

[72] Inventor Yasumasa Usui,
40, 491 Oaza-Kuno Awano machi,
Kamitsuru-gun, Tochigi-ken, Japan
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[33] Japan
[31] 42/12,768, 42/14,157, 42/15,781,
42/81,842, 42/10,867

[54] **PORTABLE WARNING APPLIANCE FOR
BURNING SOLID FUEL**
14 Claims, 9 Drawing Figs.

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44/10
[51] Int. Cl. A61f 7/06

[50] Field of Search..... 126/204,
206, 208

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Primary Examiner—Edward G. Favors
Attorney—Linton & Linton

ABSTRACT: Solid fuel for warming human body contained
mainly in case and burning appliance thereof.

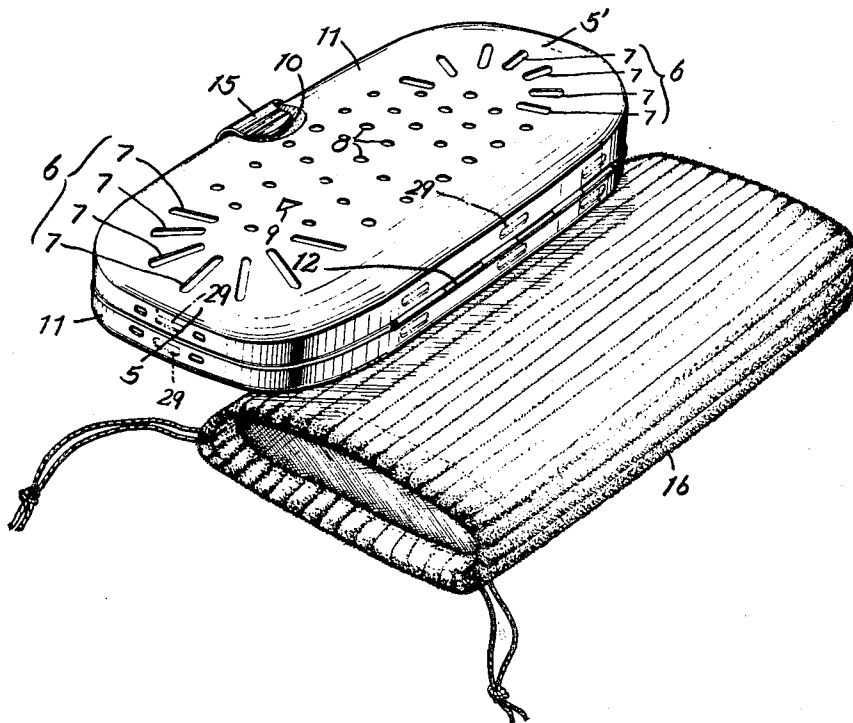


FIG. 1

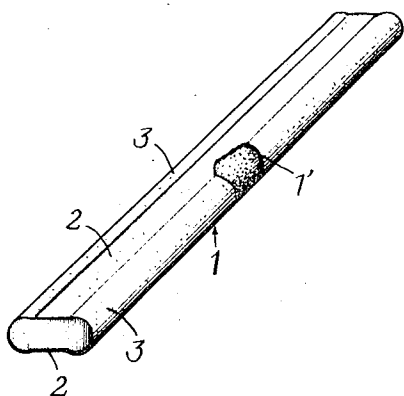


FIG. 2

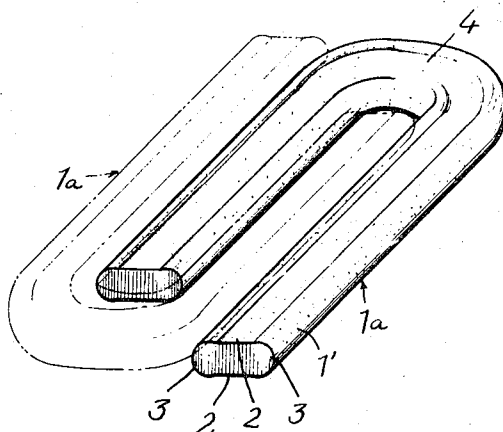
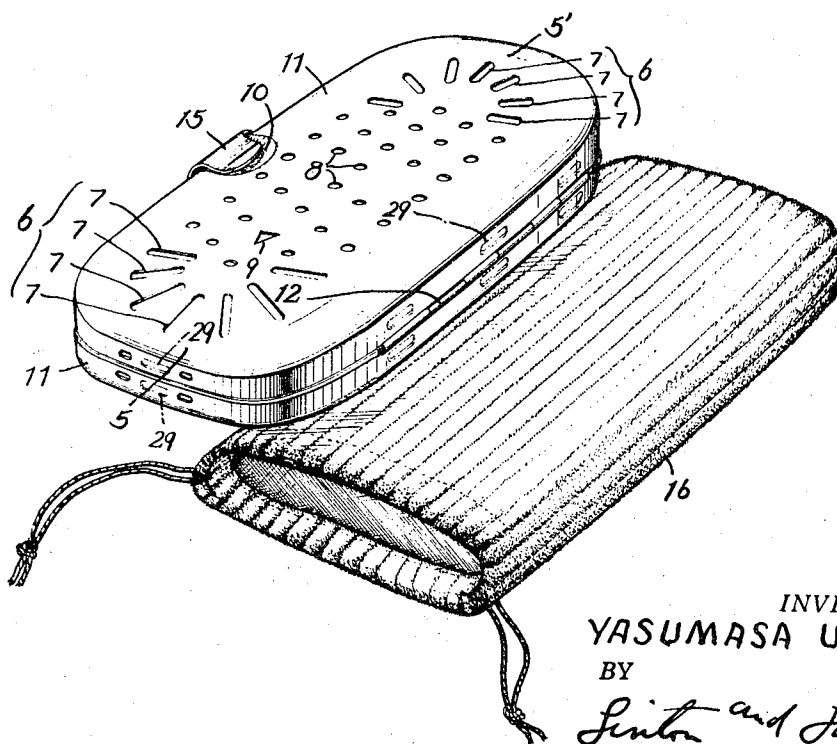


FIG. 3



INVENTOR.
YASUMASA USUI
BY
Linton and Linton
ATTORNEYS

FIG. 4

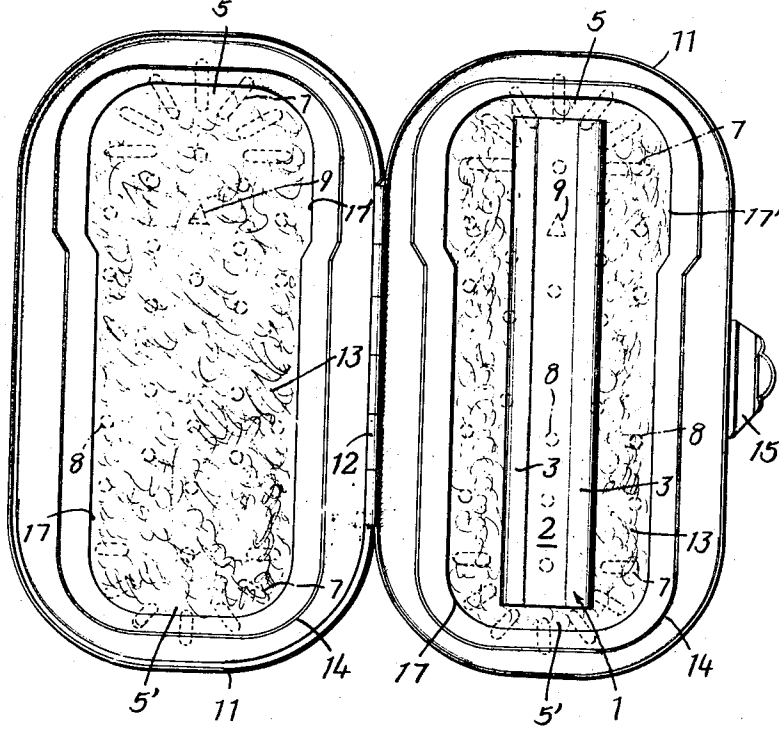
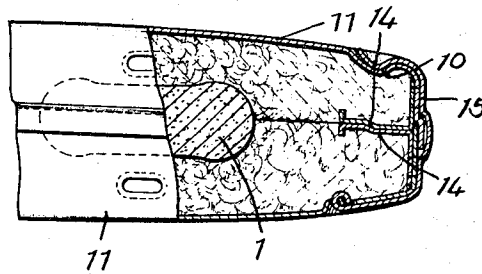


FIG. 5



INVENTOR.
YASUMASA USUI
BY
Linton and Linton
ATTORNEYS

FIG. 6

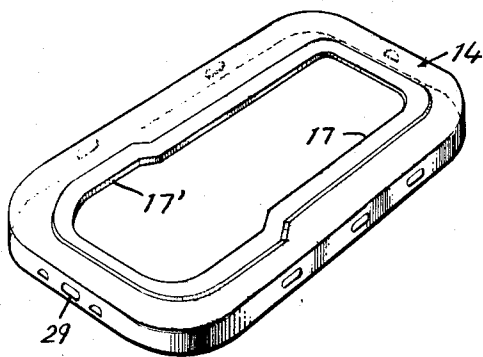


FIG. 7

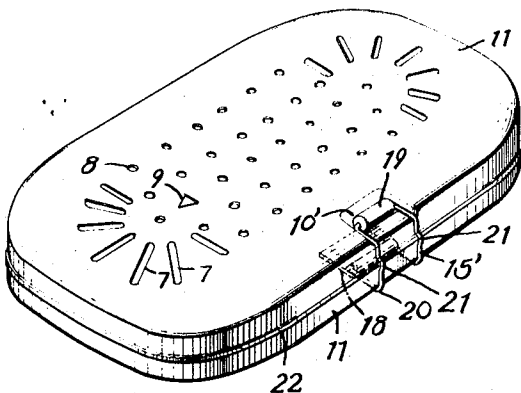
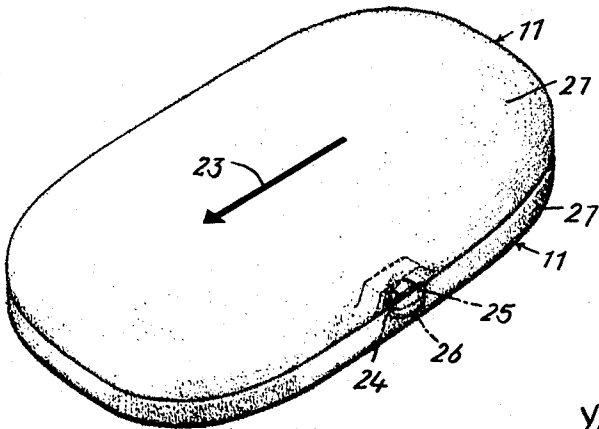
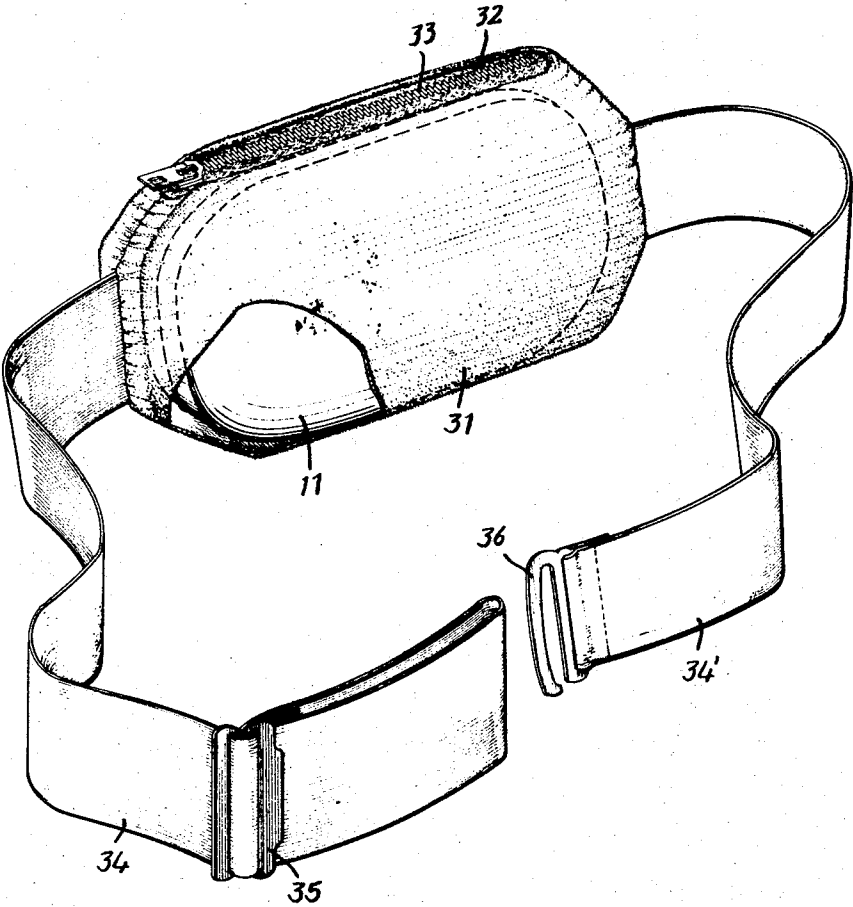


FIG. 8



INVENTOR.
YASUMASA USUI
BY
Linton and Linton
ATTORNEYS

FIG. 9



INVENTOR.
YASUMASA USUI
BY
Linton and Linton
ATTORNEYS

PORTABLE WARMING APPLIANCE FOR BURNING SOLID FUEL

This application relates to solid fuel for supplying agreeable calories and warming human body by direct attachment thereto with a case in the cold weather or a cold northern district and an appliance for burning said solid fuel.

In either the cold weather or a cold northern district human being should be well active. Especially for instance in skiing, skating, playing ice hockey or fishing not only players and fishers but also spectators are exposed to cold wind. In such cases we naturally want warmth. However warming appliances hitherto used are not necessarily suitable to the above cases. For instance a stove is too large to be utilized in the above cases even when it utilizes electricity, gas or any other heat source. Various kinds of electric heating appliances require to be connected to electric source by means of cord. Although they can be used widely indoors, they cannot be used in sports or others which require various movements of players.

The present invention is directed to providing a new solid fuel suitable for being attached to and warming human body in the cold weather or in a cold northern district and an appliance for burning said fuel. Namely the basic object of the present invention is to provide a solid fuel which continuously burns appropriately over a pretty long time in a compact combustible appliance thereby supplying calories to human body effectively. To this end, according to the present invention, a mixture of woody carbide powder is blended with assistant combustion agent producing oxygen with combustion, such as potassium nitrate lead acetate, starch or other binder respectively in appropriate quantities, kneaded with water, then molded by extrusion and dried. A solid product thus obtained is uniformly sized, shaped and blended and burns constantly. When a bar-shaped product in a fixed length is fired at one end, it burns continuously up to the other end for a pretty long time.

Assistant combustion agent such as potassium nitrate, lead acetate, uniformly distributed in structure promotes combustion by producing oxygen and does not go out. On the other hand the oxygen effectively inhibits the generation of carbon monoxide due to combustion of woody carbide, thereby protecting human body from being harmed by this gas.

Starch or other binder gives appropriate bonding property to product, thereby preventing break or cracking of product to the utmost in handling or use.

Thus a small solid fuel for warming human body which burns uniformly and smoothly for a predetermined time can be obtained.

Another object of the present invention is to burn a relatively small solid fuel continuously for more than 8 hours. Generally our daily life is sectioned in 8 hours or so. For instance working hours and sleeping hours are in a way standardized to 8 hours. A warming appliance used under such a life condition must burn for 8 hours or more. If it burns out in less hours, two or more solid fuels come to be burnt. This means that a user of such solid fuel has to carry a spare of solid fuel with himself at all times as well to be an uneconomical matter. With a mixture of components at specific ratios and a specific adjusting means the present invention secures continuous combustion for 8 hours or more, preferably 8 to 10 hours. Thus one solid fuel can suffice in tune with the section of our daily life, such as working hours, sleeping hours, etc., with no need of a spare. Further one fuel solid is enough to each section of life circumstance to a great economy without meaningless combustion.

Another object of the present invention is to obtain a solid fuel with above properties, made of easily and constantly available raw materials of low cost, not requiring high-priced and uneasily available materials. For giving a desirable continuity of combustion to the above warming solid fuel, a carbide with a relatively light specific weight such as carbide of flax stalk is essentially used as raw material. Since the present warming solid fuel is burnt in a case substantially closed and obstacles the circulation of air, it is essential to secure the

combustion continuity by blending for example carbide of flax stalk. However the carbide of flax stalk is made of stalk of flax (flax stalk) with flax removed from skin layer. The stalks of flax collected from farmers little by little are sorted and carbonized. The carbonized stalk costs are unexpectedly high due to collection expense and transportation expense so that it is priced several times or more as high as the price of either raw material (woody carbide), while the supply of carbonized flax stalk is very instable with drastic fluctuation of price due to yearly reduction of production. Therefore the production of solid fuel, using carbonized flax stalk as main material inevitably becomes fluctuating. The present invention, using no or little carbonized flax stalk, can produce a warming solid fuel with the above characteristics from for example easily and continuously available saw dust by taking a special adjusting step. Saw dust is so amply produced from saw mills all over the world that they are disposed even by paying freight. It is indeed easily available. Further since no flax carbide is used or the quantity of use thereof is limited, the present invention can avoid disadvantages due to light weight of carbonized flax stalk and other causes. Owing to light specific weight of flax stalk, a solid fuel made of flax stalk carbide is naturally increased in volume for having a predetermined combustion hour and producing predetermined calories so that it requires a larger sized case. Even if a solid fuel made of flax stalk is small sized for a small thin case, it is unsuitable to be used in skiing or other winter sports, because it burns out naturally in a short time and is troublesome for handling. Other disadvantages of small sized solid fuel are that the extrusion formation requires a strong extrusion force and the products even made of sufficiently kneaded raw material are apt to lack homogeneity and easily break. The present invention which adopts no or little flax stalk carbide can solve all these disadvantages.

Another important object of the present invention is to provide a case which is desirable for accommodating the above solid fuel and burning it. To this end the present invention uses a case with an openable and substantially perfectly closable body provided with small holes on peripheral surface and filled with noncombustible fiber wool such as glass fiber, asbestos, rock wool and slag wool. The above solid fuel inserted into this noncombustible fiber wool is burnt. The noncombustible fiber wool such as asbestos and rock wool is well known. The combustion heat of solid fuel inserted in noncombustible fiber wool prevails into fiber wool structure very slowly with gradually lowering temperature and at last reaches the case. The circulation of air is obstructed by this fiber wool structure and similarly slows down. Such a case namely fuel-burning appliance can slow down both heat transfer and circulation of air, moderate the effect of combustion heat to human body, and control combustion speed effectively in a small body. It can be carried in a pocket or the like and attached to human body irrespectively of whether any assisting attaching means such as underband is used or not.

Another object of the present invention is to control the state of combustion of solid fuel by using a fuel-burning appliance, namely a case. In case of a rod-shaped solid fuel of the present invention, which is firstly fired at one end with match, lighter or others and placed in a cold case, it is essentially required to expand combustion as rapidly as possible at the time of firing for continuation of combustion and give a warm sensation to a wearer quickly. If the rapid expansion of heat in case at the beginning of combustion is not devised, heat is taken by cold case so that a solid fuel partially fired with match or a lighter promptly goes out, leaving a part of solid fuel, not or incompletely burnt. Further when the combustion advances for instance to the middle of rod-shaped solid fuel, it is acceleratedly activated, increasing calories in case. Then the combustion may not only overheat the case or cloth, but also give unpleasant sharp painful feeling to a wearer and sometimes even produce a burn on a wearer. Accordingly in the middle stage of combustion, such undesirably activated combustion should be inhibited. In the final stage the heat

source namely burning solid fuel shortens and has no longer produce calory enough to continue combustion. Thus a small part of solid fuel often goes out. These disadvantages can of course be solved by changing the compound relation of component in respective portion of bar-shaped solid fuel. This can be done for instance by using a very ignitable blend in ignition portion and combustion inhibitive blend in the middle portion. However such a solution is quite inappropriate for producing this kind of solid fuel and must at least relay upon the way of jointing individually manufactured portions with different composition. As well known especially such a joint portion much affects the state of combustion and makes impossible the continuation of combustion so that it is the most important cause of going out. The present invention intends to solve problems of adjustment and control of combustion by changing the number of perforations provided in case. This change of number of perforation changes the amount of air to be supplied into the portion of solid fuel, held in noncombustible fiber wool, so as to make effective expansion of combustion at the early stage of firing, control of excessive expansion of combustion at the middle stage of combustion and promotion

member for attaching fuel-burning appliance of the present invention to human body.

To explain the present invention with reference to the embodiment illustrated in the attached drawings, a solid fuel according to said invention generally uses as raw material saw dust of pine, cedar Japanese cypress, or chips of similar wood. Said raw material is carbonized and powdered to 150—250 mesh or powder of woody carbide such as powdered charcoal mixed with 20 percent or less of powdered hemp stalk carbide of 150—250 mesh. 100 weight parts of this powdered carbon is mixed with 15 weight parts or less of combustion assisting material such as potassium nitrate (nitrate of soda), lead acetate (Sugar of lead) and 15 weight parts or less of binder such as starch of flour or others, or carboxymethyl cellulose (C.M.C.), kneaded together and molded. A typical example of blend is shown below.

Woody powder made of carbonized mixture of saw dust of pine, cedar Japanese cypress, 90%.

Hemp stalk carbide powder, 10%.

Chemical compositions of woody carbide and hemp stalk carbide are respectively exemplified below.

	Water, percent	Ash, percent	Volatile element, percent	Fixed carbon, percent	Calorific value, Kcal.	Pure carbon calorific value	Fuel ratio
Woody carbide fine powder.....	7.22	2.39	27.14	63.25	6.305	6.975	2.33
Hemp stalk carbide powder.....	6.68	8.42	13.14	71.43	6.739	7.938	5.30

of combustion at the final stage of combustion. This eliminates the going out of solid fuel and exerts the warming effect from the beginning of use with addition of advantageously long durable combustion.

Another object of the present invention is to provide a decent product of high merchandise value. To this end the present invention firstly spreads aluminum powder on the peripheral surface of rod-shaped solid fuel. This silver and lustrous aluminum powder heightens the beautiful appearance of periphery of solid fuel and prevents carbonized powder to stick to and soil finger and others, when a solid fuel is placed in a case with fingers. Further such aluminum powder does not leave much ask. In the present invention a case is finished into a rounded decent shape and disposed with perforation preferably in the form of pedals of flower or in dot so as to increase beautiful appearance of case. Although the case is formed of metal, its appearance is held beautiful by plating, painting or a velvetlike cover. When necessary, said case is enveloped in a velvet or other cloth bag which has effects of raising merchandise value as well as moderating warming effect transmitted to human body from case.

A number of other characteristics, concrete constitution and effect and merit of the present invention will be better understood from the description of embodiments based on the attached drawings. Wherein

FIG. 1 is a perspective view, showing a typical example of a solid fuel of the present invention, partly cut away to show the section.

FIG. 2 is a perspective view showing a variation of embodiment of the present invention adapted especially to long combustion.

FIG. 3 is a perspective view showing an example of a fuel burning appliance.

FIG. 4 is a plan view showing the open state of the same appliance.

FIG. 5 is an enlarged side view of a portion of the same appliance, partly cut away to show internal structure.

FIG. 6 is a perspective view of frame of the same appliance.

FIG. 7 is a perspective view of a variation of engaging means of case of the same appliance.

FIG. 8 is a perspective view, partly cut away, of fuel burning appliance of another embodiment.

FIG. 9 is a perspective view, partly cut away, of band

100 parts of carbide powder of the above composition is mixed with

	Parts
Potassium nitrate.....	5
Lead acetate.....	2
Flour starch.....	10
Water.....	60

Blending ratio of water is adjusted appropriately in the range of about 50—100 parts relative to 100 parts of carbide powder. These materials are sufficiently kneaded by kneader, extruded from nozzle by extrusion forming machine, molded, cut in a fixed length, and dried up to 3—5 percent of water to become a final product. A product dried to water content of about 3 percent is left in the air to have water content of about 5 percent or less by absorbing water in the air.

An explanation will be given on the above blending. 100 parts of carbide powder, raw material, with addition of about 10 parts or a little more of combustion assisting material such as potassium nitrate, lead acetate can burn almost appropriately without mixing hemp stalk carbide powder. Especially in case of use for instance in bed in sleeping, not being attached, to human body, a case namely fuel-burning appliance is relatively large sized. A solid fuel to burn in said case is also necessarily larger in diameter so that about 3 parts of combustion assisting material will suffice and hemp stalk carbide powder is needless. Either potassium nitrate or lead acetate as combustion assisting material produces oxygen and inhibits the production of carbon monoxide for good and smooth combustion. As the result of practical examinations, the inventor confirmed that the addition of lead acetate is particularly effective for obtaining perfect combustion. As binder starch or C.M.C. is widely used, but resinous binder is not preferred.

In kneading these materials and molding by extrusion, it is essential to actuate sufficient compressive force for desirable compact molding. To this end the kneaded materials is introduced into extrusion mechanism provided with a extrusion cylinder formed in connection with a hopper and given an extrusion compressive force in the order of 5—10 kg/cm² by actuating a screw with progressively narrowing pitches in nozzle portion of said extrusion cylinder. Namely with increase of extrusion compressive force the product becomes compact to

have a longer combustion time but on the other hand tends to lower combustibility. So this force must be determined appropriately within the above range according to the condition of kneaded material. When extruded, a molding should essentially be received so as not to break, crack or wrinkle. To this end nozzle is so positioned as to make an angle of about 45—70° relative to the surface of conveyor which is driven correspondingly to a speed of extrusion molding of solid fuel. A molding extruded in inclination of can be smoothly produced in quantity without producing wrinkle and cracking especially by being curved on conveyor to be worse, under action of conveying action of conveyor. The molding thus continuously molded by extrusion is cut in a predetermined length (For instance 80 mm), dried and spread with aluminum powder on its surface to make a final product.

In order to obtain solid fuel of easily available saw dust, using little hemp stalk carbide, woody carbide is used in two quite different forms of use. The one consists of ultrafine powder in the order of 300—400 mesh in the greater part, and the other consists of powder of 200 mesh or higher mixed with some coarse powder of about 150 mesh. These two kinds of material are mixed together with addition of said combustion assisting material, binder and water, kneaded, molded by a extrusion molding machine, cut in a certain length and dried. Dried solid (pocket heater) fuel is appropriately coated with aluminum powder to make the final product similarly to the aforementioned.

The present invention which adopts raw material less combustible than hemp stalk carbide, such as woody carbide has successfully improved the combustion quality of woody carbide by using ultrafine powder of 300 mesh or more of woody carbide in the greater part. Breaking property due to use of ultra fine powder can be positively avoided by appropriately adding coarse woody carbide of 200 mesh or more. A mixture of two kinds of woody carbide is made a compact structure body by extrusion so as to make bonding effect of past material blended in mixture for making a product of high strength.

Further in the extrusion molding, the addition of water more than conventional solid (pocket heater) fuel by 3 percent or more is preferred. By adding such relatively large quantity of water, combustion assisting material and binder can be easily mixed with raw material carbide and extrusion force exerted by screw mechanism of extruder or the like can be reduced to one third of that exerted by conventional mechanism for quick and smooth operation of extruder. Thus a final product of constant and uniform quality can be obtained simply with high efficiency. The blending ratio of coarser woody carbide relative to ultrafine powder of woody carbide is generally about 8—30 percent. At a smaller ratio the above rigidity cannot be obtained. At a ratio over 3 percent the improvement of combustion as achieved by the addition of ultrafine powder is not realized. In either case, no desirable product can be obtained. Water should be added at a ratio of 70—100 weight parts of raw material carbide. As above stated such a small quantity of water can realize uniform mixture and smooth extrusion.

A method of making a solid fuel of the present invention is illustrated concretely as follows:

Ultra fine powder of saw dust carbide of 300 mesh or more.....	parts...	40
Coarse saw dust carbide of 100—150 mesh.....	do.....	10
Water.....	do.....	40
Potassium nitrate.....	kg.....	15
Led acetate.....	kg.....	15
Flour starch.....	kg.....	2.5

The mixture according to the above percentages is sufficiently kneaded and then extruded by an extruder, cut in length of about 80 mm and dried. The product is coated with aluminium powder to become a final product of the present invention.

Blend with no lead acetate added, processed, extruded,

molded and dried is appropriately available as fuel of a large fuel burning case, such as burning case used in sleeping bed. Here, for a screw-type extruder, only one-third of extrusion force required by ordinary extruder namely 3—5 kg/cm² is enough. Product thus obtained does not break at all in leading or other operations. Its combustion lasts for an appropriate time with appropriate heating power. In said product tobacco stalk carbide, powdered charcoal or a small quantity of hemp stalk ash may be mixed for improving the firing, if necessary. However as above stated, a solid fuel of the present invention substantially consists of ultrafine powder saw dust carbide of 300 mesh or more especially 300—400 mesh as main component blended with 8—30 percent of coarse saw dust carbide of 200 mesh or less especially of 100—150 mesh.

A product mold by extrusion of the present invention may be shaped in sectionally round, elliptic, oval or angular rod. However in shape preferably adopted by the inventor as shown in FIG. 1, a sectionally somewhat elliptic rodlike body 1 is provided in the middle portion with a pretty wide and shallow groove 2 and on both sides with arcuate bulged portions 3, 3 so that it is sectionally shaped like cocoon. The surface of said product is coated with a layer of aluminum powder. This sectional contour of solid fuel is easily given by shape of nozzle for an extruder. Owing to above elliptical section, a solid tobacco can be held in stability in noncombustible fiber wool. Especially the shallow groove 2 formed improving the middle portion and the bulged portions 3, 3 of both sides ensure the stability and the fixation in fiber wool. Said shallow groove 2 formed in the middle moderately tightness the middle portion of elliptically extruded molding so as to make a wholly compact structure of solid fuel.

Typical actual dimensions of solid fuel as shown in FIG. 1 are as follows.

Width (Long dia. of eellipse).....	mm....	15
Thickness (at both bulged portions).....	mm....	8
Thickness (Grooved portions 2,2).....	mm....	7.5
Length.....	mm....	85

A solid fuel of the above dimensions can burn continuously for more than 8 hours even for the use described hereinafter. If it is required to burn longer, a solid fuel is molded as shown in FIG. 2 and given compactness similarly to that of FIG. 1. Namely the rod-shaped body is U-shaped by curved portion 4 in the middle, thereby being substantially twice a solid fuel of FIG. 1 in length so that it continues to burn for twice or more time as long as the combustion time of the same. In U-shaped solid fuel, the one side portion is so short as to correspond to width. For packing a U-shaped solid fuel, it must be handled in combination with another U-shaped solid fuel as shown by imaginary line in FIG. 2. In this way solid fuels can be packed substantially in compactness and are not broken in handling and transit.

A solid fuel of the present invention burns in fuel burning appliance as shown FIG. 3 and the following. To explain a basic fuel burning case as shown in FIGS. 3—6, case members 11, 11 are openably and closably connected in pivoting portion 12 of one side of case and respectively filled with inorganic fiber wool 13, such as glass fiber wool, rock wool, slag wool which is held by frame plate 14 fit inside said case member 11. A rod-shaped solid fuel 1 positioned in said frame is held by inorganic fiber wool 13, 13 and burns. Said case members 11, 11 are respectively provided with round hole 8 in the middle portion. In both side portions 5, 5' corresponding to firing position and ending position said case member is provided with slots so combines as to form flowerlike or radial pattern 6 for increasing ventilation. Among slots 7 arranged in the form of flowers 6 one slot 5 is far longer than adjacent slot (approximately twice) so as to have maximum ventilation in slot 5. Said slot is thereby made firing position, as indicated by arrowlike triangle hole 9. In the drawing 15 is a flat platelike engaging metal pivotally provided to one case member 1. Said metal is engageable with and disengageable from depressed

engaging portion of another case member 11 and can be kept in closing state. Said flat platelike engaging metal 15 is in close contact with case members 11, 11 in closing state and falls in depressed engaging portion 10, inappreciably projecting from case members so that it is not caught by velvet or other textile or knitted cloth as shown in FIG. 1, when the case is put in or taken out of bag 16. Said U-shaped engaging metal 15 closes case members 11, 11 with strength so as to fit them into engaging depressed portion 10. Accordingly they do not open by themselves without being noticed by a wearer during handling.

In frame plate 14 fit for holding fiber wool 13, 13 opening 17 is formed in the middle so as to receive solid fuel 1. In the opening 17 the portion corresponding to firing position forms particularly enlarged opening portion 17' so as to position the fired portion of solid fuel positively there as well as to facilitate supply of air to firing portion.

In fuel burning application of the above construction, case members can change sectional area of perforations for ventilation freely by means of round hole 8 provided in case members and slots appliance in combination. This controls supply of air to respective portions of solid fuel 1 as desired for combustion of respective portions. The firing point raises temperature from room temperature to a necessary temperature in a relatively short time; the middle portion controls quantity of supply of air appropriately and moreover can increase quantity of supply of air again in the portion of combustion ending portion of solid fuel 1 where perfect combustion is not expected due to scarcity of calory, thus making possible effective perfect combustion in whole solid fuel. Accordingly slots 7 can be of small numbers so that they do not reduce much strength of case members 1. Further said slot checks inorganic fiber material 3 to go out of large round opening. Further slot is seldom clogged by tar or others produced in solid fuel 1 and so appropriate and effective combustion is obtained for a long time. Slots 7 may of course be arranged to compose appropriate patterns so as to give case members beautiful appearance. They thus contribute to fancy appearance of product.

Engaging metal 15 of the embodiment as shown in FIGS. 3—6 may be appropriately changed. FIG. 7 shows a preferred mode of variation. Although it is constituted similarly to the embodiment as shown in FIGS. 3—6, a metal wire of appropriate thickness is curved 20 by pivoting plate 18 provided to one case member 11. At one end of said metal wire, engaging metal 15 rotatably provided with roller 19 is pivoted. The other case member is provided with depressed engaging portion 10' for engaging and disengaging roller 19 of engaging metal 15'. In the middle portion of engaging metal 15' curved portion 21 is for receiving flange 22 fitting in case member 11, 11 is formed correspondingly to said flange.

Another embodiment of fuel-burning appliance according to the present invention is shown in FIG. 8. In this embodiment, the metal case members 11, 11 is of similar construction as those shown in FIGS. 3—6. However as engaging metal, in place of armoring system shown in FIGS. 3—6 and FIG. 7 a publicly known engaging means is adopted. Namely engaging metal 25 appropriately elastically mounted in one case member 11 is engageable with and disengageable from engaging hole 24 of fitting edge of another case member. A small portion of said engaging metal 25 is exposed outside and projected. By pushing projecting portion 26, engaging metal 25 is disengaged from engaging hole 24. Case members 11, 11 thus substantially smoothened outside are covered with velvet or other cloth piece 27 by posting. Said cloth piece 27 moderates combustion heat and transmits it to human body. On the other hand it prevents cold case members 11, 11 to come in contact directly with human body, not to give it disagreeable feeling and cool feeling, and can save bag 16 as shown in FIG. 3. By this, painting, plating or other surface treatment may of course be simplified.

Practically for attaching fuel-burning appliance to human body, it is put in bag 16 and can be held under band, in a waist band or in other way, with the bag. However especially for convenience, the present invention uses a special band as

shown in FIG. 9. On the upper edge of bag 31 formed with appropriately obliquely reduced corners of both sides, zipper or other closing means 33 is provided to form opening 32. On both sides of bag 31 expansion band 34 provided with adjusting member 35 adjustable in length as desired and another expansion band 34' provided with engaging member 36 at the end are provided so as to open said opening 32 for enveloping a fuel burning appliance therein. Accordingly by means of said wearing band, a fuel-burning appliance can be applied in stability to any of main portions of human body such as belly, shoulder, back. When it is applied in close contact with backside of trousers under band, it does not go out due to interruption of ventilation through sophistically provided vent holes, caused by choking of said holes of upper and lower surfaces of case under pressure as is the case with flat case. Further said wearing band keeps the case on human body at all times even when trousers are taken off. Since it can be used by adjusting not to give undue oppressive feeling, U is very comfortable when applied to human body.

Especially in case of driving vehicles, when a fuel-burning appliance (a pocket heater) of the present invention is applied to back of a driver or used under a pretty wide band for trousers, almost all vent holes of upper and lower surfaces of case might be choked. For precaution of such cases, vent holes 29 are preferably formed to side surfaces too, as shown by imaginary line in FIG. 3.

I claim:

1. A portable warming appliance for burning a solid fuel comprising a case capable of being carried on a person and having similar case members pivoted to each other on one side of said members, noncombustible fiber wooly material completely filling the inside of said case members for holding the solid fuel therebetween, perforations in said case for conducting air through said perforations and said fiber wooly material to the solid fuel and transmitting heat produced by the combustion of the solid fuel through said fiber wooly material to said case.

2. A warming appliance as described in claim 1, wherein said case members have a maximum number of perforations at one end thereof, a smaller number of perforations in the middle portion thereof, less perforations than the preceding number of perforations in the other end thereof, and capable of positioning the firing portion of the solid fuel in one end portion of said case and the other end portion of the solid fuel in the other end portion of said case.

3. A warming appliance as described in claim 1, including additional perforations in both end portions of said case having slot like shapes and a triangular-shaped opening positioned at the firing point of the fuel.

4. A warming appliance as described in claim 3 wherein said slotlike perforations are radially arranged in a semicircle.

5. A warming appliance as described in claim 1, including a frame in each case member having an opening in the middle thereof and holding said fiber wooly material therebeneath in each case member and holding the solid fuel on said fiber wooly material in the opening of the frame.

6. A warming appliance as described in claim 1, including an engaging metal pivoted at one end and a depressed engaging portion of said case capable of receiving said engaging metal providing a substantially flat contour for the case in its closed position.

7. A warming appliance as described in claim 6, wherein the engaging metal is in the form of a flat plate.

8. A warming appliance as described in claim 6, wherein said engaging metal comprises a bent metal wire and a roller rotatably mounted in the end portion of said wire.

9. A warming appliance as described in claim 1, including a cloth covering for said case.

10. A warming appliance as described in claim 1, including openings in the peripheral side of said case for supplying air therethrough.

11. A warming appliance as described in claim 1, including a bag enveloping said case.

12. A warming appliance for burning a solid fuel comprising a case having at least two case members moveable from one

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another, said case members having perforations, a noncombustible fiber wooly material in each of said case members, and a solid fuel positioned for being between said noncombustible fibre wooly material when said case members are superimposed on one another.

13. A warming appliance as described in claim 11, wherein

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bands are each connected to a side of said bag and means are provided for detachably connecting said bands.

14. A warming appliance as described in claim 13, wherein one of said bands is adjustable lengthwise thereof and said means includes an engaging member for attaching said bands.

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