

[54] AIR COMPRESSOR HOUSINGS

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[22] Filed: **Oct. 10, 1972**

[21] Appl. No.: **296,402**

[52] U.S. Cl. **312/100, 312/213, 312/214, 312/236, 417/237**

[51] Int. Cl. **A47b 81/00**

[58] Field of Search **312/100, 213, 214, 284, 312/283, 236; 296/24 R; 181/33 K; 417/237**

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[57]

ABSTRACT

A portable air compressor housing including a main, open frame adapted to support an air compressor for movement over the ground surface via wheels suspended from the frame. The air compressor apparatus is enclosed by housing structure including opposite end pieces upstanding from the frame and interconnected by an elongated ridge pole from which are hinged folding doors providing full access to the air compressor parts. Below the folding doors, on opposite sides of the housing, are tool box compartments which also close the sides and ends of the housing. The bottom walls of the tool boxes are formed by an open mesh to permit hot air to escape from the housing through the mesh. The open tool box bottoms provide restrictions for the air flow and also aid in establishing a circuitous air flow pattern through the housing resulting in dissipation of sound and consequent reduction of noise. Further noise reduction may be achieved by baffles mounted on the opposite ends of the frame as well as a baffle mounted below the compressor structure in a horizontal plane under the opening in the main frame. To further reduce noise, the folding doors may be provided with sound absorption panels on the inner sides thereof.

17 Claims, 9 Drawing Figures

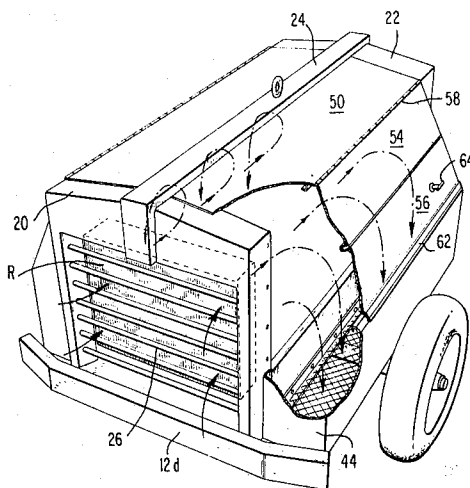


FIG. 1

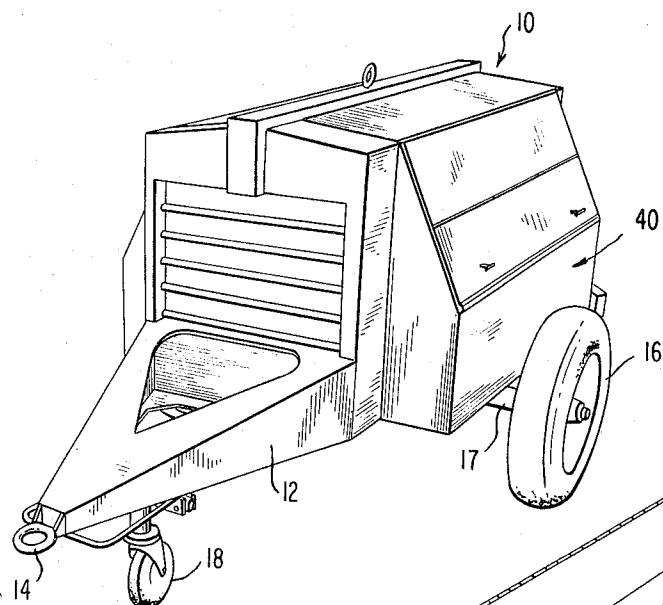


FIG. 2

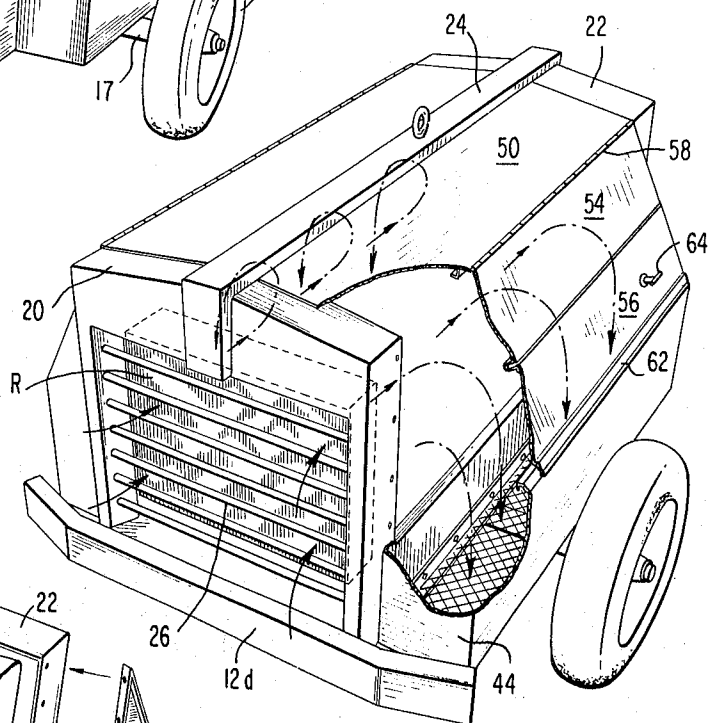


FIG. 3

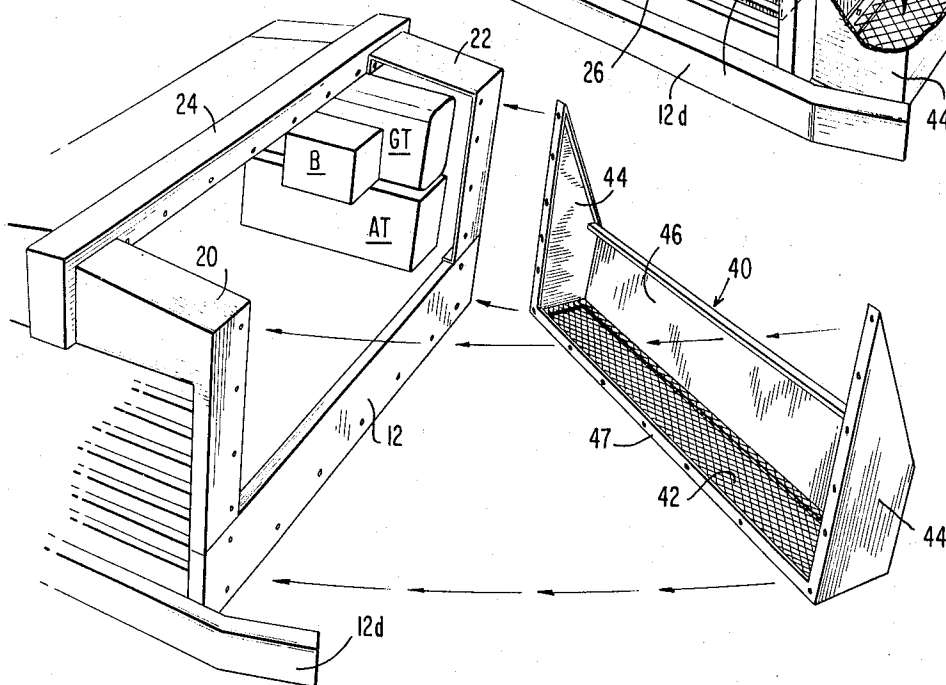


FIG. 4

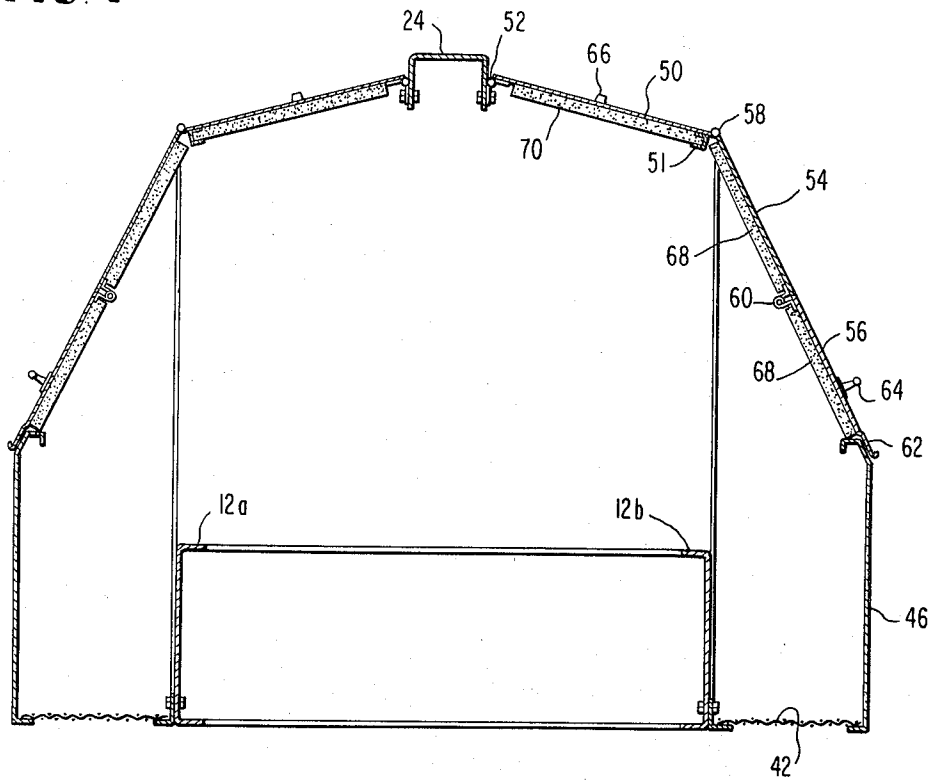


FIG. 6

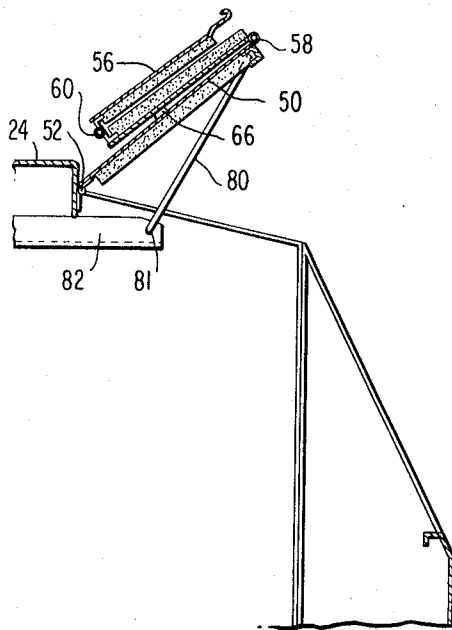
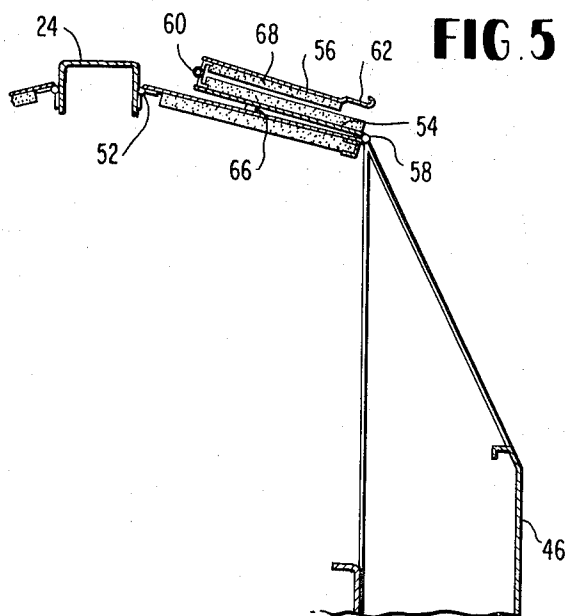


FIG. 5



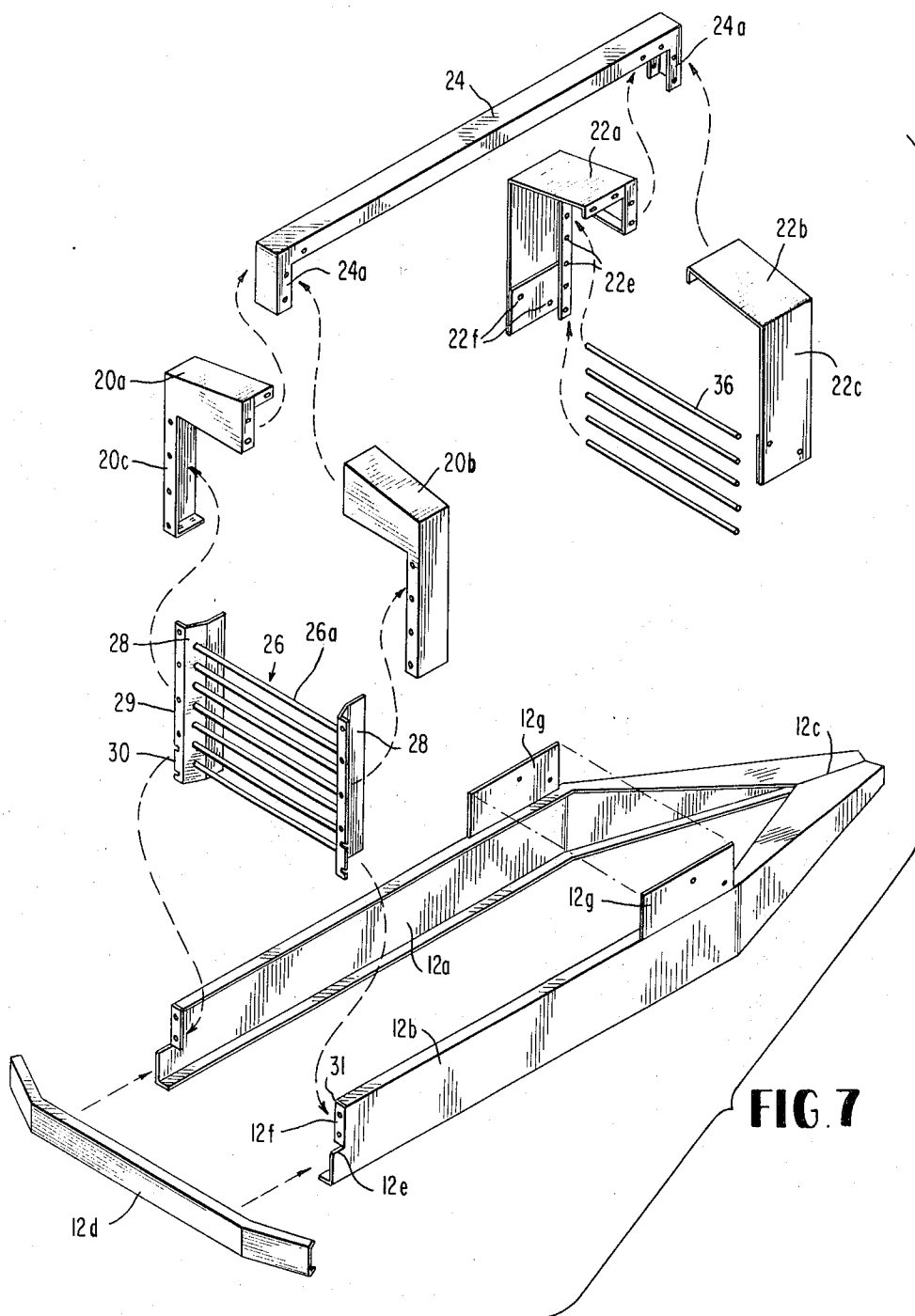


FIG. 7

FIG. 8

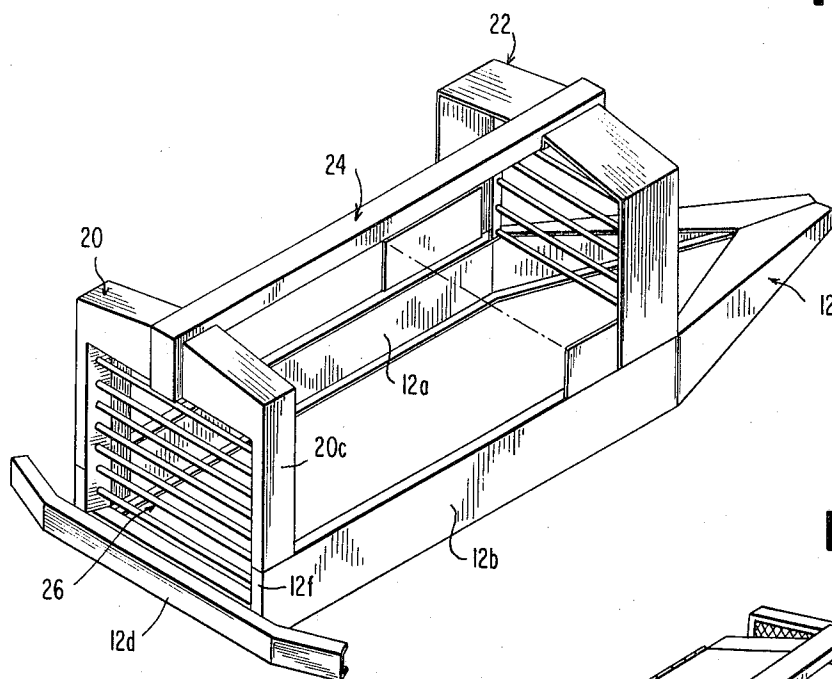
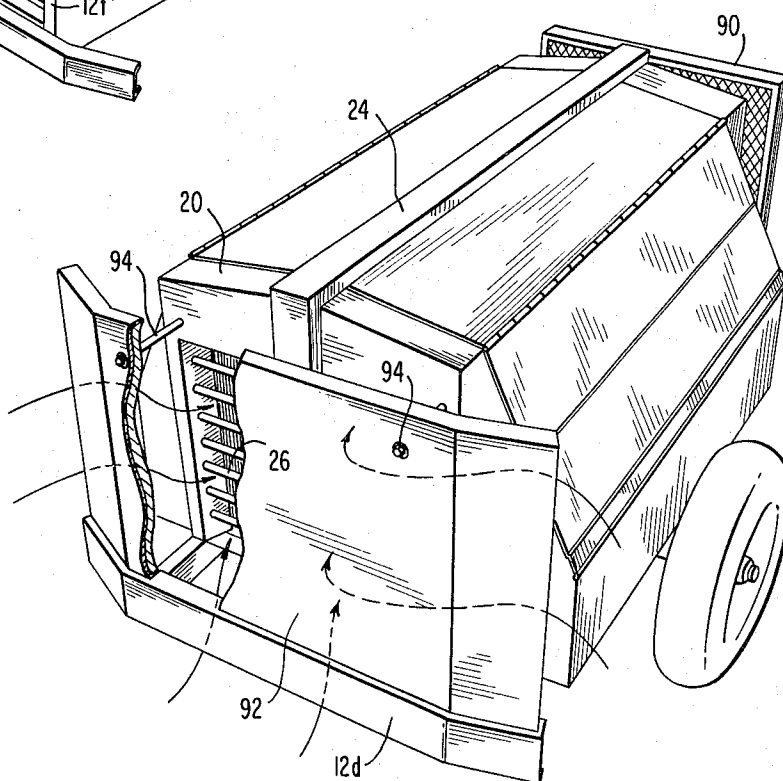


FIG. 9



closed position of the door units, upper panel 50 rests on end pieces 20 and 22 with the lower panel units 54 and 56 resting on the trapezoidal end walls of the tool boxes 40 as shown in FIGS. 1 and 2. The lower panel 56 is provided with an elongated projecting tongue 62 which, in the fully closed position of the door unit, overlies and engages the upper side edge of side wall 46 of the associated tool box 40, as shown in FIGS. 2 and 4. For purposes of manipulating the door units to move them between the open and closed positions, a handle 64 may be provided, preferably on lower panel 56. The hinges 58 and 60 are arranged so that when moving from the fully closed to a partially open position shown in FIG. 5, the lower panels 54 and 56 fold about hinge 60 into an overlying stacked condition and also fold counterclockwise about hinge 58 into the position shown in FIG. 5. Preferably, a stop 66 is fixed to upper panel 50 to engage the intermediate panel 54 when in the open position shown in FIG. 5.

In order to further open the housing, upper panel 50 with the lower panels folded thereon, are pivoted about hinge 52 in a counterclockwise direction shown in FIG. 6 into the position shown in FIG. 6 where they are retained by means of a strut 80 pivotally mounted to panel 50 and releasably anchored in a bracket 82. In order to release the panels to permit them to be moved to a closed position, strut 80 may be removed from bracket 82, thereby permitting the panels to be pivoted about hinge 52. Strut 80 is removably received in an aperture 81 in bracket 82 which is fixed to ridge pole 24.

For purposes of absorbing sound to reduce the noise when the air compressor is in use, the door units may be provided with sound panels 68 and 70 secured to the inner sides thereof as shown in FIGS. 4 and 5. In this regard, upper panel 50 is provided with an elongated channel strip 51 at its lower edge thereof to accommodate sound panel 70. Additionally, hinges 60 and 58 are designed so as to accommodate the sound panel 68 upon folding of the lower panels 54 and 64 between their open and closed positions.

The housing pieces including end pieces 20 and 22, the tool boxes 40, and the door units 50, 54 and 56 may be made from suitable sheets of steel or aluminum or any other suitable metallic material. With the aforescribed construction and with proper dimensioning, all of the compressor parts, including the internal combustion engine for driving the compressor, including the battery, gasoline supply tank as well as the radiator, may be safely enclosed in the housing therein so that when the door units are in closed position, for example, shown in FIGS. 1 and 4, all the parts are concealed and may be locked therein by applying a suitable lock to the door units. The improved housing of the present invention is particularly suitable for housing an air compressor of the type wherein a standard V-8 internal combustion engine is converted such as, for example, disclosed in U.S. Pat. No. 1,992,400 to T. G. Smith, which patent is owned by the assignee of the subject application. An improved control for such an air compressor system is also disclosed in co-pending U.S. Application, Ser. No. 268,943, filed July 5, 1972, and entitled Improvements In Air Compressors which is also assigned to the assignee of the subject application.

When the compressor including the internal combustion engine is mounted in the housing, the radiator R (see FIG. 2) for the engine and the fan are positioned

adjacent grill assembly 26 at the rear of the housing whereas the opposite end of the housing houses the gasoline tank GT, the battery B, and the air accumulating tank AT as shown in FIG. 3. The engine and the air compressor including the cylinders and carburetor are located in the housing between end pieces 20 and 22.

During operation of the air compressor, air is drawn into the housing through grill assembly 26 by means of the fan (not shown) so that the air passes through the radiator R as indicated by the arrows in FIG. 2. Inasmuch as the opposite end of the housing adjacent end piece 22 is substantially closed by the gasoline tank GT, battery B, and the air tank AT, the air travelling in the longitudinal direction in the housing is forced to change direction and travel laterally and then downwardly to the main frame through which it emerges between the main frame members 12a and 12b and also through the open mesh bottoms 32 of the tool boxes 40 wherefrom the air escapes to atmosphere. As the air passes through the housing, it of course becomes heated so that the escape of air from the bottom of the frame and the tool boxes allows the heated air to be discharged from the housing to ensure that the temperature in the housing does not reach an excessive degree which could cause damage to the compressor parts. Sound waves travelling through the housing are also caused to change direction through impingement against the compressor parts, of the blocked end of the housing at the end piece 22 and the closed doors so that the energy of the sound waves is dissipated to reduce the noise of the air compressor during operation. The dissipation of energy of the sound waves is enhanced by passage through the passages formed in the tool box bottoms. In one actual housing constructed in accordance with the present invention wherein a converted 302 cubic inch V-8 engine was employed, the noise level was reduced to 90 decibels by the present invention. This is an acceptable noise level by most standards.

Should it be desired to further reduce the noise level, acoustically treated sound baffles may be mounted on opposite ends of the housing as represented by baffles 90 and 92 in FIG. 9. Baffle 92 may be mounted on the bumper 12d and releasably secured to the housing by means of elongated bolts or stantions 94. Stantions may also be applied to mount baffle 90 on the front end of the housing. It should be noted that baffle 92 is spaced from the front end piece 20 to provide sufficient space to permit air to pass between sound baffle 92 and the housing and through grill 26 and then through the radiator into the housing; the arrows in FIG. 9 illustrating entry of air into the housing. The modified version shown in FIG. 9 in actual use has been successful in reducing the noise level to 85 decibels. Further reduction of noise to a decibel level of approximately 80 may be achieved by applying acoustic panels in the space between the main frame members 12a and 12b so as to close off the bottom of the frame. In this embodiment, the open bottoms of the tool boxes become very important if not critical since they provide discharge passages for the hot air to escape from the housing.

I claim:

1. A housing for apparatus such as an air compressor, the housing including a main frame adapted to support the air compressor and associated parts, a pair of end pieces fixed to and upstanding from opposite end por-

tions of the main frame, an elongated ridge pole extending longitudinally over the main frame and interconnecting said end pieces, a pair of door units hinged to opposite sides of said ridge pole for movement between a closed position overlying the top and side portions of the interior of the housing and an open position providing access to said interior portions, and a pair of tool boxes fixed along opposite sides of the housing respectively below said door units such that when the door units are in the closed position the lower end portions thereof engage the tool boxes respectively to close the tool boxes, said tool boxes having foraminous bottom walls throughout permitting escape of air from the housing through said bottom walls of said tool boxes for dissipating sound and consequently reducing noise generated in the housing such as by an air compressor housed therein.

2. The housing defined in claim 1 wherein each of the tool boxes includes opposite end walls and an outer side wall extending between said end walls to define the lower outer sides of the housing, said tool boxes further each including a bottom wall situated in a plane below the upper plane of the main frame.

3. The housing defined in claim 1 wherein said door units each include an upper panel hinged to the ridge pole, and a pair of lower panels hinged to each other to move relative to each other into an overlying stacked position, said lower panels further being hinged to said upper panels permitting the lower panels to be hinged into overlying relationship with the upper panel.

4. The housing defined in claim 2 wherein the opposite end walls of the tool boxes have a generally trapezoidal shape, the lower walls and side walls have a generally rectangular shape with the side wall extending substantially at right angles to the lower wall between the opposite end wall.

5. The housing defined in claim 1 wherein said main frame includes a plurality of generally parallel side members, and a bumper fixed to and cross the ends of said side frame members, and wherein said end pieces include leg portions fixed to the opposite side members respectively.

6. The housing defined in claim 1 wherein said door units include acoustical panels fixed on the inner sides thereof for absorbing sound to reduce noise.

7. A housing for apparatus such as an air compressor and the like; the housing including a main frame adapted to support the air compressor and associated parts, a pair of end pieces fixed to and upstanding from opposite end portions of the main frame, an elongated ridge pole extending longitudinally over the main frame and interconnecting said end pieces, and a pair of door units hinged to opposite sides of said ridge pole for movement between a closed position overlying top and side portions of the interior of the housing and an open position providing access to said interior portions, and wherein said end pieces include two inverted generally L-shaped portions fixed to opposite sides of said ridge pole at the opposite ends of the ridge pole respectively, said L-shaped portions including vertical leg portions, and wherein said end pieces further each include a grill assembly including a plurality of elongated rods extending between the opposite leg portions of said end

pieces.

8. The housing defined in claim 7 further including a pair of sound panels fixed on the frame adjacent to but spaced outwardly of said end pieces and covering the grill assemblies in the end pieces, respectively.

9. A housing for apparatus such as an air compressor; the housing including a main frame adapted to support the air compressor and associated parts, end walls upstanding from opposite end portions of the main frame, means including movable door units closing the space between said end walls, a pair of elongated tool boxes fixed along opposite sides of the housing respectively below said door units in communication with the interior of the housing, said tool boxes having foraminous bottom walls permitting escape of air from the interior of the housing through said bottom walls of said tool boxes for dissipating sound and consequently reducing noise generated in the housing such as by an air compressor housed therein.

10. The housing defined in claim 9 wherein said door units include acoustical panels fixed on the inner sides thereof for absorbing sound to reduce noise.

11. The housing defined in claim 10 wherein the opposite end walls of the housing have open spaces therein to permit air to enter into and exit from the interior of the housing and wherein there is further included a pair of sound panels fixed on the frame adjacent to but outwardly of said end pieces for further reducing noise.

12. The housing defined in claim 9 wherein said tool boxes including their bottom walls extend substantially throughout the longitudinal dimension of the frame terminating adjacent the end walls of the housing and said bottom walls of said tool boxes are foraminous throughout the full length thereof.

13. The air compressor defined in claim 12 wherein said enclosure means includes at least one elongated tool box on the side thereof and extending along the main frame, said tool box having a lower wall with openings therein to permit air to escape from the housing through the lower bottom walls of said tool box.

14. The air compressor defined in claim 12 wherein said enclosure means includes a foldable door unit movable between a closed position overlying the tool box and the interior of the enclosure and an open position providing access to the latter parts, said door units having acoustical panels fixed to the inner sides thereof for absorbing sound to reduce noise.

15. The air compressor defined in claim 13 further including an acoustical panel mounted adjacent said one end of the enclosure in spaced relation thereto.

16. The air compressor defined in claim 15 wherein the other end of the enclosure includes openings and wherein there is provided another sound panel fixed over said other end of said enclosure in spaced relation thereto.

17. The compressor defined in claim 12 wherein parts and accessories of the compressor are mounted adjacent said other end of the enclosure to block the flow of air from said one end through the other end of the enclosure.

* * * * *

AIR COMPRESSOR HOUSINGS

BACKGROUND OF INVENTION

Conventional air compressors and those of the prior art have been known to produce loud, highly disturbing noises when in operation. Today, with the focus on environmental control, this noise problem has become acute and in certain cases, critical. In certain instances, laws or regulations have been put into effect establishing maximum permissible noise or sound levels relative to various machines such as air compressors which operate in public areas.

In order to reduce noise resulting from operation of an air compressor, it is of course known to completely enclose the air compressor during operation by a closed structure. This, however, causes a heat problem since the closed structure does not permit escape of the hot air which flows through the radiator associated with the engine which drives the compressor. Excessive heat can cause damage to the compressor parts. The problem therefore is to reduce noise and at the same time provide circulation of air through the compressor housing so that the temperature of the compressor parts does not become excessive.

Another drawback of conventional air compressors of the portable type used in public areas, is that in an effort to provide access to all of the parts of the compressor structure, some of the parts have been located where they are accessible to theft, tampering or other damage when not in use. The problem in this regard is to provide a housing for all of the compressor parts which housing may be locked to prevent access to the compressor parts when not in use, and at the same time which will provide authorized access to the parts for repair or replacement.

OBJECTS OF INVENTION

The present invention relates to housings for portable air compressors and the like, and has for one of its objects, the provision of a new and improved air compressor housing which permits the air compressor to operate at acceptable noise levels while at the same time, preventing overheating of the air compressor parts due to insufficient circulation of air therethrough.

A further object of the present invention is to provide such an air compressor housing which will conveniently house all of the compressor parts in a manner permitting them to be concealed and locked against unauthorized access when not in use. Included herein is the provision of such an air compressor housing which will permit ready access to all the compressor parts for repair or replacement.

A still further object of the present invention is to provide an air compressor housing having an improved construction by which sufficient space is available for conveniently storing the compressor parts and various tools and at the same time providing a sturdy and durable structure which will successfully withstand long periods of repeated and rugged use.

SUMMARY OF INVENTION

The above and other objects are achieved in an air compressor housing embodying the invention and including in summary, a main, open frame formed from structural steel members from which is suspended a wheel and axle assembly for transporting the frame

over the ground surface. At the front of the frame is movably mounted a front wheel which may be extended to form a third point of contact with the ground surface when the air compressor is in use. When not in use, the front wheel may be moved to and held in a retracted position permitting transportation of the compressor over the ground surface through means of the wheel and axle assembly.

The compressor parts are fixed relative to the main frame and are enclosed by a housing structure including opposite end pieces upstanding from the frame and interconnected by an elongated ridge pole which extends longitudinally above and in parallel relation to the frame. Said end pieces of the housing have formed therein a grill work, one of which permits air to flow into the housing through the radiator adjacent said one end piece; the radiator being employed to cool an internal combustion engine utilized for operating the air compressor, it being understood that the internal combustion engine and the air compressor are located within the housing over the opening in the main frame. Fixed to the main frame as well as the end pieces on opposite sides thereof are a pair of tool boxes which have bottom walls lying in a horizontal plane and being formed by a mesh or other reticulated or foraminous construction permitting air to exit from below the housing.

Completing the housing construction are a pair of foldable door or panel units hinged to the ridge pole to close the housing above the tool boxes. When the doors are closed, and the air compressor is in operation, air flowing through the grill work in said one end piece will impinge upon the parts of the compressor as well as the doors and change direction to flow laterally and then vertically downwardly and ultimately through the open mesh in the bottom of the tool boxes. This will not only provide circulation of air to reduce the temperature of the compressor parts, but also the change in direction of the air flow in the compressor will dissipate the attendant sound to reduce the noise of the air compressor during operation. The restrictions to the air flow formed by the open mesh in the tool box bottoms will further cause dissipation of sound.

To further reduce noise, the insides of the doors may be provided with acoustically treated panels for absorbing sound. Furthermore, sound baffles may be mounted on opposite ends of the main frame adjacent the end pieces. To further reduce sound, the main frame may be provided with acoustical panels to underlie the compressor parts.

DRAWINGS

Other objects and advantages of the present invention will become apparent from the following detailed description taken in conjunction with the drawings in which:

FIG. 1 is a perspective view of an air compressor housing embodying the present invention;

FIG. 2 is a perspective view of the air compressor of FIG. 1 taken from the opposite end thereof and showing the circulation of air therethrough during operation of the air compressor, the air compressor parts being omitted from the drawing for clarity purposes;

FIG. 3 is an exploded, perspective view of a portion of the air compressor housing showing the assembly of one of the tool boxes included therein;

FIG. 4 is an enlarged, transverse, cross-sectional view of the air compressor housing when in the fully closed position;

FIG. 5 is a fragmental view similar to FIG. 4 but showing a foldable door unit in partially open position;

FIG. 6 is a view similar to FIG. 5 but showing the foldable door unit in fully open position;

FIG. 7 is an exploded, perspective view of the air compressor housing, omitting the wheels, illustrating assembly of the parts thereof;

FIG. 8 is a perspective view of the air compressor housing in partly assembled condition; and

FIG. 9 is a perspective view of the air compressor housing with end sound baffles included for further reducing noise.

DETAILED DESCRIPTION

Referring to the drawings in detail, there is shown in FIG. 1 a portable air compressor housing, generally designated 10, embodying the present invention and basically including a main frame 12 having a hitch 14 on the front end thereof for attachment to a vehicle for transporting the compressor housing over the ground surface through means of a wheel and axle assembly including wheels 16 (one shown) mounted on an axle 17 transversely suspended from main frame 12 in any conventional manner. When in use, for example, when the air compressor is used to supply air to a pneumatic tool (not shown), a front wheel generally designated 18 is lowered to engage the ground surface and provide stable three point support. During transportation of the air compressor, the wheel is maintained in a retracted position. The construction of the front wheel assembly 18 itself forms no part of the present invention, however, it is disclosed and claimed in co-pending U.S. Pat. application, Ser. No. 269,665, filed July 7, 1972, entitled Wheel Mounting Assembly and assigned to Gordon Smith & Co., Inc. the assignee of the subject application.

Referring now to FIG. 7, main frame 12 includes a pair of elongated structural steel channel members 12a and 12b having a generally U-shaped cross section, with their forward ends merging inwardly to an apex at 12c at which point they are connected, such as by welding. The rear ends of frame members 12a and 12b are interconnected by a steel bumper 12d having a generally channel-shaped cross section. As shown in FIG. 7, the rear ends of frame members 12a and 12b are recessed to provide a ledge 12e over which bumper 12d is received; the bumper being fastened by any suitable means, such as welding or bolting.

Referring to FIGS. 7 and 8, the housing further includes a pair of opposite end pieces 20 and 22 having a generally inverted U-shape and being rigidly fixed to opposite end portions of the main frame 12 to upstand therefrom, as shown in FIG. 8. End pieces 20 and 22 are interconnected by an elongated structural member 24 which may be termed a "ridge pole" having a generally inverted U-shape cross section. As shown in FIG. 7, end piece 20 is formed in two parts 20a and 20d each having an inverted, generally L-shape and fastened such as by screws or bolts to the opposite sides of depending end members 24a of ridge pole 24 in the manner illustrated in FIG. 7. End piece 20 further includes a grill assembly 26 including a plurality of rods 26a mounted in parallel relation in vertical mounting

brackets 28 which are secured, respectively, to the vertical legs 20c of end piece 20 by means of fasteners extending through the apertures, as illustrated in FIG. 7. In the specific embodiment, the mounting brackets have flange portions 29 which fit against corresponding flange portions on legs 20c of end piece 20. Additionally, the lower portions 30 of flanges 29 project below the bottoms of legs 20c to be received in slots 31 formed in the ends of frame members 12a and 12b; the lower flange portions 30 being fastened to the recessed end portions 12f of the frame member by fasteners passing through the apertures indicated in FIG. 7. Through this mounting, the end piece 20 is rigidly secured to the rear of frame 12 with the lower extremities of legs 20c flushly abutting upon the upper surfaces of frame members 12a and 12b, as shown in FIG. 8.

The opposite end piece 22 is formed similarly to end piece 20 to include two inverted L-shaped pieces 22a and 22b. End piece 22 also has a grill including rods 36. However, in this instance, grill rods 36 are secured directly in the legs 22c of end piece 22 by means of apertures 22e, illustrated in FIG. 7. End piece 22 is secured to frame 12 by means of a plurality of plates 12g upstanding from forward portions of frame members 12a and 12b to receive, in flush parallel engagement therewith, the legs 22c which are secured thereto by means of fasteners passing through apertures 22f, as shown in FIG. 7. Ridge pole 24 is secured between end pieces 22a and 22b by means of the depending end portion 24a of ridge pole 24 which is received between end piece members 22a and 22b and secured thereto by means of fasteners passing through apertures as shown in FIG. 7.

Referring to FIG. 3, the compressor housing is provided with elongated tool boxes generally designated 40 on the opposite sides thereof. In the specific embodiment shown, each tool box includes a bottom wall 42, end walls 44 upstanding from the bottom wall 42 and interconnected by an outer side wall 46. In the shown embodiment, bottom wall 42 has a rectangular shape as does side wall 46 with the end walls having a trapezoidal shape terminating above the level of side wall 46 in apices as shown in FIG. 3. Each tool box 46 has an inner U-shape frame 47 which is secured to main frame 12 and end pieces 20 and 22 by fasteners passing through apertures in said members, as illustrated in FIG. 3.

In accordance with one of the features of the present invention, the bottom walls 42 of the tool boxes are formed with a suitable foraminous construction which may be formed by mesh or grill work, or apertures etc. for permitting air to escape from the bottom of the housing during operation of the air compressor. This, of course, does not detract from the capability of the tool boxes to provide storage space for tools and the like in conventional manner on opposite sides of the air compressor housing.

Referring now to FIGS. 2, 4, 5 and 6, the housing is completed by a pair of folding door units on opposite sides of the housing which, when in the fully closed position, shown in FIG. 4, completely close the upper and opposite side portions of the housing. Each folding door unit includes an upper door or panel 50 hinged at 52 to ridge pole 24, as shown in FIG. 4, and a lower panel unit including two doors or panels 54 and 56 hinged to the upper panel 50 by hinge 58 as well as being hinged to each other by hinge 60. In the fully