STEAM DRIVEN SPIT FOR CHARCOAL GRILLS

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STEAM DRIVEN spit FOR CHARCOAL GRILLES

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The present invention relates to a steam driven spit for charcoal grilles, and it particularly relates to a readily portable structure of the character described which may be readily employed for outdoor grilles.

Most spits for outdoor grilles must be electrically driven and they cannot be readily taken to picnic grounds nor can they be readily employed in the yard or adjacent to the home without long cable connections or special electrical connections.

Hand driven grilles on the other hand require considerable attention and are normally not utilized once this novelty has worn off.

It is among the objects of the present invention to provide a small, lightweight, readily assembled, inexpensive, portable spit arrangement which may be readily placed upon charcoal grilles either adjacent to the home or out on picnics and which does not require either manual attention or expensive wiring connections or long cables connected thereto.

Another object is to provide a safe, low cost, automatically driven spit arrangement for charcoal and other grilles in which the mode of power will be independent of the external connections, and which may be readily installed or dismounted at any desirable grill position.

A still further object is to provide an automatically driven spit for a charcoal outdoor grille in which the spit will be driven from the heat of the charcoal fire itself without requiring manual intervention or electric cable connections.

Still further objects and advantages will appear in the more detailed description set forth below, it being understood, however, that this more detailed description is given by way of limitation, since various changes therein may be made by those skilled in the art without departing from the scope and spirit of the present invention.

In accomplishing the above objects, it has been found most satisfactory according to one embodiment of the present invention to provide an automatically driven spit arrangement which will be actuated by the heat of the actual grill fire, and which will be safe and dependable without requiring manual intervention.

Preferably a steam boiler arrangement is provided supported upon a frame which will depend into and rest against the charcoal fire. This boiler arrangement will have a flexible connection to a small steam driven piston arrangement which will have a slight pivotal movement directing operation upon a valve plate.

This plate will alternately park the cylinder at each end to the steam and to the air so as to give a reciprocating movement. This piston movement will drive a flywheel which in turn will drive through a reduction gearing arrangement, a spit having an adjusted position upon an upright standard arrangement.

The spit will be connected to a series of gears which will give about 1000 to 1 reduction from the flywheel of the steam engine arrangements.

Desirably, the entire arrangement is conveniently mounted upon a rectangular frame which will fit around the periphery of the charcoal grille and which will carry the water boiler arrangements.

In the preferred form the water boiler arrangement, which is a safety steam valve to prevent excessive pressure, will also carry a series of attachments to enable different types of meat, fowl or other food products to be grilled upon the charcoal fire.

With the foregoing and other objects in view, the invention consists of the novel construction, combination and arrangement of parts as hereinafter more specifically described, and illustrated in the accompanying drawings, wherein is shown an embodiment of the invention, but it is to be understood that changes, variations and modifications can be resorted to which fall within the scope of the claims hereunto appended.

In the drawings wherein like reference characters denote corresponding parts throughout the several views:

FIG. 1 is a top perspective view showing the charcoal grill with the steam driven spit of the present invention in position thereon.

FIG. 2 is an end elevational view taking the direction indicated by the arrow 2 of FIG. 1 and upon an enlarged scale as compared to FIG. 1, showing the flywheel and reduction gearing.

FIG. 3 is a transverse sectional view taken upon the line 3—3 of FIG. 2.

FIG. 4 is a transverse sectional view taken upon the line 4—4 of FIG. 3.

FIG. 5 is a transverse sectional view taken upon the line 5—5 of FIG. 3.

FIG. 6 is a fragmentary transverse sectional view taken through the boiler arrangement showing the steam relief valve and also the steam outlet connection.

FIG. 7 is a front perspective view of an alternative steam driven charcoal spit arrangement which may be independently mounted upon a supporting structure.

FIG. 8 is a top perspective view similar to FIG. 7 showing the manner of collapsing the structure of FIG. 7 together to enable easier transportation and carrying there of.

FIG. 9 is a top perspective view of the brazier construction which may be used for mounting a steam driven grille of the type shown in FIGS. 1 to 8.

FIG. 10 is a top perspective view of an alternative mounting brazier construction in which the brazier has a rectangular pan instead of a circular pan as shown in FIG. 9.

Referring to FIG. 1, there is shown a charcoal grille A having the grate or furnace or receptacle B on which is positioned the rectangular frame C forming the base of the steam driven spit.

Carried by the frame C is the boiler or water receptacle D having the filling cap E and the steam safety valve F and also the steam outlet connection G.

The frame C carries the end plate or structural support H upon which is mounted the gear box I, the valve plate K and the piston cylinder engine L.

The flywheel M will be positioned between the gear box J and the piston cylinder arrangement L.

The spit N is driven from the gear box J, and it will be carried by the upright Q at one side of the spit structure.

The other side of the spit structure also has two adjustable uprights R and S (see FIG. 2).

The cover S will be mounted upon the top of the plate H and the adjustable mounting Q.

The charcoal grille has a table member 10 having the four legs 11 mounted at the corners 12.

The table 10 has the central opening 13 which receives the pan 14 having the openings 15 and designed to receive the charcoal fire indicated at 16.

The rectangular base C has the side arms 25 which have pivotal connections at 26 to the swinging arms 27.

The lower ends 28 of the swinging arms 27 are connected to the ends 29 of the cylinder D. The top of the cylinder D has a plate 30 which is mounted above the openings 31 and 32 of the cylinder D.
The plate has a threaded opening 33 which receives the threaded nipple portion 34 of the cap E. The threaded nipple portion 34 carries the gasket 35 which forms a seal.

The external face 36 may be serrated or ridged to enable the cap E to be screwed in or screwed out.

The cap E has a central opening 37 into which projects the stem 38 of the steam relief valve F. The stem 38 carries the coil spring 39 which reacts upon the water 40 and upon the head 41 at its lower end.

The upper end of the stem 38 passes through the opening 43 in the enlarged head 42 of the nut member 44.

The nut member 44 has a threaded nipple 45 and a gasket 46.

The spring 39 at its upper end reacts against the bottom 47 of the recess in the nut 42. The upper end of the stem 39 fits into the knob 49 which receives the gasket 49.

When the steam pressure builds up within the cylinder D to too high a level the spring 39 will be compressed, opening the gasket 49 from the nut 42 and permit escape thereof.

When it is necessary to replenish the water, the cap E may be unscrewed and water poured in through the tapped opening 33.

Should a water leak generated in the boiler D pass out through the opening 32 into the pipe or outlet G (see FIG. 6).

As shown in FIG. 1, the pipe G has a curved extension 60 which leads into a flexible hose 61 which is connected at its upper end 62 to the pipe 63 leading into the valve plate K. The pipe 63 will feed steam into the bore 64 in the valve plate K.

The bore 64 has the steam port openings 64, 65 and 66 which respectively feeds steam into the lower and upper ends of the piston cylinder arrangement L.

The piston cylinder arrangement, as best shown in FIGS. 4 and 5, consist of a block 75 having the bore 76 which is capped at 77. The sides of the cylinder are provided with the lower porting arrangement 78 and the upper porting arrangement 79.

The lower end of the block 78 has the passageway 80 which receives the stem 81 of the piston 82. The lower end or stem 81 has an eccentric connection at 83 to the flywheel M.

The upper port 79 alternatively connects with the outlet steam port 64 and the inlet steam port 65 both in the valve plate K. The lower port 78 alternatively connects with the lower inlet steam port 65 and the lower outlet steam port 85.

The side of the block 75 against the valve plate K has two bosses 86 and 87 which ride thereon and shortly frictionally form a perfect seal.

The pistons are generally mounted upon the rod 88 which extends through the recess 89 and through the valve plate at 90.

The block 75 and the valve plate K are held closely together by means of the spring 91 and tension of which is adjusted by means of the nut 92.

The valve plate in turn is mounted by the arms 93 upon the face 94 of the gear box J.

The crank is provided with a central pinion 100 which drives the large gear 101. The large gear 101 in turn drives the pinion 102 which drives the gear 103. The gear 103 drives the pinion 104 which drives the large gear 105.

The large gear 105 drives the pinion 106 which drives the large gear 107. The large gear 107 is connected to the shaft 108 which drives the end of the rod 109 which forms the main spit connection.

The gear box J is mounted upon the plate H which in turn has the stud connections 110 and 111 which may be adjusted by means by the various slots 112 and 113 in the upright bars 114 and 115.

These bars at their lower ends 116 and 117 are mounted upon the cross-member 118 on the rectangular frame C. By means of the adjustment provided by the various slots 112 and 113, it is possible to vary the height of the

spit N. The other end of the rod 109 has a bearing connection at 119 in one of the openings 120 on the upright member Q mounted at 121 on the transverse portion 122 of the rectangular frame C.

The end of the rod 109 is provided with the handle 123 which enables adjustment in the position of the spit rod 109.

The upper ends of the vertical slotted bars Q at one end and 114 and 115 at the other end will carry the cover S as indicated at 124 and 125.

The bar 109 may be provided with the attachments or adjustable pin members 126 and 127 for attachment to the meat, fowl or other object being grilled.

Alternatively carrying connections may also be provided upon the rod 109 for frankfurters or other objects.

In operation, the boiler D will rest upon and follow the charcoal fire downwardly as it burns out due to the pivoted connection at 26. When the water is exhausted, the engine will stop and the heat of the charcoal fire will not be sufficient to cause any damage to the boiler D.

At the same time an excess of steam pressure will readily unseat the valve F permitting an escape of steam, and a whistle may also be provided as a warning signal.

The steam which is generated in the boiler D will pass through the passage G and through the connections 60, 61 and 62 to the inlet bore 64 in the valve plate K. Then, as the cylinder block 75 reciprocates on the pivot 88, the upper and lower ends of the cylinder chamber 76 above and below the piston 82 will be alternately connected by means of the passageways 78 and 79 to the steam inlet ports 65 and 66 and to the outlet ports 84 and 85.

This will result in a swinging and reciprocatory movement of the pivot connection 83 and rotation of the flywheel M which will drive the gearing 105 to 107 and cause a slow rotation of the spit N.

The reduction may vary from 200 to 1 and is preferably in the order of 1,000 to 1 so that the steam engine will repeatedly reciprocate with relatively slow motion of the spit N.

By means of the slotted adjustments 112 and 113 at the right of FIG. 1 and 120 at the left of FIG. 1, it is possible to change the position of the spit rod N.

The entire arrangement is of lightweight and may be readily lifted from the grille table 10 and readily transported.

In the assembly as shown in FIG. 1, the rod N and the end plate H together with the rod Q may all be removed from the cover S and the rectangular frame C.

The steam cylinder arrangement L is readily disassembled from the valve plate K for cleaning or adjustment and the bosses 86 and 87 will readily wear themselves into position upon the valve plate K permitting an accurate valving of the inlet and outlet stem.

Referring to FIG. 7, there is shown a lower flame structure V, a rotatable spit W, the top cover structure X, a steam producing or boiler structure Y, the side frame structure Z and a steam motor driving structure Z.

Referring to FIG. 7, the lower base rectangular structure V has the long members 150 and 151 connected by the transverse members 152 and 153. These members may be fitted together by means of the corner rivets or screw pivoting studs 154, 155, 156 and 157.

The depending legs 153 and 159 are pivotally mounted at 160 and 161 and are connected by pins 162 to the caps 163 at the ends of the boiler U.

Referring to FIG. 8, it will be noted that the end members 152 and 153 may be turned inwardly from their positions as shown in FIG. 7.

When the members 152 and 153 are turned outwardly, they will be turned on the pivots 154, 155, 156 and 157. It will be noted that the pins 175, 176, 177 and 178 in FIGS. 7 and 8 act as stop to limit the movement of the transverse members 153 and 154 when they engage the recesses 179, 180, 189 and 190.
It will be noted that the frame V is in reverse position in FIG. 8 as compared to FIG. 7. The steam boiler U has the connection 200 from the top plug 201 to the rubber hose 202 which continues to the nut 203 on the steam motor Z.

The steam motor Z is of the same construction as the steam motor shown in FIGS. 1 to 5 with the flywheel M, the gear box J and the valve plate K. The upright members 204 and 205 form the end frame Y and they carry the shield or end plate H which has the outwardly extending upper and lower inclined plate members 206 and 207.

The motor will drive the spit W which has a square cross section rod 208 carrying the spit elements 209 and 210, having the pins 211 and 212. At the end of the rod 208 is a wooden handle 213 beyond the notch 214 in the vertical members 215. The notch 214 supports the end of the rod 208 at 216.

The bar 215 is notched as indicated at 217, at 218, at 219 to provide different elevations or positions for the rod W.

It will be noted that the lower ends of the bars 204 and 205 are permanently mounted at 220 and 221 on the cross member 153 so that when the cross member 153 is turned inwardly these elements will be folded into parallelism with the frame V.

When this occurs, the motor Z together with the gear box J and the flywheel M will be folded in position for transportation, shipping, packing and storage as indicated in FIG. 8.

At the same time the vertical member 215 is permanently mounted upon the cross member 152 at 222.

The spit W together with the wooden handle 213 may be held in position as shown at the lower part of FIG. 8 and held in the corners 223 of the cross members 152 and 153.

The top cover plate X may be mounted by means of the tab or angles 230, 231 and 232 upon the top of the vertical members 204 and 205 at 215. It will be noted that the cover X has the recesses at 233 and 234 to receive the bent over portions 231 and 232.

The pin elements 209 and 210 may be positioned in the collapsed structure at the lower lefthand corner thereof as shown in FIG. 8.

The openings 240 and 241 in the side members 159 and 161 receive pins or rods for holding the assembled, collapsed structure as shown in FIG. 8.

As shown in FIG. 7, the structure may be readily changed from extended or assembled position in FIG. 7 to collapsed shipping position in FIG. 8 without difficulty.

In FIG. 9 is shown a base receptacle AA consisting of a fireproof metal brazier which may receive the charcoal fire, having the upright notched members BB, CC and DD.

These members are provided with a series of notches 260, 261 and 262. The upright members are mounted upon the clips or clamps 265 and 266 which fit on the edges 263 and 264 of the brazier or pan AA.

The locking nuts 267, 268 and 269 will hold the clamps 265 and 266 in position.

The upright members BB, CC and DD are mounted permanently in position by means of the spot welding 270, 271 and 272.

From the bracket, there will extend downwardly and inwardly the inclined arms 273 which carry the end cup 274 of the water boiler EE.

The brass or copper pipe connection 275 may be extended to a rubber hose 61 as shown in FIG. 1 or 202 shown in FIG. 7.

It will be noted that the plate H may be directly mounted upon the legs CC and DD by removing it from the notches 276 in the legs 204 and 265, and placing the plate H in the notches 261 and 262 in the legs CC and DD of FIG. 9.

The spit then may be extended to rest in one of the notches 260 and the cover plate X may be placed on top of the combination.

In the embodiment shown in FIG. 9, the brazier FF carries the element BB on its end wall 285 with the lock nut or tightening screw 267 tightening the clip 265 in position against said wall 285. The notches 260 then may receive the spit W.

At the right of FIG. 10 is shown the notched vertical members CC and DD with the notches 261 and 262 mounted upon the side wall 286 of the brazier or pan FF.

The boiler EE is shown carried inside of the brazier FF by the depending arms 273 which hold the end caps 274.

The cross member 266 is spot welded in position as indicated at 271 and 272, and the depending portions 287 and 288 will cooperate with the downwardly extending lugs 289 and 290 and the clamping screws 268 and 269 to hold the device in position.

Here too the plate H may be dismounted from the notches 276 in FIG. 8 and then mounted in the notches 261 and 262 in FIG. 10 with the spit being engaged in one of the notches 260 in the vertical member BB.

In this alternative arrangement, the elements BB, CC and DD may be separately assembled and carried in the back of a car, and the unit carried on the plate H may also be separately carried, and the whole readily assembled with either the brazier AA or the brazier FF having an outdoor charcoal fire.

It is thus apparent that the applicant has provided a simple, ingenious, inexpensive, lightweight steam driven grill which does not require electrical connections or manual attention and is readily adapted for either back yard or out of door picnic grilles.

While there has herein been illustrated and described the preferred embodiment of the invention, it is to be understood that applicant does not limit himself to the precise construction herein disclosed, and the right is reserved to all changes and modifications coming within the scope of the invention as defined in the appended claims.

The present application is a substitute of application Serial No., 558,489, filed January 11, 1956, now abandoned.

Having now particularly described and ascertained the nature of the invention, and in what manner the same is to be performed, what is claimed is:

1. A steam driven spit arrangement for outdoor charcoal grilles having a frame construction for mounting upon a grill, said construction having vertical end structures, a spit rod mounted for rotation upon said end structures, and a steam piston cylinder combination, said combination including a valve plate mounted on one end structure and having steam passageways therethrough, a cylinder mounted on said valve plate to receive steam first at one end and then at the other end, a piston mounted to reciprocate in said cylinder having a connecting crank rod, a fly wheel pivotally mounted on said one end structure to be rotated by said crank rod and a gear box connected between said fly wheel and the end of said said pivot, said construction driving said spit rod and a vertically movable water tank, a pivot arm extending between the tank and the frame construction, pivotal connections at the ends of said pivot arm to said tank at one end and to said construction at the other end, outlet for steam from said water tank, an inlet for steam to said valve plate, a flexible conduit connecting said outlet and inlet, said water tank serving as a water boiler supplying steam to said combination and heated by said charcoal grill.

2. A steam driven spit arrangement for outdoor charcoal grilles having a frame construction for mounting upon a grill, said construction having vertical end structures, a spit rod mounted for rotation upon said end structures, and a steam piston cylinder combination, said combination including a valve plate mounted on one end structure and having steam passageways therethrough, a cylinder mounted on said valve plate to receive steam first at one end and then at the other end, a piston mounted to recipro-
cane in said cylinder having a connecting crank rod, a fly wheel pivotally mounted on said one end structure to be rotated by said crank rod and a gear box connected between said fly wheel and the end of said spit, said construction driving said spit rod and a vertically movable water tank, a pivot arm extending between the tank and the frame construction, pivotal connections at the ends of said pivot arm to said tank at one end and to said construction at the other end, outlet for steam from said water tank, an inlet for steam to said valve plate, a flexible conduit connecting said outlet and inlet, said water tank serving as a water boiler supplying steam to said combination and heated by said charcoal grille, said water tank being adjustably suspended from said frame construction and depending into said charcoal grille and resting at all times upon the charcoal fire.

5. A steam driven split arrangement for outdoor charcoal grilles having a frame construction for mounting upon a grille, said construction having vertical end structures, a spit rod mounted for rotation upon said end structures, and a steam piston cylinder combination, said combination including a valve plate mounted on one end structure and having steam passageways therethrough, a cylinder mounted on said valve plate to receive steam first at one end and then at the other end, a piston mounted to reciprocate in said cylinder having a connecting crank rod, a fly wheel pivotally mounted on said one end structure to be rotated by said crank rod and a gear box connected between said fly wheel and the end of said spit, said construction driving said spit rod and a vertically movable water tank, a pivot arm extending between the tank and the frame construction, pivotal connections at the ends of said pivot arm to said tank at one end and to said construction at the other end, outlet for steam from said water tank, an inlet for steam to said valve plate, a flexible conduit connecting said outlet and inlet, said water tank serving as a water boiler supplying steam to said combination and heated by said charcoal grille, said steam piston cylinder combination including a pivot connection extending through the valve plate and through the cylinder and a gearing train in said gear box and means to drive one end of said gearing train from the flywheel and means to drive the end of the split from the other end of the gearing train.

6. A steam driven split arrangement for outdoor charcoal grilles having a frame construction for mounting upon a grille, said construction having vertical end structures, a spit rod mounted for rotation upon said end structures, and a steam piston cylinder combination, said combination including a valve plate mounted on one end structure and having steam passageways therethrough, a cylinder mounted on said valve plate to receive steam first at one end and then at the other end, a piston mounted to reciprocate in said cylinder having a connecting crank rod, a fly wheel pivotally mounted on said one end structure to be rotated by said crank rod and a gear box connected between said fly wheel and the end of said spit, said construction driving said spit rod and a vertically movable water tank, a pivot arm extending between the tank and the frame construction, pivotal connections at the ends of said pivot arm to said tank at one end and to said construction at the other end, outlet for steam from said water tank, an inlet for steam to said valve plate, a flexible conduit connecting said outlet and inlet, said water tank serving as a water boiler supplying steam to said combination and heated by said charcoal grille, said combination being provided with a valve plate and said valve plate having a bore with ports to the upper and lower ends of the cylinder, which passageways receives steam from the boiler, and said valve plate also having spaced passageways for relieving exhaust steam from said cylinder and said valve plate having a pivot rod extending through said cylinder and said valve plate to permit turning motion thereon.

7. A portable collapsible readily assembled and mounted and readily dismounted steam driven spit for outdoor picnic and garden domestic grilles having a vessel with side walls for receiving a glowing charcoal bed, having side vertical frame members with detachable means at their lower means engaging the side walls of the grille vessel, horizontal transverse frame members extending between and readily detachable from and assembled with the vertical members, a rotatable horizontal spit member readily assembled with and detachable from said vertical members to rotate upon its connection to said vertical members, a gear box and a swinging piston-cylinder type steam engine having a flexible water plate, a flexible valving for said engine carried on one of said vertical members to drive said spit, and a water container having a pivot arm and pivot connections at the ends of said arm to said water container at one end and to said frame members at the other end to permit movement of the container and a gear arrangement provided thereon.

8. A charcoal grill having a steam driven split having an elongated receptacle for a bed of glowing charcoal, a vertically reciprocable cylindrical water container steam generator having an axis transverse to the elongated direction of the receptacle, swinging mounting means for said generator upon said end structure of the receptacle to rest upon the glowing charcoal, a horizontal rectangular frame for carrying the mounting means to rest on top of the elongated receptacle, upstanding vertical
frame members at the ends of the rectangular frame, an elevated rotating spit positioned in said frame member midway of their vertical height, a cover for the receptacle mounted at the upper ends of the frame member, a piston cylinder engine mounted on the vertical members to drive the spit and an oscillating disk valve steam supply arrangement connected to the generator and supplying steam from the generator to the engine through the disk valve.

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