

Nov. 26, 1935.

C. T. MORSE ET AL

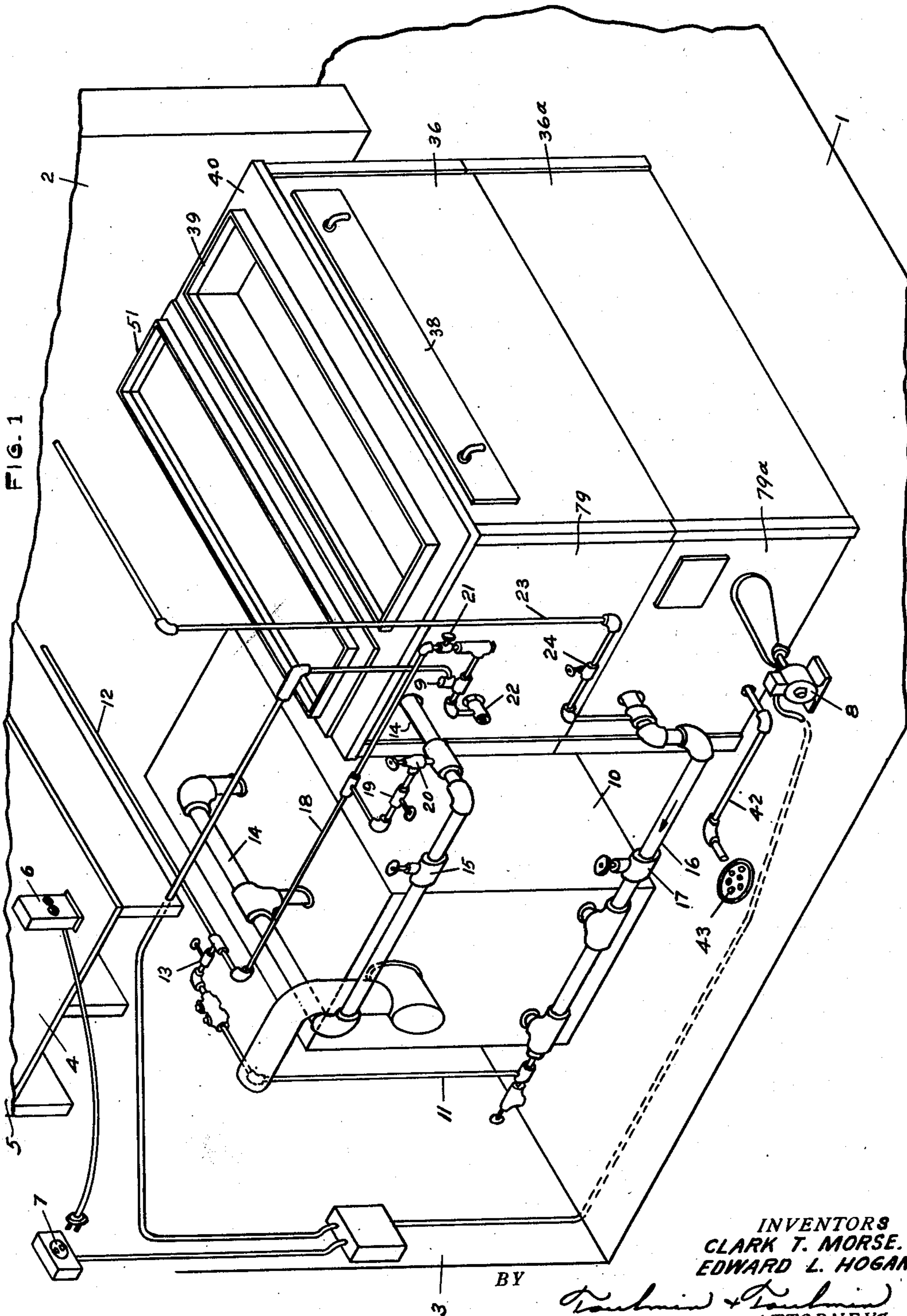
2,022,133

AIR CONDITIONING SYSTEM

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3 Sheets-Sheet 1

FIG. 1



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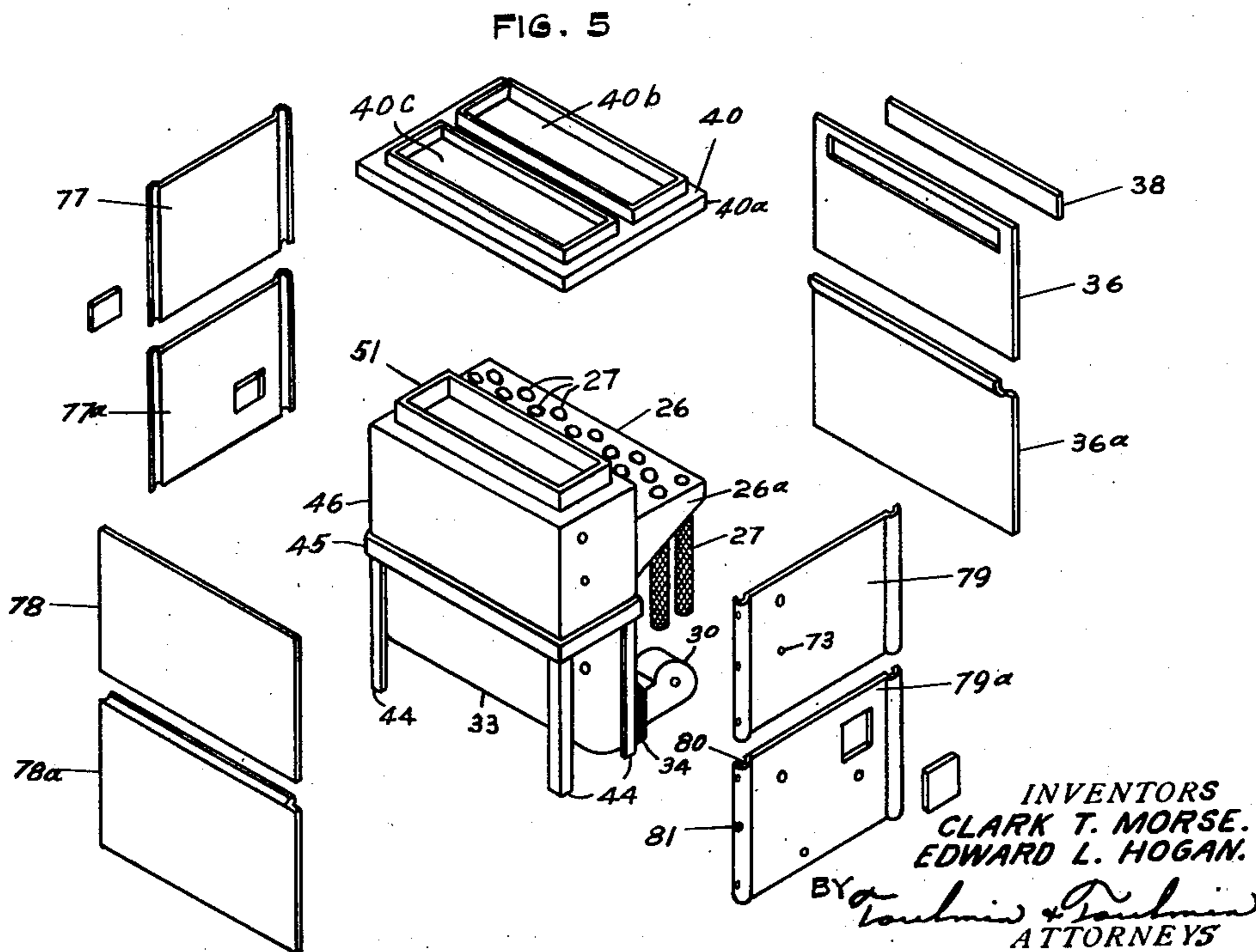
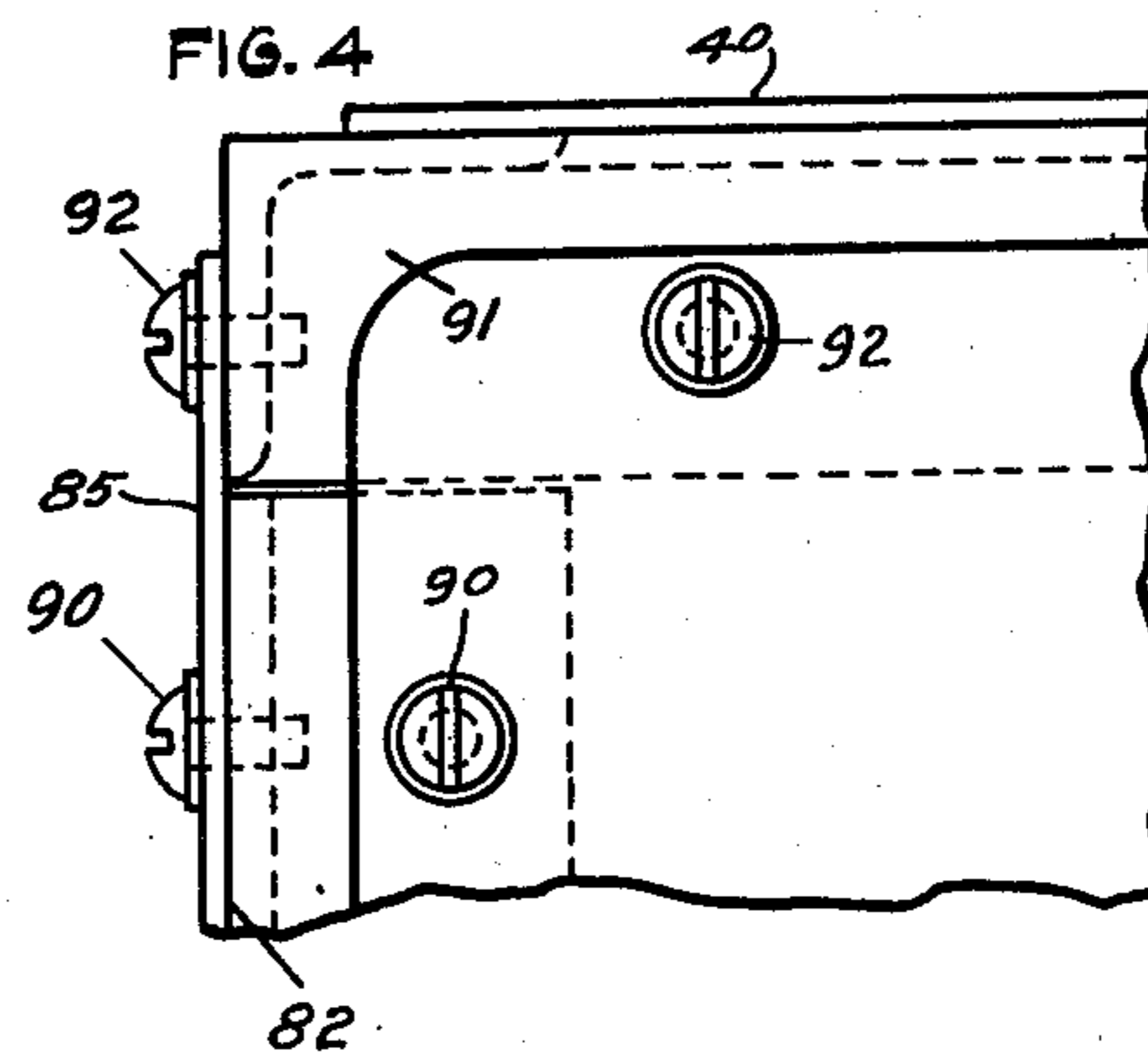
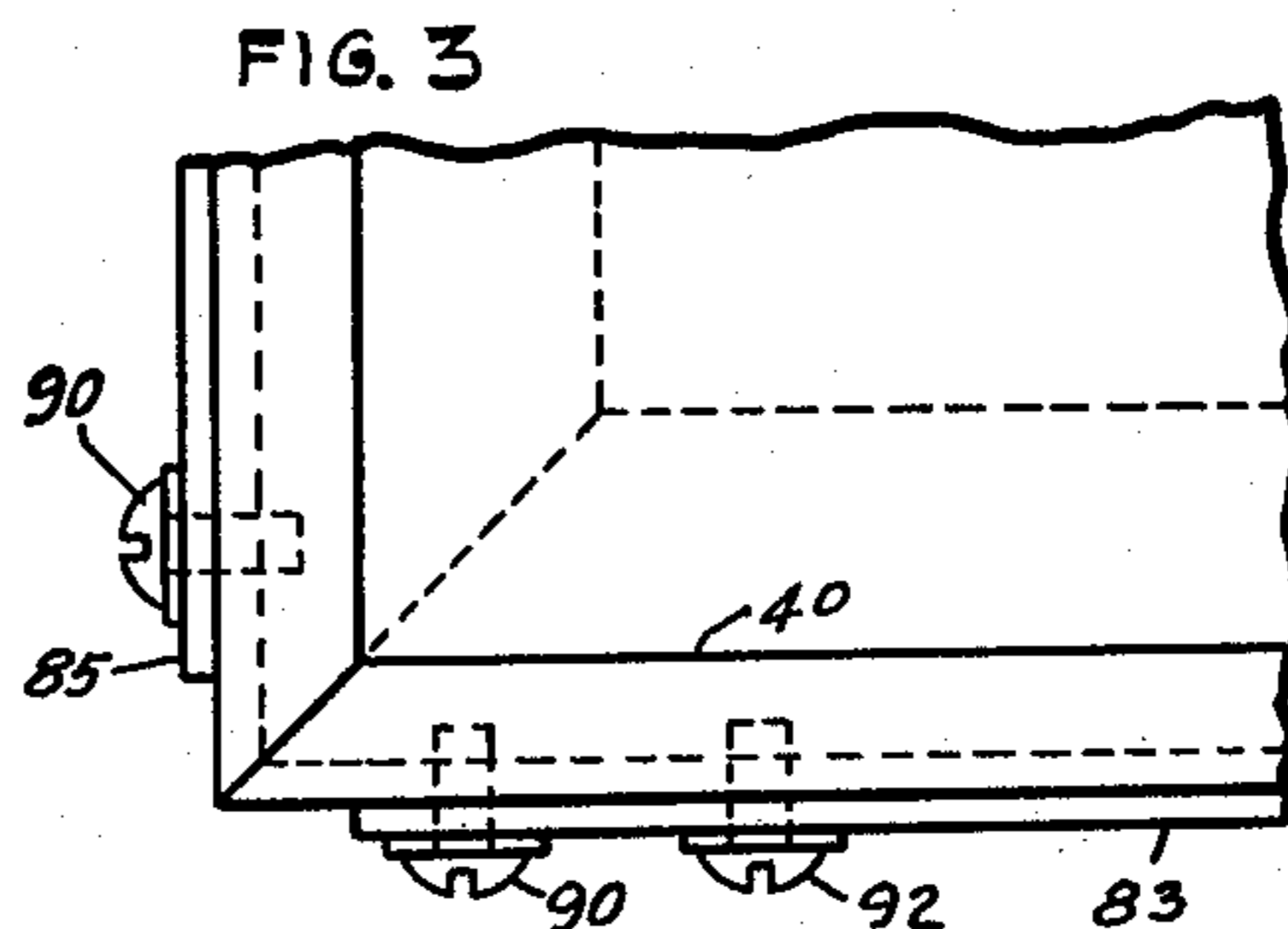
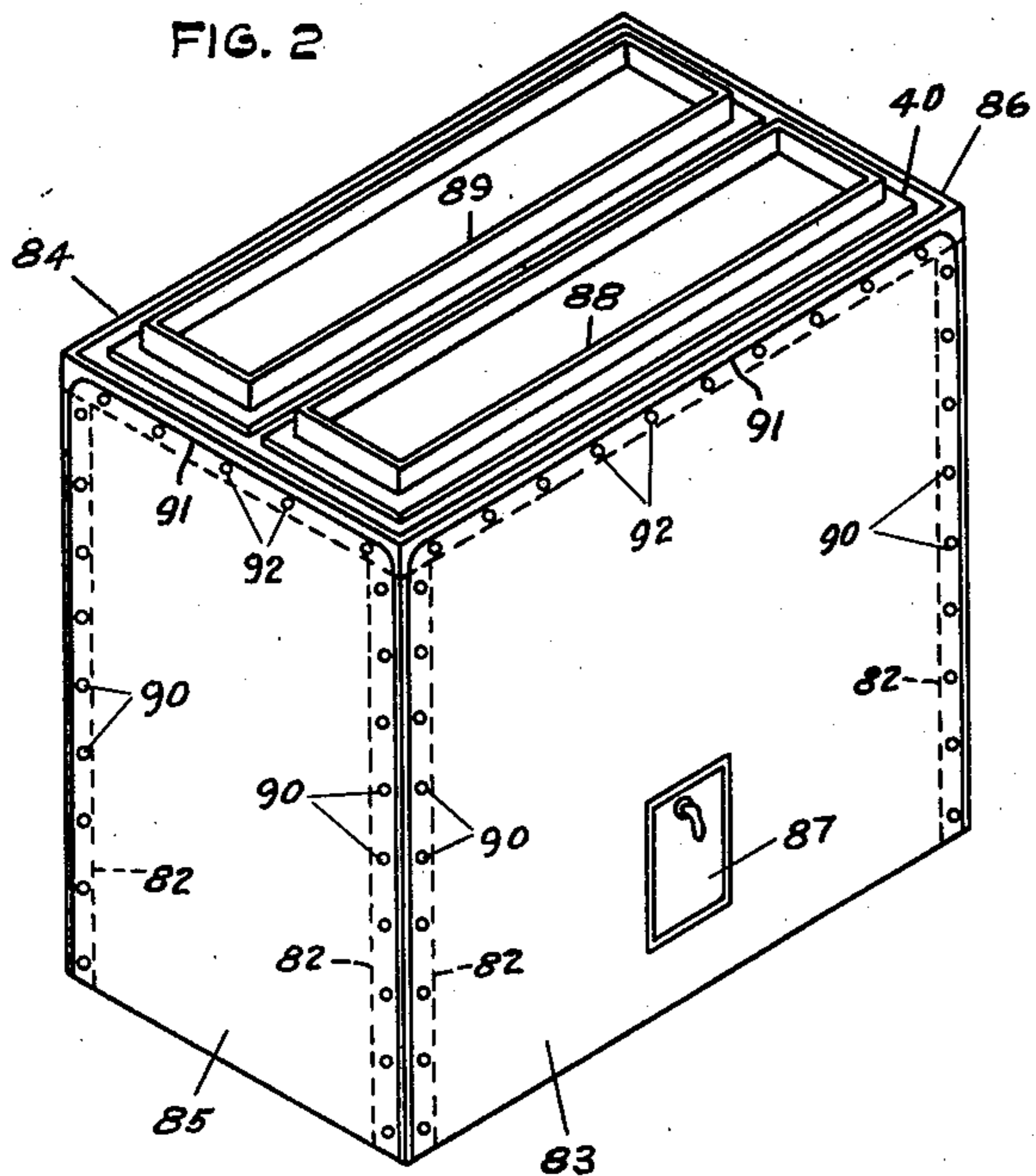
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3 Sheets-Sheet 2



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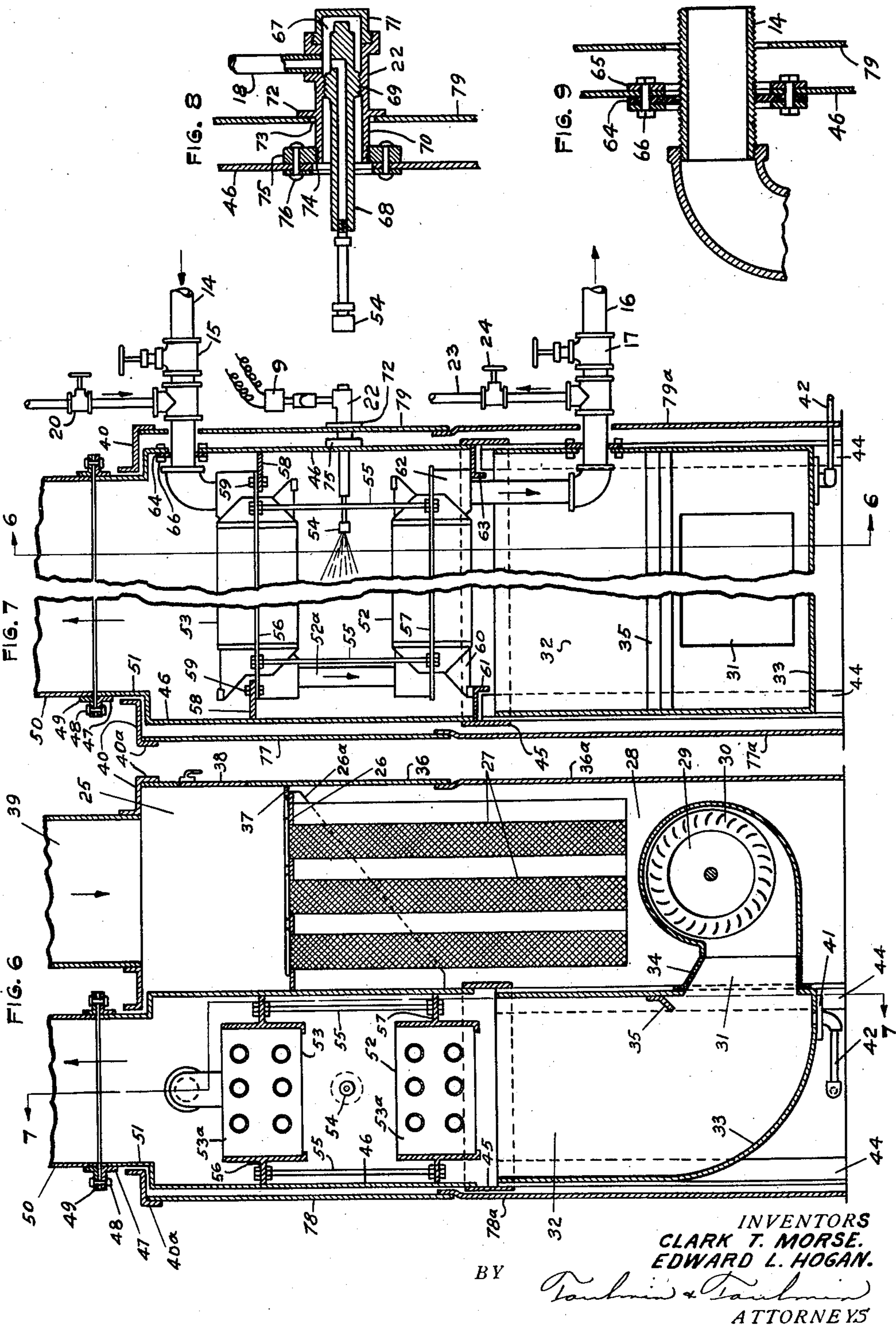
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3 Sheets-Sheet 3



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## UNITED STATES PATENT OFFICE

2,022,133

## AIR CONDITIONING SYSTEM

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Application April 9, 1932, Serial No. 604,142

18 Claims. (Cl. 257—9)

Our invention relates to an apparatus for air conditioning.

It is the object of our invention to provide a unitary apparatus for the conditioning of air circulated to and from an enclosure, such apparatus being adapted to employ in the same mechanism either a heating fluid or a cooling fluid.

It is our object to provide in such connection a heating generator, such as a hot water generator, and an interconnected supply of cooling fluid as from a city water line or any other source of cooling or refrigerated liquid.

It is a further object to provide a unit in which the interior apparatus is supported as an integral unit separate from the outside enclosing casing and in which the outside enclosing casing is self supporting and is independent of the interior mechanism, both of such mechanisms resting upon a common foundation, thereby preventing the vibrations of the interior mechanism from being communicated to the exterior casing so as to reduce any noise of operation of the parts of the mechanism.

Referring to the drawings:

Figure 1 is an isometric perspective of the system installed in the cellar of a home showing the first floor partially broken away;

Figure 2 is a detail perspective of one form of the outside casing;

Figure 3 is a detail plan view of one corner of the casing shown in Figure 2;

Figure 4 is a detail side elevation of one corner of the casing shown in Figure 2;

Figure 5 is an exploded view of the casing side walls showing the interior unit around which the casing side walls are located, the casing in this case being a modification of the casing shown in Figures 2, 3, and 4;

Figure 6 is a section on the line 6—6 of Figure 7 showing in section the air conditioning unit;

Figure 7 is a section on the line 7—7 of Figure 6;

Figure 8 is a detail section of the spray nozzle and associated mechanism;

Figure 9 is a detail section through the duct outside casing and pipe connection to one of the radiators.

Referring to the drawings in detail, 1 is the floor of a building, such as the floor of a cellar, 2 and 3 are the side walls thereof, 4 is the first floor of the room 5 into which conditioned air is discharged and from which it may be withdrawn through suitable openings.

A thermostatic control 6 of any desired char-

acter is adapted to be plugged in at 7 which controls the operation of the motor 8 and the valve 9.

A hot water boiler used as a hot water generator designated generally 10 may be employed of any desired construction. This boiler is supplied with water for its make up fluid through the pipe 11 from the city water line 12. This is controlled by the valve 13. The exit line from the hot water generator is designated 14. The outlet of such water is controlled by the valve 15. The return line is designated 16 and is controlled by the valve 17. The outlet line 14 from the hot water generator has connected to it the branch 18 from the incoming city water line, which branch is controlled by the valve 19 and the introduction of the cold water into the line 14 is controlled by the valve 20. The valve 21 controls the application of cold water to the humidifier spray casing 22.

When cold water is employed instead of hot water from the hot water generator, the cold water makes its exit through the line 23 controlled by the valve 24. This line 23 leads to a suitable outlet, such as the sewer.

Turning to the air conditioning mechanism per se, it will be noted that it consists of an air inlet chamber 25, the bottom of which is formed by a plate 26 supported on the bracket 26a and having apertures for supporting the filter stockings 27 which are open at the top and closed at the bottom through which air passes into the chamber 28. It then passes into the eye of the blower casing 29 where the blower 30 discharges air through the passageway 31 upwardly through the passageway 32 within the casing 33. The blower casing 29 is connected to the casing 33 by a canvas connector 34. Over the upper part of this connection is an outwardly and downwardly projecting flange 35 constituting a drip sheet extending the full length of the casing 33 to prevent precipitate moisture from dripping upon, and soaking through the textile material constituting the connector sleeve 34.

The connection between the stockings 27 and the supporting plate 26 is sealed by using a pressed felt strip to close the space between the filter bag support 26 and the outside casing, a part of which is designated at 36. This felt seal is designated 37.

In the wall of the casing 36 is an inspection door 38. An air inlet passageway formed by the duct 39 discharges the incoming air into the chamber 25, the top of which is closed by the supporting cap plate 40. It will be noted that the cap plate 40 supports the duct 39. The side

wall 36 has an interlocking lower side plate 36a.

The duct 32 is provided with a drip catcher 41 which is drained by the discharge pipe 42 discharging into the cellar drain 43.

5 The duct 33 is supported by the angle iron supports 44. Mounted on the top of these supports and surrounding the top of the duct 33 is a collar 45, in which is telescopically mounted the duct or passageway 46 that is connected at its top  
10 by the flange 47 and bolts 48 to a cooperating flange 49 on the outlet duct 50. The restricted throat 51 of the duct or passageway 46 is surrounded by the cap plate 40 but out of contact with it. This cap plate 40 overlaps the side  
15 walls of the outside casing, as hereinafter described, of which the side wall 36 and 36a is one part.

Mounted within the duct or passageway 46 is the lower radiator 52 while above this radiator  
20 in spaced relationship to it is the upper radiator 53 and between these radiators is the humidifier nozzle 54. 52a designates the pipe which connects the headers of the radiators for intercommunication between the radiators. By locating  
25 the humidifier between the radiator sections the extended fins 53a of the upper radiator serve as eliminator plates for the removal of all entrained moisture from the air.

Both radiators 52 and 53 have plates, such as  
30 53a, for guiding the air. The two sections of radiators are connected together by bolts 55 mounted in the side plates 56 and 57 of the radiators. These plates are connected to the sealing strips 58 which seal the space between the  
35 radiators and the adjacent walls of the duct 46. Such adjustable steel seal strips or plates 58 are so designed that they may be set in position to prevent the passage of air between the radiator and the casing 46. Bolts 59 hold these sealing  
40 strips in adjustable position. The lower radiator 52 is provided with feet 60 which rest upon the transverse angle iron support 61 while the other end of the radiator as at 62 rests upon a similar transverse angle iron support 63.

45 The inlet and outlet pipes to these radiators are sealed with respect to the ducts 33 and 46 by a means shown in Figure 9. This arrangement comprises a resilient ring 64 mounted on the duct wall by the clamping ring 65 and bolts 66.  
50

#### Humidifier

55 The humidifier nozzle 54 is supplied with water from the pipe 18 controlled by the valve 21. After the predetermined amount of liquid is determined by the setting of the valve 21, the opening and closing of the humidifier is controlled by the solenoid valve 9. The water is admitted to a chamber 67 whence it enters a tubular member  
60 68 threaded at 69 within the sleeve member 70 which has a detachable plug head 71. This casing is provided with an overlapping flange 72 covering the opening 73 in the outer decorative casing.

65 The inner end of the sleeve member 70 is threaded at 74 into the ring 75 retained by the bolts 76 on one wall of the duct 46. The humidifier nozzle 54 is threaded in the inner end of the tubular member 68. The construction of the  
70 humidifier assembly is such that, upon the removal of the plug 71, the entire nozzle supporting means and the nozzle itself may be withdrawn for inspection or repair without disturbing the humidifying mechanism casing or any pipe connection thereto.  
75

#### Outer casing

With special reference to Figure 5, it will be noted that the casing sheets 36 and 36a, 77 and 77a, 78 and 78a, and 79 and 79a, are assembled  
5 around the interior operating mechanism.

The lower sheets 36a and 78a are placed in position and then the lower sheet 79a, whose ends are suitably formed to overlap the ends of the sheets 36a and 78a as at 80, is placed in position  
10 and fastened by screws 81. The lower sheet 77a is then placed in position in the same manner.

The upper half of the casing is then similarly arranged comprising the parts 36, 78, 77, and 79.  
15

Then the cover 40 with its overlapping flanges 40a and having openings 40b and 40c is placed in position as indicated in Figure 6.

Referring to Figures 2, 3, and 4 where there is an alternate method of constructing a casing  
20 where it is particularly adaptable to units of relatively small size, the complete casing assembly consists of the following parts: angle iron uprights 82 receive the sheets 83 and 84 and end sheets 85 and 86. A suitable access door 87 is  
25 provided. The cap 40 is lowered into position. Around the inlet and outlet openings are angle iron collars 88 and 89. The inlet collar 88 is drilled to receive attaching bolts for connecting the inlet duct 39 thereto. In erecting this modified form of casing, after the interior operating  
30 mechanism has been erected, the angle iron uprights 82 are fastened to the side sheets 83 and 84 by screws 90. Then the side sheets are held in position and the two end sheets 85 and 86 are  
35 fastened to the angles 82 by the screws 90. The top sheet assembly 40 is then placed in position so that its reinforcing angles 91 rest upon the upright angles 82 and the screws 92 are then inserted fastening the side and end sheets 83, 84, 40  
85, and 86 to the angles 91.

#### Method of operation

When the hot water source is employed the  
45 valve 15 is opened and the valves 19 and 20 are closed. The hot water enters through the pipe 14 into the top radiator 56 and after circulating through that radiator passes downwardly through the pipe 52a, thence circulates through the radiator 52 out through the pipe 16 through the valve  
50 17 which is open.

When cooling fluid is used the valve 15 is closed and the valves 19 and 20 are open. The cooling fluid enters through the pipe 18 thence to the  
55 radiator 53 through the pipe 52a, radiator 52 and pipe 16 upwardly through the pipe 23, the valve 24 being open and the valve 17 being closed.

It will be understood that the blower 30 is operated by the motor.  
60

It will be understood that we desire to comprehend within our invention such modifications as may be necessary to adapt it to varying conditions and uses.

Having thus fully described our invention, what  
65 we claim as new and desire to secure by Letters Patent, is:

1. In combination, a supporting frame, a blower and duct supported thereby, radiation means in said duct, a bracket on said duct supporting filter-  
70 ing means, a casing enclosing said foregoing means and forming with said filter supporting bracket an inlet air chamber, and a detachable cover for said casing having an opening communicating with said chamber.  
75

2. In combination, a supporting frame, a blower and duct supported thereby, radiation means in said duct, a bracket on said duct supporting filtering means, a casing enclosing said foregoing means and forming with said filter supporting bracket an inlet air chamber, a detachable cover for said casing having an opening communicating with said chamber, and an outlet duct supported on said first-named duct out of engagement with said casing.

3. In combination, a supporting frame, a blower and duct supported thereby, radiation means in said duct, a bracket on said duct supporting filtering means, a casing enclosing said foregoing means forming with said filter supporting bracket an inlet air chamber, a detachable cover for said casing having an opening communicating with said chamber, an outlet duct supported on said first-named duct out of engagement with said casing, and means sealing a connection yieldingly between said casing and the bracket supporting said filtering means.

4. In an air conditioning mechanism, a frame work, a vertically-disposed duct having an inlet at the bottom and an outlet at the top mounted thereon, a blower connected to the inlet at the bottom of the duct to one side thereof, radiation means in the upper portion of the duct, a bracket on the side of the duct, and a plurality of filtering means depending therefrom over said blower.

5. In an air conditioning mechanism, a frame work, a vertically-disposed duct having an inlet at the bottom and an outlet at the top mounted thereon, a blower connected to the inlet at the bottom of the duct to one side thereof, radiation means in the upper portion of the duct, a bracket on the side of the duct, and a plurality of filtering means depending therefrom over said blower, and an outlet passageway connected to the top of said vertically-disposed casing.

6. In an air conditioning mechanism, a frame work, a vertically-disposed duct having an inlet at the bottom and an outlet at the top mounted thereon, a blower connected to the inlet at the bottom of the duct to one side thereof, radiation means in the upper portion of the duct, a bracket on the side of the duct, a plurality of filtering means depending therefrom over said blower, an outlet passageway connected to the top of said vertically-disposed casing, an enclosing casing spaced from the foregoing mechanism, means of sealing the filter supporting means bracket to said casing and a detachable cover for said casing carrying an inlet duct over said filtering means.

7. In combination, a discharge duct, temperature controlling means therein, humidifying means therein, a blower connected by a textile connecting means to the lower end of said duct and a drip sheet mounted above said blower connection.

8. In combination, a discharge duct, temperature controlling means therein, humidifying means therein, a blower connected by a textile connecting means to the lower end of said duct and a drip sheet mounted over said blower connection, and means to drain precipitate liquid from said duct below said blower connection.

9. In an air conditioning apparatus, a vertically-disposed duct, a pair of spaced radiators thereon having fins thereon, a humidifier located between said radiators, and means at the bottom of the duct for removing the precipitate moisture therefrom which is scrubbed from the air by the fins on said radiator means, and means on the side wall of the duct to deflect said precipitate

moisture towards the interior thereof away from an inlet opening thereof.

10. In an air conditioning mechanism, a vertically-disposed frame comprising spaced legs, a vertically-disposed duct carried therebetween having a bottom inlet opening at the side thereof, a collar mounted on the top of said duct, transverse supporting members associated therewith, radiator means carried on said supporting members, an upper duct section surrounding said radiators and sealed with respect thereto to insure the passage of air through the radiators.

11. In an air conditioning mechanism, a vertically-disposed frame comprising spaced legs, a vertically-disposed duct carried therebetween having a bottom inlet opening at the side thereof, a collar mounted on the top of said duct, transverse supporting members associated therewith, radiator means carried on said supporting members, an upper duct section surrounding said radiators and sealed with respect thereto to insure the passage of air through the radiators, and an outlet duct mounted on said last mentioned duct for conveying the air from said radiators.

12. In an air conditioning apparatus, vertically-disposed, spaced frame members, a lower duct having an inlet opening to one side and an arcuate bottom, a blower connected thereto, spaced radiators supported on said upright members, an upper casing associated therewith supported by said upright members surrounding said radiators, a humidifier located between said radiators, means to seal said radiators with said upper casing, fluid inlet and outlet pipes connected to said radiators passing through said casing, means to yieldingly seal the connection between said casings and fluid inlet and outlets.

13. In an air conditioning apparatus, vertically-disposed, spaced frame members, a lower duct having an inlet opening to one side and an arcuate bottom, a blower connected thereto, spaced radiators supported on said upright members, an upper casing associated therewith supported by said upright members surrounding said radiators, a humidifier located between said radiators, means to seal said radiators with said upper casing, fluid inlet and outlet pipes connected to said radiators passing through said casing, means to yieldingly seal the connection between said casings and fluid inlet and outlets, a bracket supported on the outside of said casing above said blower and a plurality of filter stockings supported thereon depending over said blower.

14. In an air conditioning apparatus, vertically-disposed, spaced frame members, a lower duct having an inlet opening to one side and an arcuate bottom, a blower connected thereto, spaced radiators supported on said upright members, an upper casing associated therewith supported by said upright members surrounding said radiators, a humidifier located between said radiators, means to seal said radiators with said upper casing, fluid inlet and outlet pipes connected to said radiators passing through said casing, means to yieldingly seal the connection between said casings and fluid inlet and outlets, a bracket supported on the outside of said casing above said blower and a plurality of filter stockings supported thereon depending over said blower, and an outer casing spaced from the foregoing mechanism and surrounding it save where yieldingly engaging the filter supporting bracket.

15. In combination, a detachable outside casing supporting an air inlet passageway, an interior casing supporting an air outlet passageway, means of supporting a filter below the inlet passageway and parallel to the outlet passageway, a blower therebeneath connected to the outlet passageway, temperature changing means in the outlet passageway and moisture changing means in the outlet passageway, said filter supporting means yieldingly engaging said outer casing to form with it an air inlet passageway.

16. In combination in a humidifying apparatus having an inner and outer casing having concentric registering apertures, means for supporting a sleeve on the inner casing around the inner aperture within the outer aperture, means of supplying water to said sleeve, a tubular member mounted within said sleeve adapted to receive the water and forming with the sleeve a chamber, a detachable head for said chamber and a nozzle on said tubular member extending within the inside casing.

17. In combination in a humidifying apparatus having an inner and outer casing having concentric registering apertures, means for sup-

porting a sleeve on the inner casing around the inner aperture within the outer aperture, means of supplying water to said sleeve, a tubular member mounted within said sleeve adapted to receive the water and forming with the sleeve a chamber, a detachable head for said chamber and a nozzle on said tubular member extending within the inside casing, and means on said sleeve overlapping the aperture in the outside casing.

18. In combination in a humidifying apparatus having an inner and outer casing having concentric registering apertures, means for supporting a sleeve on the inner casing around the inner aperture within the outer aperture, means of supplying water to said sleeve, a tubular member mounted within said sleeve adapted to receive the water and forming with the sleeve a chamber, a detachable head for said chamber and a nozzle on said tubular member extending within the inside casing, said sleeve being detachably mounted upon the inside casing for complete removal therefrom with its associated mechanism as a unit.

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