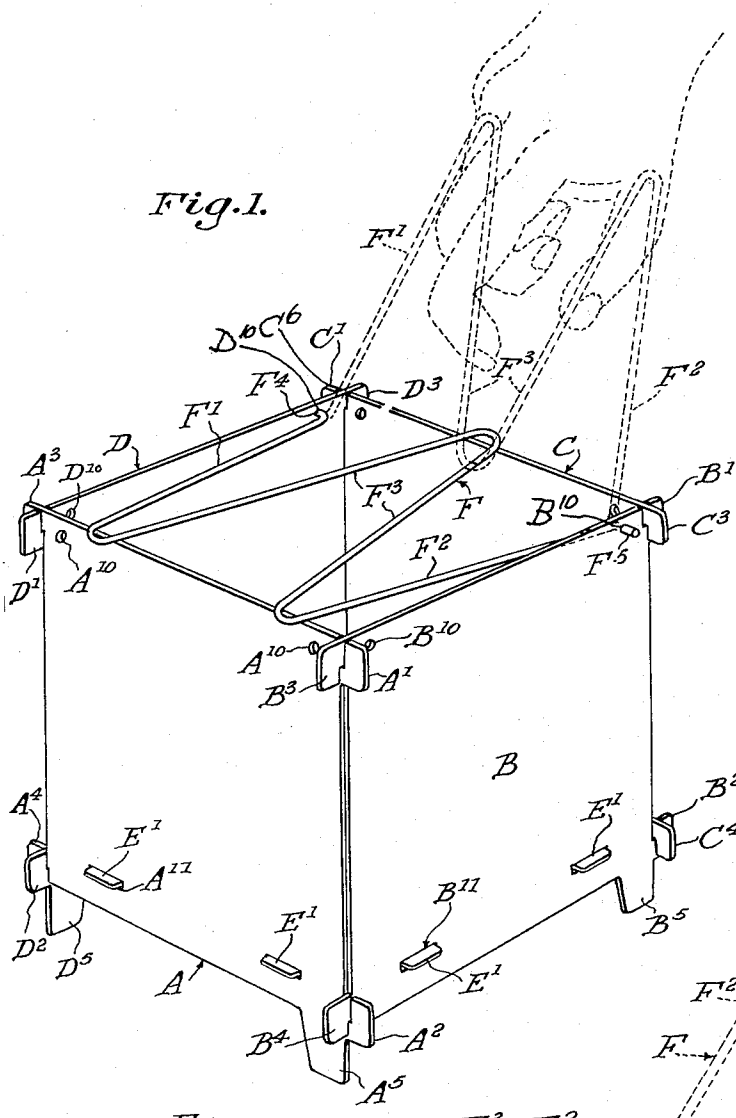
Nov. 5, 1963 R. H. OTT ETAL 3,109,420

PORTABLE KNOCKDOWN STOVE

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Fig. 1.



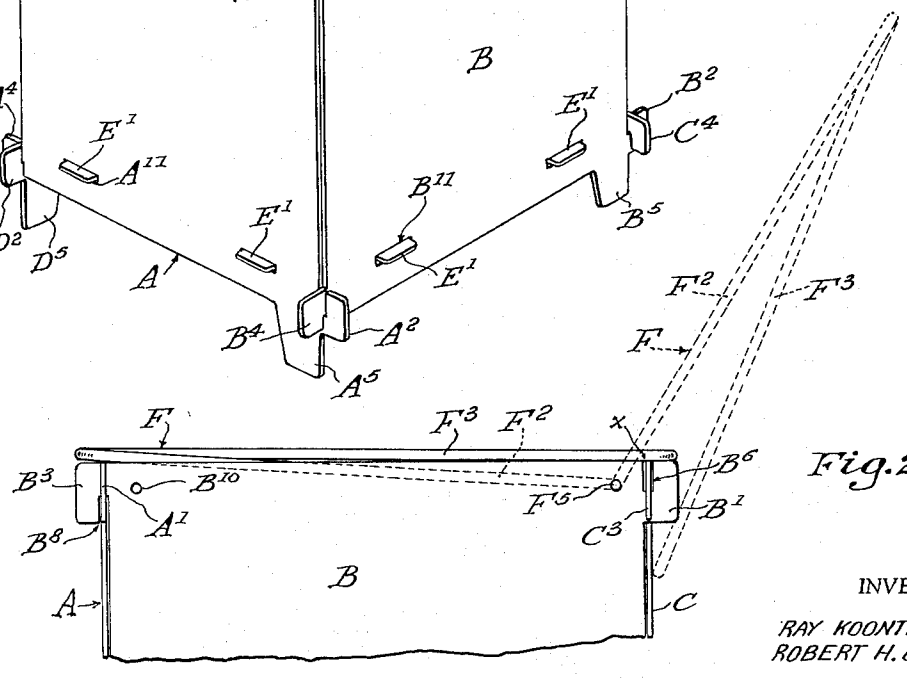


Fig. 2.

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Fig.3.

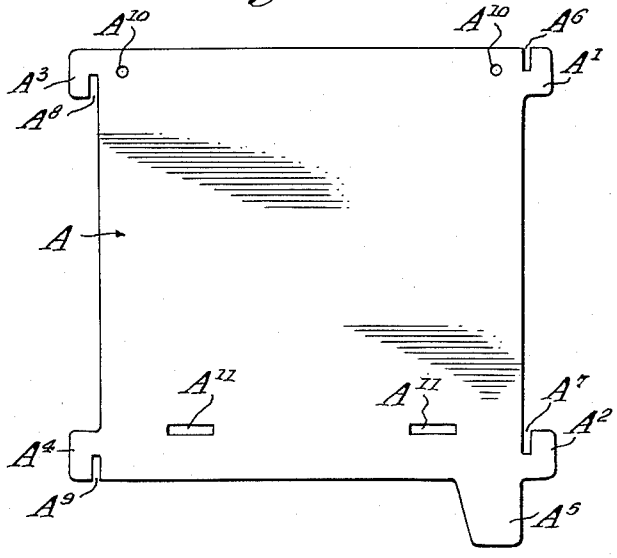


Fig.5.

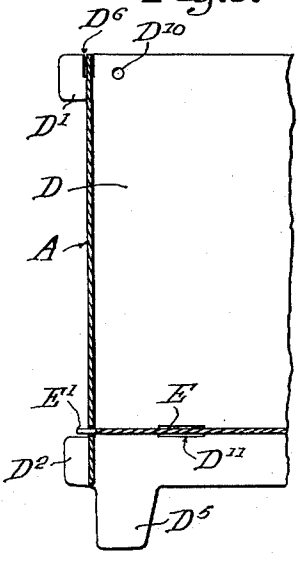


Fig.4.

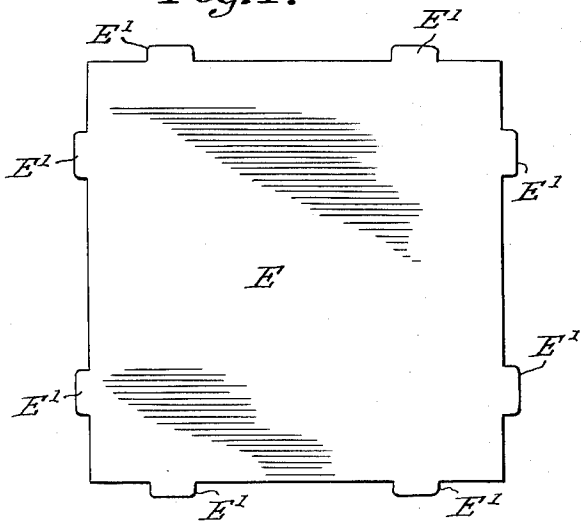


Fig.6.

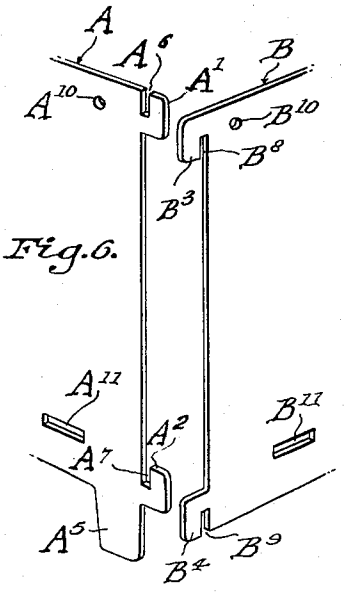
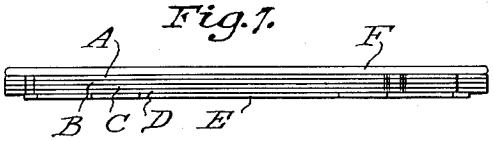


Fig.7.



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PORTABLE KNOCKDOWN STOVE

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7 Claims. (Cl. 126—9)

This invention relates to portable knockdown stoves, and particularly to stoves of this general class which may easily be disassembled and conveniently packed for storage or carrying.

Folding or collapsible camp stoves heretofore provided have generally required fastening elements, such as screws or clips, or hinges, or differently formed body or panel elements to enable the stoves to be assembled or set up for use and to be collapsed or taken apart for storage or carrying. This has, to some extent, limited the compactness achievable in packing the collapsed main stove elements, and in some prior constructions has required the provision of relatively large numbers of differently shaped or constructed parts.

An object of the present invention is to provide a stove of the general class referred to which is of simple and economical construction and which in large measure overcomes the limitations and disadvantages of previously known stoves of the same general class.

Another object of the invention is to provide a stove of the character stated which includes a minimum number of differently shaped parts. In achieving this object, there preferably is provided a stove having a plurality of side members or panels of identical outline or shape, a stove bottom, and a top or grid member, there being elements of only three different shapes.

A further object of the invention is to provide a stove as characterized above and in which the parts are individually flat so as to be easily and compactly stackable when disassembled.

Other and more specific objects of the invention will become apparent from a reading of the following description, the appended claims, and the accompanying drawings, in which:

FIGURE 1 is a perspective view of a portable knockdown stove embodying the invention in a preferred form, a stove grid being shown in full lines in the position normally occupied when the stove is in use and being shown in dotted lines in a position to which it may be moved for facilitating lifting or carrying of the stove;

FIGURE 2 is a fragmentary side elevation of the upper portion of the stove shown in FIGURE 1, again showing the stove grid in alternative positions respectively in full and dotted lines;

FIGURE 3 is an elevation of one of the four stove side panels;

FIGURE 4 is a plan view of the stove bottom;

FIGURE 5 is a vertical sectional view through one side panel adjacent to a corner of the stove, showing the detachably interlocked connection of two adjacent side panels and the stove bottom;

FIGURE 6 is a perspective view fragmentarily showing two adjacent side panel portions where they meet at a corner of the stove, the two panels being shown in separated relation; and

FIGURE 7 is a side elevation of a pack of all of the elements for constituting the stove, shown in compact stacked relation for carrying or storage.

The illustrative embodiment of the invention is of simple construction comprising essentially four side panels A, B, C and D of substantially the same or identical shape or outline and preferably being formed of metal sheets or plates, a bottom E and a top or grid member F. When knocked down or disassembled these parts, all of which are shown as being flat, may be stacked in a compact

pack as shown in FIGURE 7 for convenience in storing or carrying. The pack may easily be accommodated by a garment pocket of moderate size, for example a pocket of the size normally provided in jackets worn by hunters, fishermen, woodsmen, and other outdoor enthusiasts.

The parts are so constructed or shaped relatively to each other as to permit their being detachably interlocked in assembled relation without requiring any additional fastening means such as screws, clips, or the like, and this is so even though the stove comprises only elements of three different shapes or formations. The side panels A, B, C and D are, as previously stated, of generally the same or identical shape or outline, so that a description of one panel will serve as a description of each of the four panels. As shown in FIGURE 3 the side panel A, which is illustrated in its upright position, that is its standing position when in use, is formed with upper and lower ears A^1 and A^2 which project outwardly from one side edge of the panel A respectively adjacent to the top and bottom of the side edge, and is also formed with upper and lower ears A^3 and A^4 which project outwardly from the opposite side edge respectively adjacent to the top and bottom of the latter. A single leg tab A^5 projects downwardly from the bottom edge of the side panel A.

The two side ears A^1 and A^2 projecting from the panel side above the leg tab A^5 are formed respectively with open top downwardly extending slots A^6 and A^7, whereas the ears A^3 and A^4 projecting outwardly from the opposite side edge of the panel A are formed with open bottom upwardly extending slots A^8 and A^9. The panel A is also formed adjacent its upper corners but below its top edge with pivot holes A^{10} and is provided above but adjacent or close to its bottom edge with two spaced openings A^{11}.

As previously stated, the panels B, C and D are generally the same or identical to the panel A, that is they have parts corresponding to those described with reference to the panel A, as indicated by the correspondence of the exponential characters. For example, the ears B^1, C^1 and D^1 respectively having open top downwardly extending slots B^6, C^6 and D^6 correspond to the ear A^1 having a downwardly extending open top slot A^6, and so on.

As shown in FIGURE 4, the bottom E is square and so dimensioned as to fit inside of the side panels A, B, C and D when the latter are assembled as shown in FIGURE 1. The bottom E is formed with ears E^1, there being two ears projecting outwardly from each of the four side edges of the bottom member for extension into the side panel openings A^{11}, B^{11}, C^{11} and D^{11}.

FIGURE 7 shows all of the parts of the stove in compactly stacked or packed arrangement for storage or carrying. In order to assemble the stove parts for use, the side panels are first partially interlockingly connected by means of the outwardly projecting vertically slotted side panel ears. For example, the side panels A and B may be connected by slipping the ears B^3 and B^4 downwardly into the slots in the ears A^1 and A^2 respectively at one corner of the assembly. The opposite edge of the panel A may be connected to the panel D by slipping the ears A^3 and A^4 downwardly into the slots in the ears D^1 and D^2. The panel C may be connected to the panel B at the edge of the latter opposite its connection to the panel A by slipping the ears C^3 and C^4 downwardly respectively into the slots in the ears B^1 and B^2. At this point, the adjacent edges of the panels C and D are not connected, but instead the partially connected assembly of all four panels is opened or spread partially from the square arrangement shown in FIGURE 1 so as to enable the bottom E to be inserted between the side panels. The partially open condition of the side panel assembly will enable the

bottom ears E^1 to be inserted freely into the side panel openings adjacent to the interlocked connections between the panels A and D and between the panels A and B. The mutually adjacent edges of the panels C and D which have not yet been interlockingly connected may then be brought together with some slight forcing and deflection of the slightly resilient parts to bring the remaining bottom ears E^1 into the associated side panel openings A^{11}, B^{11}, C^{11} and D^{11} and to bring the side panel ears D^3 and D^4 respectively into interlocking engagement with the side panel ears C^1 and C^2. Once the side panels and bottom have been assembled in this manner, the inherent resilience of the parts will maintain them detachably interlocked so as to provide a stable bottom and side panel construction. The parts may be disassembled in generally a reverse order of operations, a small degree of forcing or straining being required, insufficient however permanently to deform any of the parts.

It is desirable that the single leg tab forming a part of each side panel be disposed substantially at or adjacent to the intersection of the associated panel bottom edge and that side edge of the panel from which project the ears having open top downwardly extending slots, the other end of the bottom edge being free of any downward projection. This insures that there will be no tendency for one of two interlocked side panels to be separated vertically from the associated panel because of engagement of either panel with the ground or other surface or with a surface protuberance or unevenness. For example, the single leg tab A^5 of the panel A supports the weight of the adjacent edge of the panel B through the open top ears A^1 and A^2 and the open bottom ears B^3 and B^4 which rest upon the ears A^1 and A^2. If the panel B were to have a leg tab adjacent its vertical edge which is contiguous to the panel A and if this additional leg tab were to rest upon a stone, rock, or other surface protuberance not engaged by the leg tab A^5, there would be a tendency for the edge of the panel B adjacent to the panel A to be separated vertically from the panel A. This tendency or possibility is eliminated by forming each side plate or panel with only a single leg tab, and that being adjacent to the intersection of the panel bottom edge with the side edge formed with slots having open top downwardly extending ears.

When the stove is assembled, the top edges of the four side panels lie in a common plane in which the grid member F, or most of it, may be rested or supported. In accordance with the invention, the grid member F is resilient, in the form shown being formed of wire or wire-like stock and comprising two springy side arms F^1 and F^2 and a central portion F^3 intervening between and connecting the side arms F^1 and F^2. As shown, the wire forming the grid member is bent to a zig-zag formation in a manner to provide the side arms and central portion.

The side arms F^1 and F^2 are provided respectively with pintle portions F^4 and F^5 which may be inserted into the opposed coaxial holes D^{10} and B^{10} in the plates D and B, the holes being a little below the common plane containing the top edges of the side panels. The grid F is so dimensioned that parts thereof intervening between the side arms F^1 and F^2 overlap the side panels A and C, as clearly shown in FIGURE 1. The resilience of the grid F urges or tends to maintain all of the grid parts in a single plane, but when the grid is positioned as shown in full lines in FIGURE 1 with portions overlapping the panels A and C, the springiness of the side arms F^1 and F^2 enables these arms to be flexed downwardly so as to extend at a downward inclination from the common plane of the panel top edges so that the pintles F^4 and F^5 can be projected into the associated holes D^{10} and B^{10} in the plates D and B. With the grid so positioned, its resilience and the downward inclination of the side arms F^1 and F^2 in connection with the overlapping of the grid with the panels A and C tends yieldably to maintain the grid overlapping portions in firm contact with the upper edges of the panels A and C.

This is the normal position of the grid when the stove is set up for use, the grid providing a support for meat or anything to be grilled, or for supporting a cooking vessel.

The stove is adapted for use in connection with various fuels such as solid fuels, e.g. charcoal, or so-called "canned heat." Air sufficient to support combustion can enter through the unsealed joints between the panel vertical edges, the points between the bottom and the side panels, and through the clearances between the bottom ears E^1 and the panel openings A^{11}, B^{11}, C^{11} and D^{11}. Placing the fuel on the stove bottom may be facilitated by swinging the grid upwardly to provide an unobstructed opening within the side panels. The resilience of the grid enables it to be swung about the pintles F^4 and F^5 while the grid portion overlapping the panel C remains pressed against the upper edge of the panel C until the overlapping grid part extends downwardly below the top edge of the panel and substantially parallel to and in contact with the panel C. When so swung upwardly, the grid may also serve as a handle for lifting the stove, in which case the grid will move beyond its straight upright position to the lifting position shown in dotted lines in FIGURES 1 and 2, the further swinging of the grid being limited by engagement of the side arms F^1 and F^2 with the upper edge of the panel C as indicated at *x* in FIGURE 2.

The stove shown embodies the invention in a preferred form, but it is intended that the disclosure be illustrative rather than definitive, the invention being defined in the claims.

We claim:

1. In a portable knockdown stove, four plate-like side panels of the same shape and each having two vertical side edges, a top edge, a bottom edge, upper and lower ears extending outwardly from each side edge, the ears on one side edge of each panel being formed with open top downwardly extending slots and the ears on the other side edge of each panel being formed with open bottom upwardly extending slots, the open top downwardly extending slot ears on one panel at each corner of the stove being detachably interlocked with the open bottom upwardly extending slot ears of the adjacent panel, each side panel having a downwardly extending leg tab adjacent said one side edge thereof, the remaining bottom edge portions of said side panels being free from any downward projection; and a stove bottom detachably connected to said panels.

2. In a portable knockdown stove, four resilient plate-like side panels of the same shape and each having two vertical side edges, a top edge, a bottom edge, openings above and adjacent said bottom edge and between said side edges, and upper and lower ears extending outwardly from each side edge, the ears on one side edge of each panel being formed with open top downwardly extending slots and the ears on the other side edge of each panel being formed with open bottom upwardly extending slots, the open top downwardly extending slot ears on one panel at each corner of the stove being detachably interlocked with the open bottom upwardly extending slot ears of the adjacent panel, each side panel having a downwardly extending leg tab adjacent said one side edge thereof, the remaining bottom edge portions of said side panels being free from any downward projection; and a stove bottom having ears extending into said panel openings for detachably connecting said bottom to said panels.

3. In a portable knockdown rectangular stove, four plate-like side panels of identical shape and being connected together at the four corners of the stove, the top edges of said panels being substantially in a common plane and two of the panels at opposite sides of the stove having axially aligned pivot holes below said common plane; and a resilient grid member comprising two springy side arms formed with horizontal pintles pivoted respectively in said holes, said side arms extending upwardly at an inclination from said holes to said common

plane and overlying the top edge of a third panel, and a central portion connecting said side arms and extending from said third panel to overlie the top edge of the fourth panel, the resilience of said grid member tending to cause said side arms and central portion to lie co-planar but enabling said side arms to extend at said inclination from said holes upwardly to said common plane, whereby the resilience of said grid member will urge the panel overlying portions thereof into firm engagement with the underlying side panels.

4. In a portable stove, four side panels having top edges substantially in a common plane and two of the panels at opposite sides of the stove having axially aligned pivot holes below said common plane; and a resilient grid member comprising two springy side arms formed with horizontal pintles pivoted respectively in said holes, said side arms extending upwardly at an inclination from said holes to said common plane and overlying the top edge of a third panel, and a central portion connecting said side arms and extending from said third panel to overlie the top edge of the fourth panel, the resilience of said grid member tending to cause said side arms and central portion to lie co-planar but enabling said side arms to extend at said inclination from said holes upwardly to said common plane, whereby the resilience of said grid member will urge the panel overlying portions thereof into firm engagement with the underlying side panels.

5. In a portable stove, four side panels having top edges substantially in a common plane and two of the panels at opposite sides of the stove having axially aligned pivot holes below said common plane; and a resilient grid member of wire like material and of zig-zag shape comprising two springy side arms formed with horizontal pintles pivoted respectively in said holes, said side arms extending upwardly at an inclination from said holes to said common plane and overlying the top edge of a third panel, and a central portion connecting said side arms and extending from said third panel to overlie the top edge of the fourth panel, the resilience of said grid member tending to cause said side arms and central portion to lie co-planar but enabling said side arms to extend at said inclination from said holes upwardly to said common plane, whereby the resilience of said grid member will urge the panel overlying portions thereof into firm engagement with the underlying side panels.

6. In a portable stove, four side panels having top edges substantially in a common plane and two of the panels at opposite sides of the stove having axially aligned pivot holes below said common plane and adjacent respectively to two of the stove corners; and a resilient grid member comprising two springy side arms formed horizontal pintles pivoted respectively in said holes, said side arms extending upwardly at an inclination from said holes to said common plane and overlying the top edge of a third panel, and a central portion connecting said side arms and extending from said third panel to overlie the top edge of the fourth panel, the resilience of said grid member tending to cause said side arms and central portion to lie co-planar but enabling said side arms to extend at said inclination from said holes upwardly to said common plane, whereby the resilience of said grid member will urge the panel overlying portions thereof into firm engagement with the underlying side panels.

7. In a portable stove, four side panels having top edges substantially in a common plane, a first and second of said panels at opposite sides of the stove having axially aligned pivot holes below said common plane and close to the intersections of said first and second panels with a third panel but spaced slightly from said third panel toward a fourth panel, said pivot holes being much closer to said third panel than to said fourth panel; and a resilient grid member comprising two side arms formed with horizontal pintles pivoted respectively in said holes, said side arms extending upwardly at an inclination from said holes to said common plane and overlying the top edge of said fourth panel, and a central portion connecting said side arms and extending from said fourth panel to overlie the top edge of said third panel, the resilience of said grid member tending to cause said side arms and central portion to lie co-planar but enabling said side arms to extend at said inclination from said holes upwardly to said common plane, whereby the resilience of said grid member will urge the panel-overlying portions thereof into firm engagement with said third and fourth side panels on opposite sides of said pivot hole common axis, said grid member being yieldable to enable it to be swung about said axis to a raised position while the portion of said grid member which overlies said third panel remains in engagement therewith, the swinging of said grid member to raised position being limited by engagement of said side arms with said third panel.

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