invention is shown in FIGS. **9, 10** and **11** wherein an electric motor is utilized instead of the fluid pressure motor or piston and cylinder device H hereinabove described. In this form of the invention, the main plate **31** of the trolley I is extended as indicated at **31***a* to serve as a support for an electric motor N on whose horizontal output shaft **70** is rigidly mounted a circular crank disc **71** having a crank pin **72** extending through a horizontal slot **73** in a drive plate **74** which is vertically slidably mounted in guides **79** mounted on the main plate **31***a* of the carriage and to which is connected a push rod **75** which in general corresponds to the piston rod **27** and has a pivotal connection **76** with the hold-down element or foot **77** which may be identical with the foot **25.** The rod **75** preferably is formed of two telescopically associated sections the tubular one **75***a* of which is directly connected to the drive plate **74** while the smaller section **75***b* is slidable in the section **75***a* and adjustable by means of a pin **76** selectively insertable through opening **75***c* in the section **75** and transverse holes **78***a* in the main section, thereby providing for adjustment of the length of the rod **75.** With this construction it will be observed that the rotation of the drive disc **71** by the motor N will cause reciprocation of the drive plate **74** and push rod **75.**

The control mechanism is shown as comprising a switch *f* which may be of the same nature and is mounted in the same location as the switch *c* of the construction shown in FIG. **1** through **6,** being operated by movement of the leg F which supports the torque wrench E. The control circuit also includes switches *g* and *h* that are mounted on the push rod **75** and actuated selectively by a handle lever **80** corresponding to the lever **52,** pivotally mounted at **81** on the push rod. These switches are connected in circuit to coact with a hold switch *i*, all of the switches being connected in circuit with each other, the motor and the source of power which is represented by the coil **82.** An interlock switch *j* is also connected in the circuit and is physically mounted on a bracket **84** depending from one of the guide bars **79** with its button *jj* located so as to be actuated in one direction by the drive plate as the plate descends, to prevent improper operation of the motor.

In operation of the apparatus, and assuming the hold-down bar to be in its normal uppermost position, the normally open switch *f* is closed upon lifting of the torque wrench with one hand of the operator and the motor N is started upon simultaneous closing the switch *g* by pressing down the lever **80** with the other hand of the operator. Upon starting of the motor the drive plate **74** and push rod **75** are moved downwardly to force the hold-down element into contact with the panel boards **8** held in the clamps. The switch *i* is normally open with its actuating button *ii* spring-pressed into one of two diametrically opposite notches **71** in the periphery of the disc **70,** and the switch is closed when the disc starts to rotate and continues closed so as to hold the circuit with the hold-down bar in contact with the boards until the other notch **71** is brought into juxtaposition to the button of the switch whereupon the switch is opened, but the hold-down bar continues to hold the boards and the operator can move the wrench to another clamp, opening the switch *f*, without affecting the hold circuit. The operator can release the hold-

down bar when desired by swinging the lever **80** to close the switch *h*, which closes the circuit through the motor and causes the motor to continue rotation of the drive disc and thereby raise the drive plate and the hold-down bar to their normal open positions whereupon the switch *i* is again allowed to open and the motor is stopped.

I claim:

1. A clamp machine including clamps to receive panel boards between fixed and adjustable jaws in rigid frames spaced apart in a common plane on a support and means for aligning the top surfaces of said panel boards, a motor-operated means separably coactive with operating elements for said adjustable jaws, means mounting said motor-operated means for manipulation by one hand of the operator to connect and disconnect said motor-operated means to and from said operating elements and to move said motor-operated means from one operating element to another, said means for aligning the top surfaces of said panel boards in said clamps including a hold-down element to engage said surfaces of the boards, a horizontal rigid support beam above said clamps, a motor-driven apparatus movable horizontally on said beams and having a pivoted connection with said hold-down element, and control mechanism for controlling application and release of power to and from said motor driven apparatus to cause said hold-down element to exert and relieve pressure on and from said boards, respectively, said control mechanism including a plurality of control devices connected in a circuit with a source of power, operation of a first one of which devices is controlled by movement of said mounting means by one hand of the operator to move said motor-operated means into and out of engagement with said operating elements, and operation of others of which devices is controlled by manipulation of a control lever by the other hand of the operator selectively in opposite directions, and another device is a circuit hold device activated upon operation of the first-mentioned device, providing for movement of the hold-down element in one direction to engage the panel boards and momentarily hold it in hold-down position on the panel boards and then for a movement of said hold-down element in the opposite direction out of hold-down position.

2. The combination as defined in claim **1** wherein said motor-driven apparatus comprises a trolley movable horizontally on said support beam, an electric motor mounted on said trolley and having an output shaft, a push rod pivotally connected at one end to the hold-down element and vertically slidably mounted on said trolley, and a driving connection including a plurality of movable parts between the output shaft of the motor and said push rod, said plurality of devices of the control mechanism include electric switches connected in circuit with each other and the source of power for said electric motor, and actuation of said circuit hold device into open and closed positions is controlled by one of said parts of said driving connection between the motor and the push rod.

3. The clamp machine as defined in claim **1** wherein said motor-driven apparatus includes a part movable horizontally on said beams and another vertically reciprocable part which is pivotally connected to said hold-down element, and said control mechanism includes a main control element for controlling the application and release of power to and from said motor-driven apparatus to cause said hold-down element to exert and relieve pressure on and from said boards, respectively, and operation of said circuit hold device is controlled by coaction of the first-mentioned device and the second-mentioned devices, thereby to cause the reciprocable part to move in one direction to actuate the hold-down elements into and momentarily hold it in hold-down position on the panel boards and then to release said reciprocal part and hold-down bar for movement in the opposite direction out of hold-down position, respectively, and means to move said reciprocable part and hold-down bar in the last-mentioned direction.

4. The combination as defined in claim **3,** wherein said support beam has upper and lower parallel tracks, and with the addition of a trolley having a main plate on which said motor driven apparatus is rigidly mounted, said trolley having rollers thereon that suspend said trolley from the lower track for movement horizontally and allow upward vertical movement of the trolley to cause frictional engagement of said plate with the track and against movement along the track when the hold-down element is pressed against the panel boards, said trolley having other rollers engaging the upper track to hold the trolley with the cylinder and piston rod in approximately perpendicular relation to the commom plane of the clamps.

5. The combination of a plurality of clamps comprising rigid frames mounted on a common support at their inner ends and disposed approximately parallel to one another in a common plane each with one fixed jaw and one movable jaw to receive panel boards between them, and a clamp tightening attachment which includes a rotatable operating element at the outer end of each clamp for moving the adjustable jaw, a motor having means for controlling supply of power thereto and a rotatable drive shaft separably engageable with said operating element of means mounting said motor for manipulations by one hand of the operator to move said drive shaft into and out of engagement with said operating element and to move the drive shaft from the operating element of one clamp to the operating element of another clamp, means for aligning the top surfaces of panel boards in said clamps including a hold-down element to engage said surfaces of the boards a horizontal rigid support beam above said clamps, a cylinder and piston device whose cylinder is mounted to move horizontally on said beam and whose piston has a vertical rod to which said hold-down element is pivotally connected, and control mechanism including a valve controlling the supply and release of compressed air to and from said cylinder above said piston to cause said hold-down element to exert and relieve pressure on and from said boards, respectively, said control mechanism also including plurality of control devices connected in a circuit with a source of power one of said devices being disposed on said mounting means normally inactive and actuated into active and inactive positions upon movement of said motor into and out of engagement with said clamp operating element, respectively, two other of said devices being mounted in spaced apart relation on said piston rod, one normally active and the other normally inactive, there being a control lever for said two other devices on said piston rod normally in neutral position between said two devices and movable by the other hand of the operator selectively in either of opposite directions to cause movement of said two devices each independently of

the other into and out of its normal position, another of said control devices being a hold device for said circuit controlled by said two other devices providing selectively for admission and holding of compressed air on the top of said piston in the cylinder and for release of air from said cylinder upon movement of said control lever in opposite directions, respectively, thereby to cause the piston to move in one direction to actuate the hold-down element into and momentarily hold it in hold-down position on the panel boards and then to release said piston and hold-down bar for movement in the opposite direction out of hold-down position, respectively, and means to move said piston and hold-down bar in the last-mentioned direction.

6. The combination as defined in claim **5** wherein said mounting means for the motor includes horizontal tracks disposed beneath the outer ends of the clamps, a carriage on said tracks, a motor support leg pivotally connected at one end to said carriage to swing toward and from the clamps, and wherein the power source for the control circuit is compressed air, the first-mentioned control device comprises a three-way valve normally closed when said support leg is swung away from the clamps and open upon movement of the leg toward the clamps, the second-mentioned devices being three-way valves connected in series on the piston rod with a check valve between them and with their actuating buttons at opposite sides of said control lever, one being normally open and the other normally closed, and wherein the hold device comprises said valve for admitting air to the cylinder in the form of a three-way normally closed valve having a pilot controlled by coaction of the first-mentioned and second mentioned valves to admit air into the cylinder and by one of the second-mentioned valves to release air from the cylinder through the pilot-controlled valve.

7. The combination as defined in claim **5** wherein said mounting means for the motor includes horizontal tracks disposed beneath the outer ends of the clamps, a carriage on said tracks, a motor support leg pivotally connected at one end to said carriage to swing toward and from the clamps, and wherein the power source for the control circuit is electrical, the first-mentioned control device comprises an electric switch in said circuit mounted in said carriage normally open or inactive when said support leg is swung away from the clamps and closed upon movement of said support leg toward the clamp, the second-mentioned two devices being switches on the piston rod with their actuating buttons at opposite sides of said control lever, one being normally open or inactive and the other normally closed or active, and wherein the hold device is an electrical relay including a switch and a cooperative coil energization of which is controlled by coaction of the first-mentioned and second-mentioned switches and deenergization of which is controlled by one of said second-mentioned switches, said air-control valve for the cylinder and piston device is operated by a solenoid the circuit through which is controlled by said relay.

8. The combination as defined in claim **7** wherein the power source comprises a transformer with a high voltage input coil and a low voltage output coil, said hold device is an electrical relay that includes an operating coil having its first terminal connected to one terminal of said low voltage output coil, said valve is electromagnetically operated by a coil one terminal of which is connected to said high voltage input, the normally closed one of the second-mentioned control switches has one terminal connected to one terminal of said low voltage output coil and to one terminal of the normally open one of second-mentioned control switches whose other terminal is connected to one terminal of the first-mentioned control switch which has its other terminal connected to the second terminal of said relay operating coil, said hold device relay has two simultaneously operated switch contacts one of which is connected to said high voltage input, and coacts with the other terminal of said valve coil to energize the coil, the other of said relay switch contacts is connected to the second-mentioned terminal of the first-mentioned normally open control switch and has a terminal connected to the other terminal of said normally closed second-mentioned control switch.

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