Nov. 1, 1960 J. DREEBEN 2,958,368

BAG SEALING MACHINES

Filed Dec. 11, 1958 4 Sheets-Sheet 1

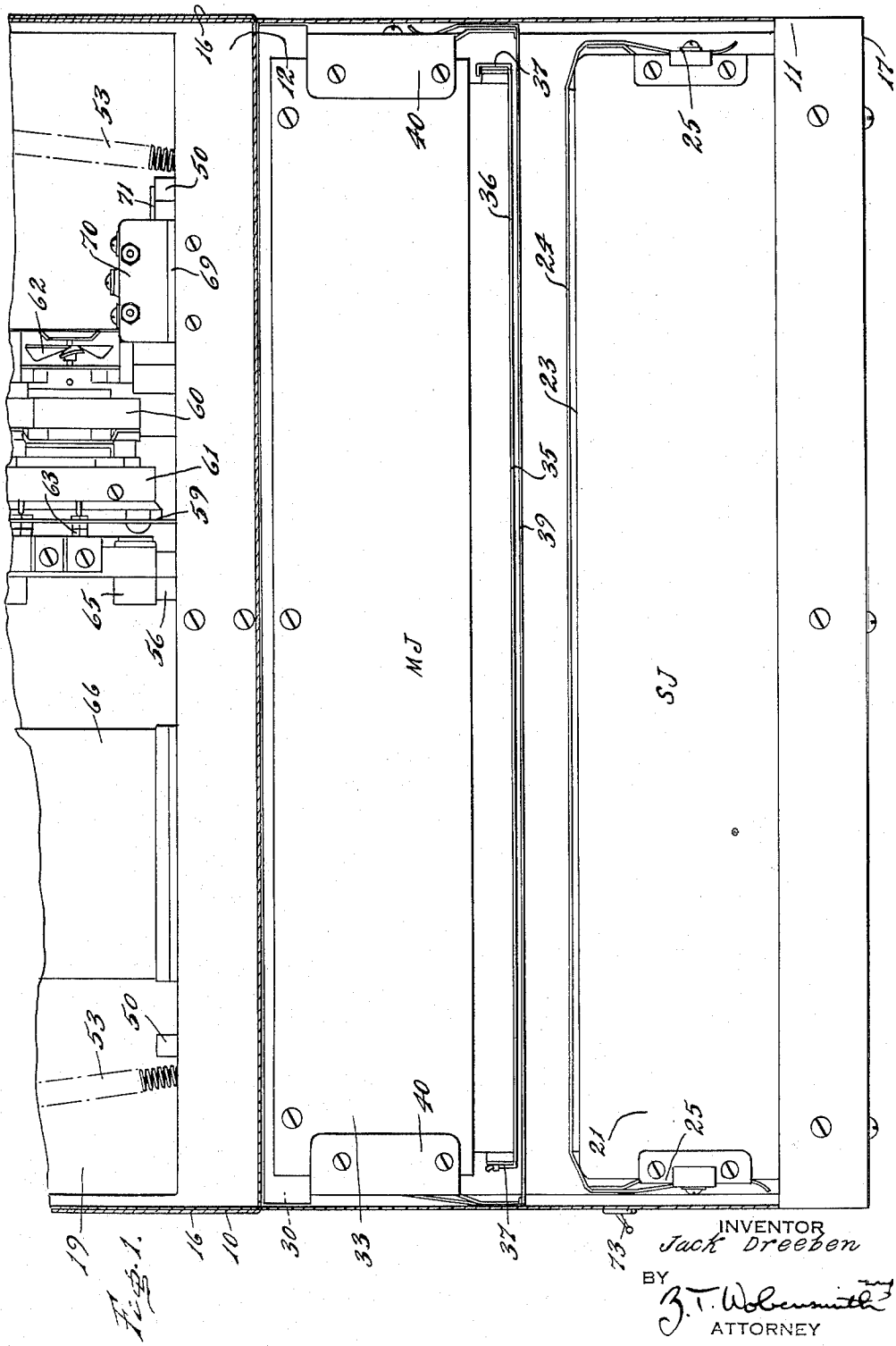


Fig. 1.

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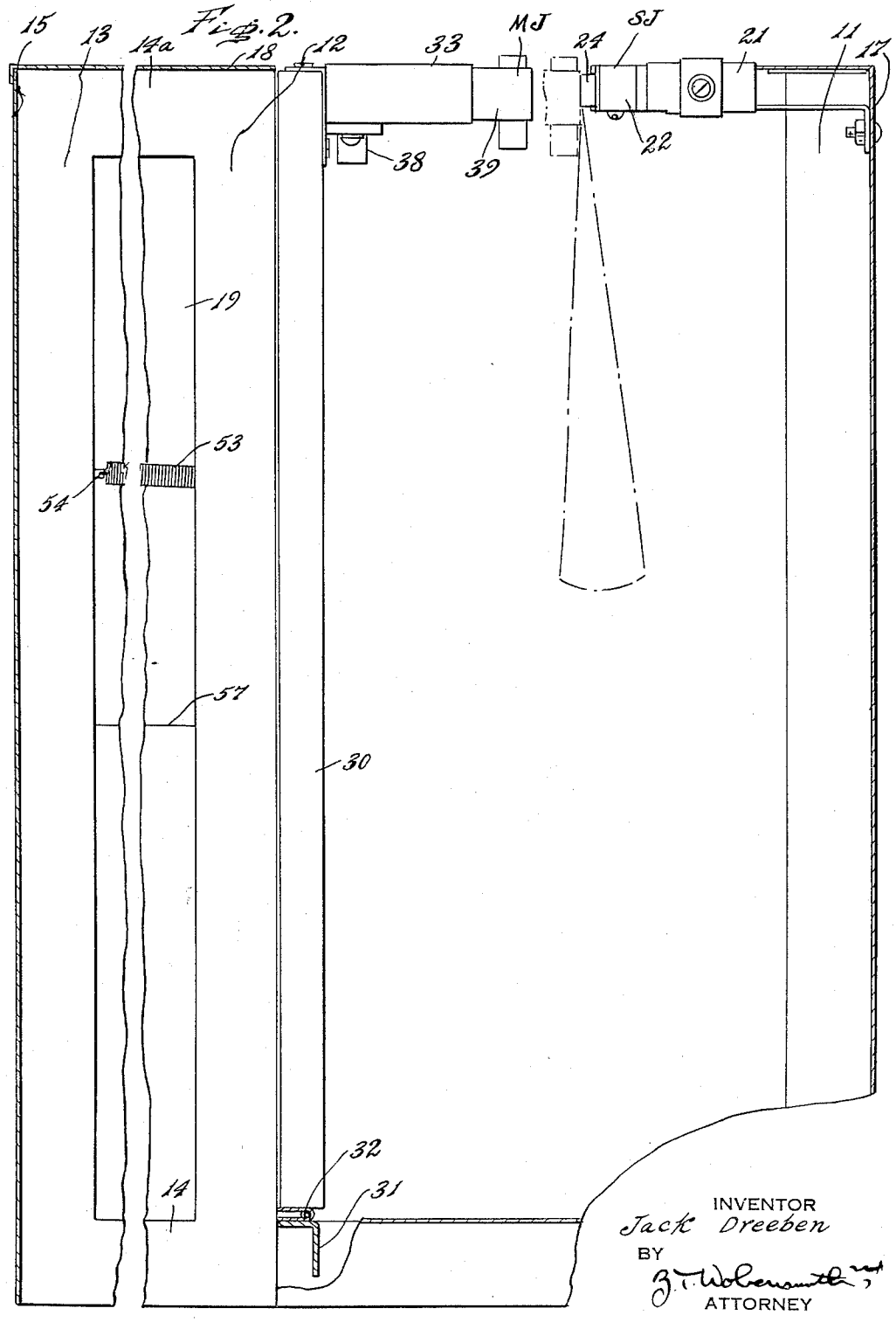
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Fig. 2.



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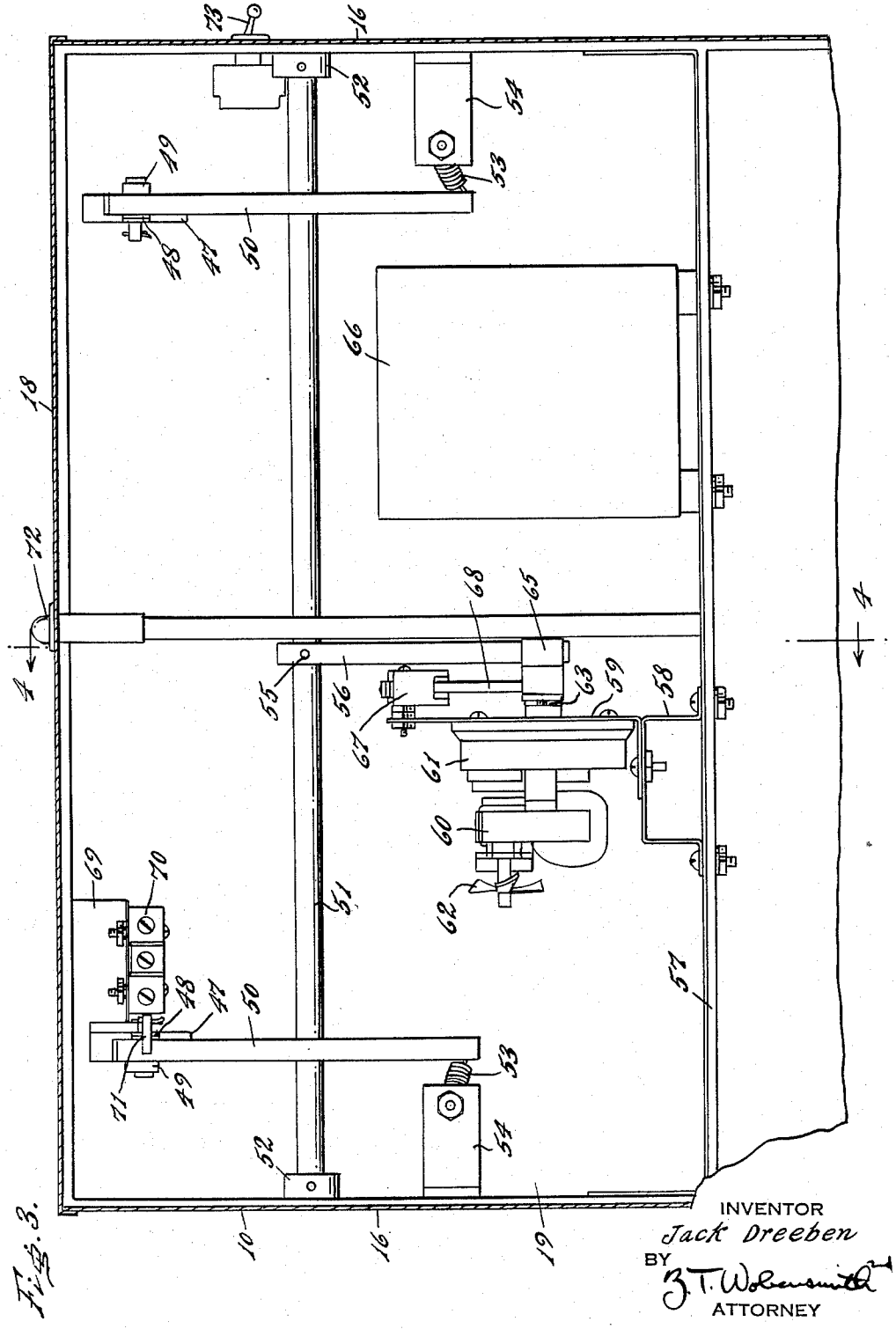


Fig. 3.

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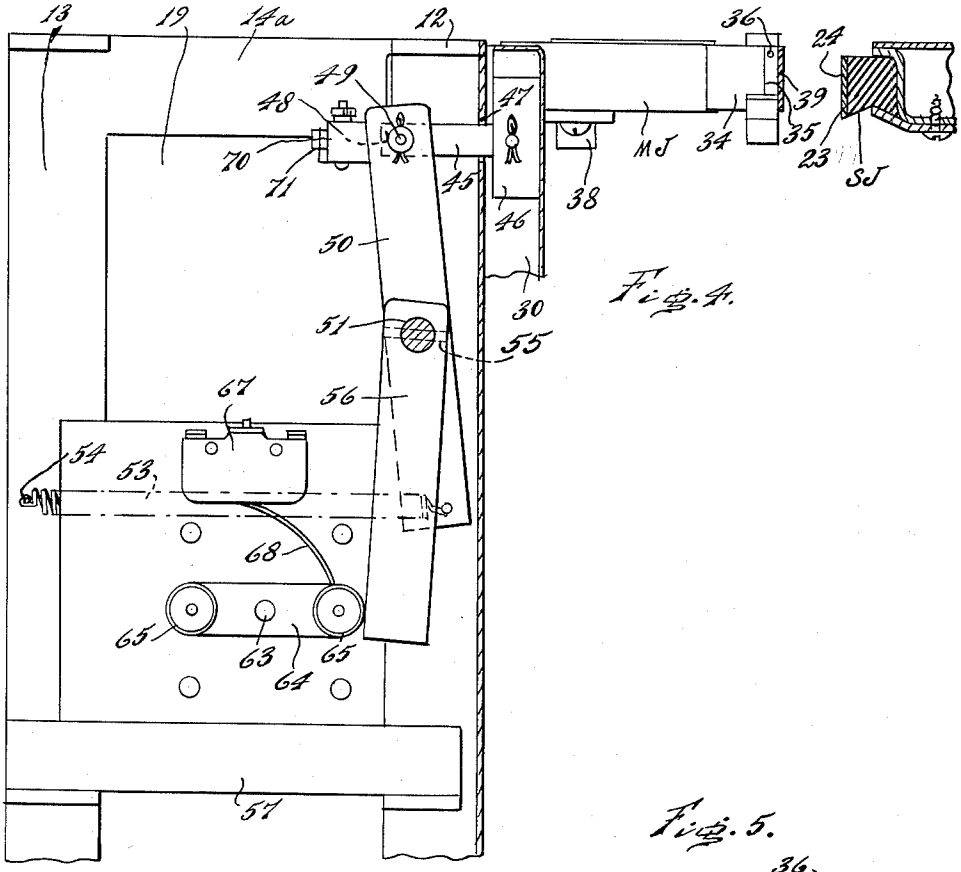
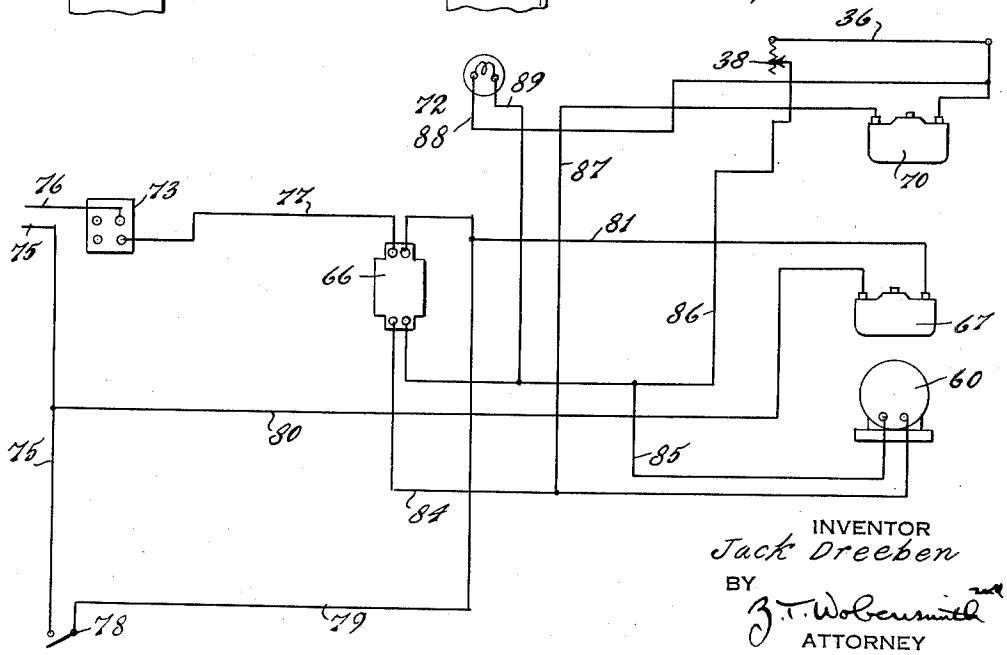


Fig. 4.

Fig. 5.



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BAG SEALING MACHINES

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19 Claims. (Cl. 154—42)

This invention relates to bag sealing machines and more particularly to a machine for sealing bags of synthetic plastic sheet material and especially polyethylene and the like.

The bag machines heretofore available for this purpose have been complicated in construction with a multitude of parts which rendered their construction difficult, the cost excessive, and involved maintenance problems.

It is the principal object of the present invention to provide a bag sealing machine which is simple in construction, reliable in its action, and in which the components are of simple and sturdy construction free from likelihood of failure.

It is a further object of the present invention to provide a heat sealing machine for closing bags and the like which is brought into operation by an initial manual switch actuation and which will, upon initiation of its action, carry through a sealing cycle.

It is a further object of the present invention to provide a heat sealing machine for closing bags and the like which while suited for intermittent sealing operations can operate as a multiple cycle machine.

It is a further object of the present invention to provide improved actuating mechanism for a movable sealing jaw of a bag sealing machine.

It is a further object of the present invention to provide a bag sealing machine which is suitable for use with a large variety of sizes and types of bags, thereby rendering unnecessary the maintenance of various sizes of bag sealing machines.

It is a further object of the present invention to provide a bag sealing machine in which the sealing jaws, including a stationary sealing jaw and a movable sealing jaw, are so mounted in their relationship to each other as to permit of supporting bags of various sizes therebelow for expeditious sealing operations.

It is a further object of the present invention to provide a machine for sealing bags and the like in which the power requirements are relatively small while providing an effective heat sealing operation.

Other objects and advantageous features of the invention will be apparent from the description and claims.

The nature and characteristic features of the invention will be more readily understood from the following description, taken in connection with the accompanying drawings forming part thereof, in which:

Figure 1 is a fragmentary top plan view of a machine in accordance with the invention;

Fig. 2 is a fragmentary end view of the machine illustrated in Fig. 1;

Fig. 3 is a rear elevational view of the machine with the cover plate removed;

Fig. 4 is a fragmentary sectional view taken approximately on the line 4—4 of Fig. 3; and

Fig. 5 is a diagrammatic view showing the circuit arrangements of the preferred electrical circuits employed in connection with the machine of the present invention.

It should, of course, be understood that the description and drawings herein are illustrative merely, and that various modifications and changes can be made in the structure disclosed without departing from the spirit of the invention.

Like numerals refer to like parts throughout the several views.

Referring now more particularly to the drawings, in which a preferred embodiment of the invention is illustrated, the machine in accordance with the invention includes a housing **10** having a vertical front panel section **11**, a central vertical panel section **12** and a rear vertical panel section **13**, the panel sections **11, 12** and **13** being connected by frame pieces **14** at the bottom and the panel sections **12** and **13** being connected by frame pieces **14***a* at the top. A removable vertical cover plate **15** is provided for the rear panel section **13**. Vertical cover plates **16** are also provided for the sides extending between the rear and central panel sections **13** and **12**, and a vertical cover plate **17** is provided for the front of the front panel section **11**. A horizontal top cover plate **18** is provided between the rear and central panel sections **13** and **12**.

An enclosed space **19** is thus provided between the central panel section **12**, the rear panel section **13**, the side cover plates **16** and the top cover plate **17**.

At the upper part of the front panel section **11** a stationary sealing jaw SJ is provided which includes a jaw supporting frame **21** on which is mounted a horizontally disposed jaw **22** having a horizontally disposed resilient strip **23** of rubber or the like providing a backing block, with a vertical facing strip **24** therealong of Teflon or the like. The strip **24** is retained in tension by mounting clamps **25** on the sides of the jaw supporting frame **21**.

At the front side of the central panel section **12**, a movable sealing jaw support **30** is provided, connected at its lower end to a transverse frame piece **31** by a hinge **32** of any desired type, the type of hinge known as a piano hinge being preferred. At the upper end of the movable sealing jaw support **30** a sealing jaw MJ is provided which includes a jaw supporting frame **33** and has a horizontally disposed heat insulating backing strip **34** of non-electrical conducting material secured thereto, the front face **35** of which is inset.

An electrical resistance heating element **36** is provided, preferably in the form of a wire, along the front vertical face **35** of the strip **34** and is secured at its ends by brackets **37** carried on the backing strip **34** for retaining the element **36** under the desired tension to retain it in straight horizontal condition.

The jaw supporting frame **33**, as illustrated in Fig. 2, can have an adjustable resistance regulator **38** mounted thereon and connected in series with the heating element **36**. A vertical facing strip **39** is provided, on the supporting frame **33** of Teflon or the like, the strip **39** being retained in tension by mounting clamps **40** on the sides of the jaw supporting frame **33**. The facing strip **39** permits the flow of heat therethrough for sealing when it is pressed against the resistance heating element **36** but, upon separation from the heating element **36**, aids in stripping with respect to the bag upon the completion of the sealing operations.

In order to control the positioning of the movable sealing jaw support **30**, a pair of links **45** is provided, secured at their front ends to pivot blocks **46** in the movable sealing jaw support **30**. The links **45** extend through openings **47** in the central panel section **12** and have their rear ends **48** pivotally connected by pins **49** to the upper ends of jaw actuating arms **50**. The jaw actuating arms **50** are keyed or otherwise rigidly connected to a horizontal shaft **51** having its ends pivotally carried in sockets **52** at the sides of the central panel section **12**.

The lower ends of the jaw actuating arms **50** have the

front ends of tension springs 53 connected thereto, the springs 53 being connected at their opposite or rear ends to spring mountings 54 secured to the rear panel section 13. The springs 53 normally tend to urge the movable sealing jaw MJ to a sealing position with the strip 39 in meeting relation to the strip 24 on the stationary jaw SJ.

The shaft 51 also has rigidly secured thereto, in any desired manner such as by a pin 55, a cam follower arm 56.

Within the space 19 between the rear panel section 13 and the central panel section 12, a horizontal shelf 57 is provided. A motor supporting bracket 58 is secured to the shelf 57 and has a vertically extending plate portion 59. An electric motor 60 is provided and mounted on a speed reducer 61 which is in turn mounted on the plate portion 59 for supporting the motor 60 and the speed reducer 61.

The motor 60 may have a fan 62 connected thereto and operated thereby for providing a circulation of cooling air to and around the motor 60.

The speed reducer 61, operated by the motor shaft (not shown) of the motor 60, has an output shaft 63 on which a cam arm 64 is mounted for rotation therewith. The cam arm 64 has cam rollers 65 at each end thereof for successive engagement with the cam follower arm 56, as hereinafter explained.

A voltage reducing transformer 66 may be provided, also carried on the shelf 57, for providing electrical energy at reduced voltage for operating the motor 60.

On the plate portion 59, above the shaft 63, a motor microswitch 67 is mounted. The microswitch 67 has switch contacts which are normally closed, but are opened by engagement of one of the cam rollers 65 with a resilient control arm 68 of the microswitch 67.

A microswitch supporting bracket 69 is provided, carried by the central panel section 12, and has a sealing control microswitch 70 with a resilient actuating arm 71 for engagement by one of the jaw actuating arms 50 at a predetermined position thereof. The microswitch 70 also has normally closed contacts which are opened by engagement by one of the jaw actuating arms 50 with the control arm 71 in one position of operation.

On the top cover plate 17, indicator light 72 is preferably provided shunted across the leads to the heating element 36 to indicate the energization thereof. If desired, an on-off toggle switch 73 can be provided on the central panel section 12 for controlling the power input to the machine.

Referring now more particularly to Fig. 5, a wiring diagram is there shown, and includes power leads 75 and 76 connected to a suitable source of electrical energy, which can conveniently be conventional 115 volt 60 cycle alternating current. The lead 76 is connected to the toggle switch 73 and a connection 77 extends to one terminal of the primary winding of the transformer 66. The lead 75 extends to a foot actuated switch 78 with a connection 79 therefrom to the other terminal of the primary winding of the transformer 66.

Shunted across the connections to the foot actuated switch 78 by conductors 80 and 81, the motor operating microswitch 67 is provided.

The terminals of the secondary winding of the transformer 66 are connected by conductors 84 and 85 to the terminals of the motor 60. The secondary winding of the transformer 66 is also connected by a conductor 86 to and through the resistance regulator 38 to one of the leads of the heating element 36, the other lead of the heating element 36 being connected in series with the heating element microswitch 70 from which a conductor 87 extends to one of the terminals of the secondary winding of the transformer 66. The indicator light 72 is shunted across the connections 86 and 87 to the heating element 36 by conductors 88 and 89.

The mode of operation will now be pointed out.

At the beginning of operations, the cam arm 64 is disposed with one of its rollers 65 in engagement with the cam follower arm 56 to retain the movable sealing jaw support 30 and the movable sealing jaw MJ in retracted position in opposition to the force exerted by the springs 53. The contacts of the motor microswitch 67 are open and held open by the engagement of the same cam roller 65 with the microswitch control arm 68.

If the toggle switch 73 is operated to "on" position, no power is supplied to the motor 60 or to the heating element 36.

If now the foot switch 78 is operated to close the circuit therethrough, a motor actuating circuit is set up from the secondary winding of the transformer 66 to start operation of the motor 60 and through the speed reducer 61 effect rotation of the shaft 63. As the shaft 63 is rotated the cam roller 65 quickly moves from engagement with the cam follower arm 56 and from engagement with the microswitch control arm 68. As soon as this cam roller 65 has disengaged the microswitch control arm 68, a circuit is set up through the normally closed contacts of the motor microswitch 67 to continue operation of the motor 60, even if the foot switch 78 is released.

As the cam roller 65 moves from engagement with the cam follower arm 56, the movable sealing jaw support 30 is moved by the tension of the springs 53 to move the movable sealing jaw MJ to closed and sealing position with respect to the stationary jaw SJ.

As the jaw actuating arms 50 are moved, the switch actuating arm 71 of the sealing microswitch 70 is disengaged therefrom to set up a circuit through the microswitch 70 for activating the resistance heating element 36.

The movable jaw MJ moves to a position close to the sealing jaw SJ for sealing heat sealable material such as the top of a bag interposed between the jaws MJ and SJ by the heat available from the resistance heating element 36. During the sealing of the bag the bag can be supported in any desired manner and if desired the excess air in the bag can be expelled in any desired manner. As the shaft 63 continues to rotate, the next cam roller 65 moves to a position to engage the cam follower arm 56 to commence the retraction of the movable jaw MJ and engage the switch actuating arm 71 to discontinue the supply of electrical energy to the resistance heating element 36 and to engage the microswitch arm 68 of the microswitch 67 to discontinue the supply of electrical energy to the motor 60 so that the cam arm 64 stops in a horizontal position ready for another cycle.

The cycle can be repeated as often as desired by depressing the foot actuated switch 78 to initiate the cycle.

The single cyclic operation just referred to can be changed to a continuous cycling operation assuming that bags to be sealed can be supplied thereto with sufficient rapidity for insertion during the interval the movable sealing jaw MJ is separated from the stationary sealing jaw SJ and with the foot switch 78 continuously pressed.

It will be noted that the motor 60 is only operated when a sealing cycle is to be carried out so that a smaller and lower priced motor can be employed, this also being possible because of the relatively low inertia of the moving parts.

It will also be noted that the heating element 36 is also only activated prior to and during the sealing so that heat loss through continued activation of the heating element 36 during idle periods is avoided.

While the jaws MJ and SJ are in closed and sealing position the excess material above the bag can be torn off by the operator at the upper margin of the seal which is in weakened condition when heated.

I claim:

1. A heat sealing machine comprising a housing having a first section and a second section connected thereto in spaced relation, a fixed sealing jaw mounted at one

margin of one of said sections and facing towards the other of said sections, a jaw support movably connected to said housing in the space between said sections and having a movable sealing jaw mounted on one margin thereof for movement towards and away from said fixed sealing jaw, said sections having an opening therebetween at at least one end thereof in communication with said space and being free from obstructions outwardly of said jaws, one of said jaws having an electric resistance heater extending therealong, and means for controlling the movement of said movable jaw, said means including jaw actuating arms connected to said jaw support, resilient members connected to said jaw actuating arms and to a portion of said housing for normally urging said movable jaw in a predetermined direction with respect to said fixed jaw, an actuating arm rigidly connected to said jaw actuating arms, a cam member for engagement with said actuating arm for moving said jaw actuating arms in opposition to the force exerted by said resilient members, an electric motor having a driving connection to said cam member, and circuit connections for energizing said motor.

2. A heat sealing machine as defined in claim 1 in which the circuit connections for energizing said motor include a manually operable switch for initiating motor operation, and a circuit connection including a switch controlled by said cam member for energizing and de-energizing said motor.

3. A heat sealing machine as defined in claim 1 in which a member is provided engageable by said cam member for controlling the motor actuation.

4. A heat sealing machine as defined in claim 1 in which a member is provided controlled by said jaw actuating arms for controlling the energization of said resistance heater.

5. A heat sealing machine as defined in claim 1 in which said movable sealing jaw has a heating element mounted thereon and an energizing connection is provided connected to said heating element, and a switch operated device is provided for controlling said last circuit connections having a portion engageable upon retracting movement of said sealing jaw for breaking such circuit and for completing said circuit upon movement of said movable sealing jaw towards sealing position.

6. A heat sealing machine comprising a housing having a front upright section and a central upright section connected thereto in spaced relation, a fixed sealing jaw mounted at one margin of one of said sections and facing towards the other of said sections, a jaw support hingedly connected to said housing in the space between said sections and having a movable sealing jaw mounted on one margin thereof for movement towards and away from said fixed sealing jaw, said sections having an opening therebetween at at least one end in communication with said space and being free from obstructions outwardly of said jaws, one of said jaws having an electric resistance heater extending therealong, and means for controlling the movement of said movable jaw, said means including jaw actuating arms connected to said jaw support, resilient members connected to said jaw actuating arms for normally urging said movable jaw towards said fixed jaw, an actuating arm rigidly connected to said jaw actuating arms, a cam member for engagement with said actuating arm for retracting said jaw actuating arms, an electric motor having a driving connection to said cam member, and circuit connections for energizing said motor.

7. A heat sealing machine comprising a housing having a front upright section and a central upright section connected in spaced relation, a fixed sealing jaw mounted at the upper end of said front section and facing towards said central section, a jaw support hingedly connected to the lower part of said central section and having a sealing jaw mounted on the upper end thereof for movement towards and away from said fixed sealing jaw, said movable jaw having a resistance heater extending therealong, and means for controlling the movement of said movable jaw, said means including a horizontal shaft, members in said housing for supporting said shaft, jaw actuating arms secured to said shaft and connected to said jaw support, resilient members connected to said jaw actuating arms for normally urging said movable jaw towards said fixed jaw, an actuating arm rigidly connected to said shaft, a cam member for engagement with said actuating arm for retracting said jaw actuating arms, an electric motor having a driving connection to said cam member, and circuit connections for energizing said motor.

8. A heat sealing machine as defined in claim 7 in which the circuit connections for energizing said motor include a manually operable switch for initiating motor operation, and a circuit connection including a switch controlled by said cam member for energizing and de-energizing said motor.

9. A heat sealing machine as defined in claim 7 in which a member is provided engageable by said cam member for controlling the motor actuation.

10. A heat sealing machine as defined in claim 7 in which a member is provided controlled by said jaw actuating arms for controlling the energization of said resistance heater.

11. A heat sealing machine as defined in claim 7 in which said movable sealing jaw has a heating element mounted thereon and an energizing connection is provided connected to said heating element, and a switch operated device is provided for controlling said last circuit connections having a portion engageable upon retracting movement of said sealing jaw for breaking such circuit and for completing said circuit upon movement of said movable sealing jaw towards sealing position.

12. A heat sealing machine as defined in claim 7 in which said cam member includes a plurality of circumferentially spaced rollers, the spaces between said rollers permitting rapid disengagement of said rollers with respect to said actuating arm.

13. A heat sealing machine comprising a housing having a front upright panel section, a central upright panel section and a rear upright panel section connected in spaced relation, a horizontal sealing jaw mounted at the upper end of said front panel section and facing towards said central panel section, a jaw support hingedly connected to the lower part of said central panel section and having a movable sealing jaw mounted on the upper end thereof for movement towards and away from said fixed sealing jaw, said front panel section and said central panel section having an opening therebetween at at least one end in communication with said space for introduction of a bag with upper margins of the bag freely accessible above said jaws, said movable jaw having a resistance heater extending therealong, and means disposed in the space between said central and rear panel sections for controlling the movement of said movable jaw, said means including a horizontal shaft supported by said housing between said central and rear panel sections, jaw actuating arms secured to said shaft and connected to said jaw support, resilient members connected to said arms for normally urging said movable jaw towards said fixed jaw, an actuating arm rigidly connected to said shaft, a cam member for engagement with said actuating arm for retracting said jaw actuating arms, an electric motor having a driving connection to said cam member, and circuit connections for energizing said motor.

14. A heat sealing machine as defined in claim 13 in which the circuit connections for energizing said motor include a manually operable switch for initiating motor operation, and a circuit connection including a switch controlled by said cam member for energizing and de-energizing said motor.

15. A heat sealing machine as defined in claim 13 in which a member is provided engageable by said cam member for controlling the motor actuation.

16. A heat sealing machine as defined in claim 13 in which a member is provided controlled by said jaw actu-

ating arms for controlling the energization of said resistance heater.

17. A heat sealing machine as defined in claim 13 in which a member is provided engageable by said cam member for controlling the motor actuation, and a member is provided controlled by said jaw actuating arms for controlling the energization of said resistance heater.

18. A heat sealing machine as defined in claim 13 in which said movable sealing jaw has a heating element mounted thereon and an energizing connection is provided connected to said heating element, and a switch operated device is provided for controlling said last circuit connections and having a portion engageable upon retracting movement of said sealing jaw for breaking such circuit and for completing said circuit upon movement

of said movable sealing jaw towards sealing position.

19. A heat sealing machine as defined in claim 13 in which said cam member includes a plurality of circumferentially spaced rollers, the spaces between said rollers permitting rapid disengagement of said rollers with respect to said actuating arm.

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