

Nov. 12, 1929.

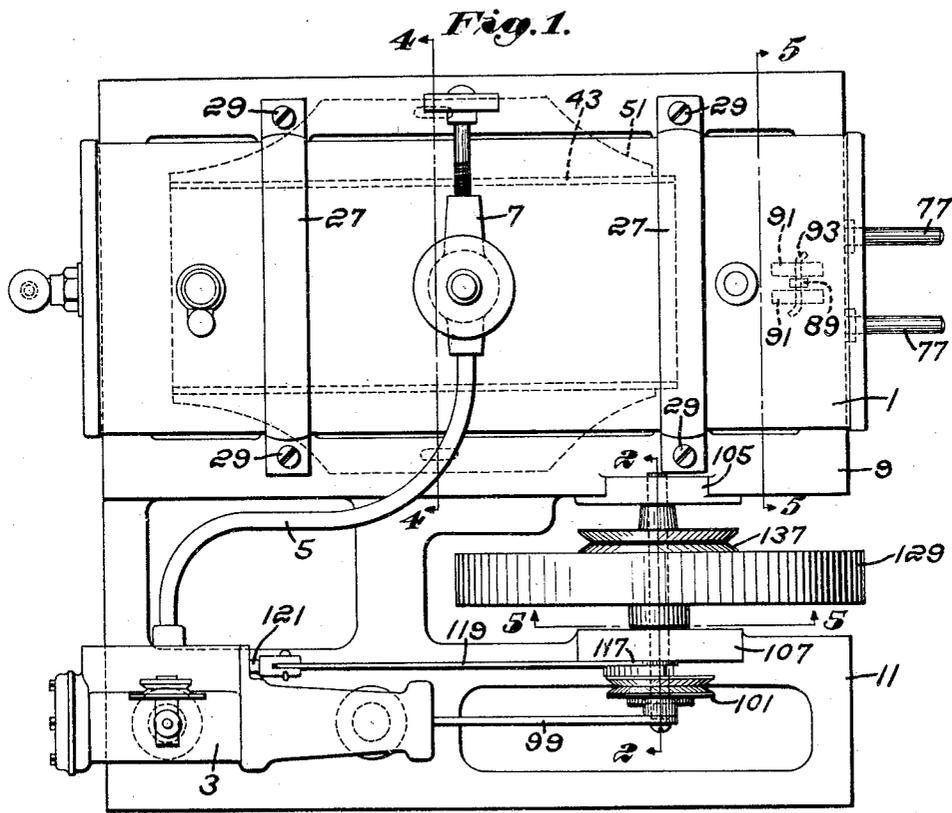
W. RITCHIE

1,735,057

TOY STEAM ENGINE

Filed Dec. 8, 1925

3 Sheets-Sheet 1



Inventor:
William Ritchie,
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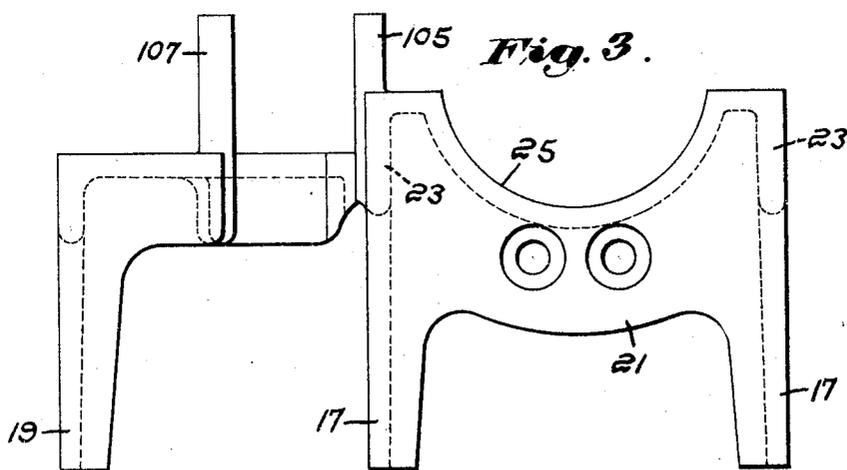
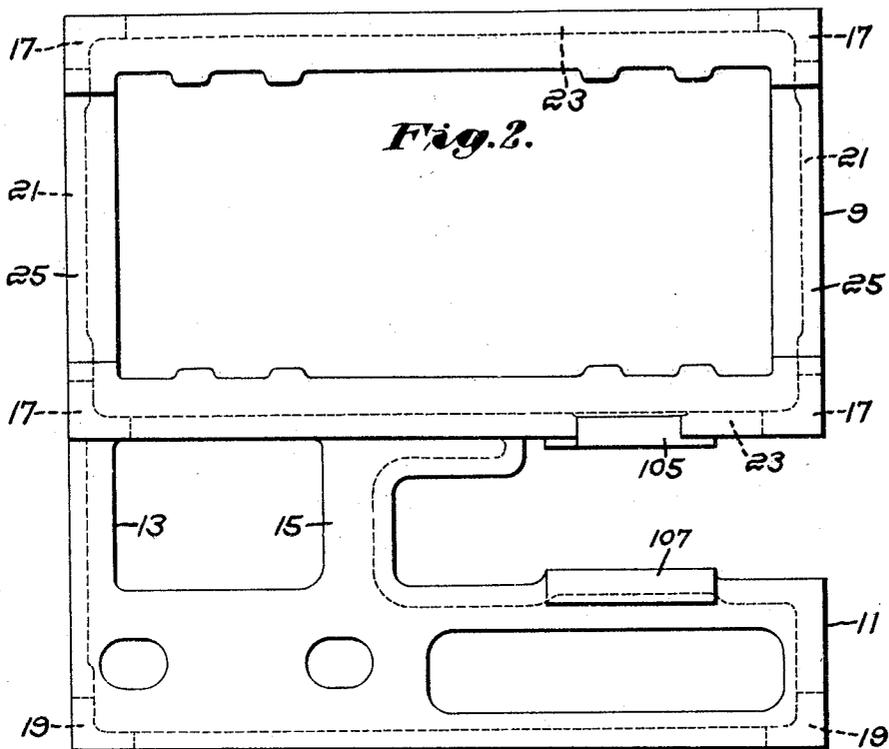
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3 Sheets-Sheet 3

Fig. 4.

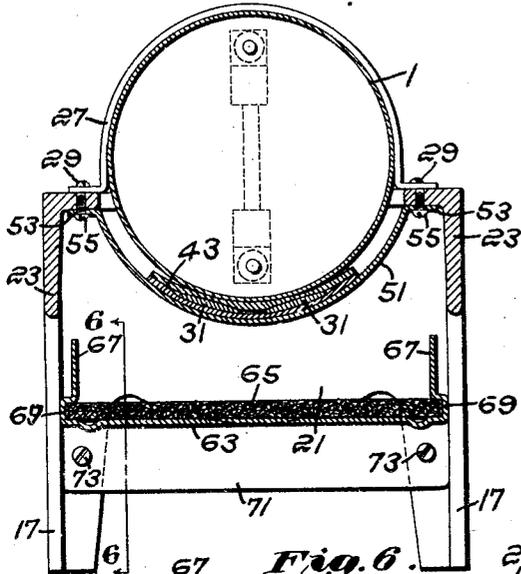


Fig. 5.

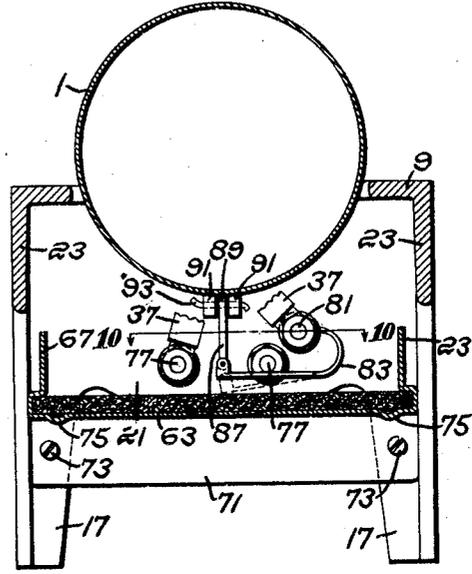


Fig. 6.

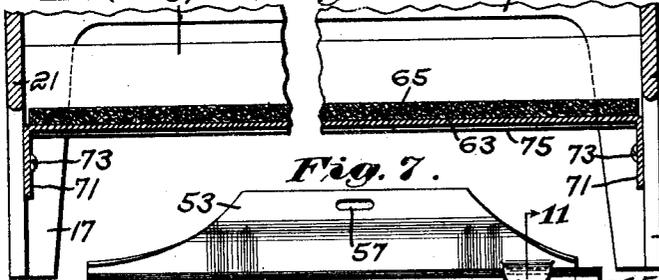


Fig. 7.

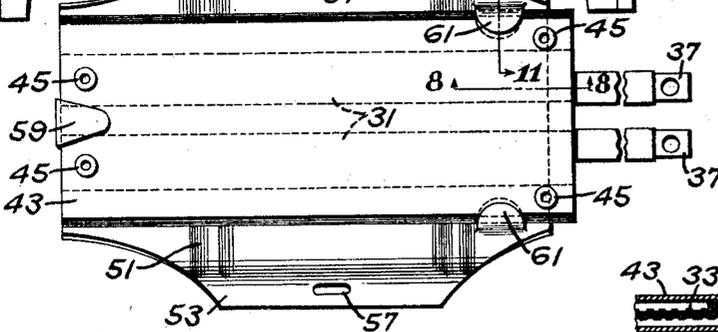


Fig. 9.

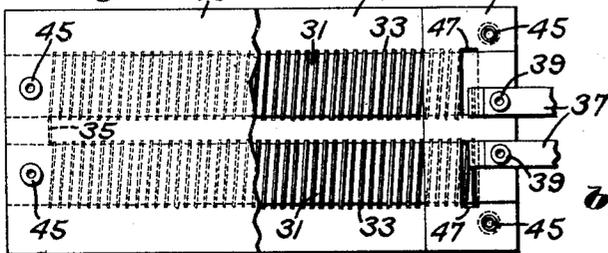


Fig. 10.

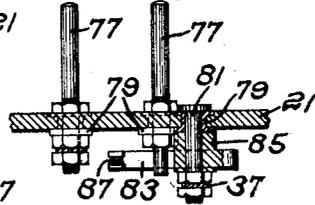


Fig. 11.



Fig. 8.



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UNITED STATES PATENT OFFICE

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TOY STEAM ENGINE

Application filed December 8, 1925. Serial No. 74,142.

My invention relates to toy engines operated by pressure fluid, and particularly but not exclusively to toy steam engines in which the steam is generated by an electric heating element.

My invention will be best understood from the following description when read in the light of the accompanying drawings of several specific embodiments of my invention selected for illustrative purposes, while the scope of my invention will be more particularly pointed out in the appended claims.

In the drawings:—

Fig. 1 is a plan of the toy constructed according to my invention;

Fig. 2 is a plan view of the frame of the toy according to Fig. 1;

Fig. 3 is an end view of Fig. 2 looking from the right;

Figs. 4 and 5 respectively are sections on the lines 4—4 and 5—5 of Fig. 1;

Fig. 6 is a section on the line 6—6 of Fig. 4;

Fig. 7 is a plan view of the heating element and its support;

Fig. 8 is a section on the line 8—8 of Fig. 7;

Fig. 9 is a plan of the resistance element with the right hand portion of the upper sheet of insulating material broken away;

Fig. 10 is a section on the line 10—10 of Fig. 5; and

Fig. 11 is a section on the line 11 of Fig. 7 showing a detail.

Referring particularly to Figs. 2, 3 and 4 of the drawings I have herein illustrated a toy steam engine which comprises a frame carrying a boiler 1 for generating the steam, and an engine for utilizing the steam, the cylinder of the engine being indicated at 3, and steam being conducted thereto by means of the pipe 5 controlled by a throttle valve 7.

As herein illustrated the frame consists of a casting having the portion 9 which supports the boiler and the portion 11 carrying the engine, these two portions being connected by the bars 13 and 15 formed integrally therewith. Formed integrally with the frame I have provided the legs 17 at the four corners of the portion 9 and the legs 19 at those corners of the portion 11 which are farthest from the portion 9.

The portion 9 of the casting constituting the frame as herein illustrated is provided with the end walls 21 and the side walls 23, the top and bottom of this portion of the casting being open as clearly illustrated in Figs. 2, 3 and 4. At the top of the casting the side walls 21 are cut away as indicated at 25 in Fig. 3 for receiving the ends of the boiler, the boiler thereby substantially closing the top of the portion 9 of the frame. For securing the boiler in position I have herein provided the straps 27 (Figs. 1 and 4) which are secured to the top of the frame by screws 29.

Referring particularly to Fig. 1 and Figs. 4 to 9 I have herein illustrated the boiler as heated by an electric resistance heating element which is located at the under side of the boiler in the chamber defined by the side and end walls of the portion 9 of the frame.

As herein illustrated the heating element comprises a plurality (herein two) of strips 31 of insulating material, as for example mica, upon which is wound a length of resistance wire 33 which preferably is in the form of a thin narrow ribbon. The two resistance coils thus formed are connected in series as indicated at 35 at which the wire on one strip is shown crossing over to the other strip. At one of their ends the strips carry terminals 37 which preferably are in the form of ribbons of flexible conductive material leading to the terminals upon which the source of energizing electromotive force is impressed. Conveniently for securing the terminal strips 37 to the strips 31 I may employ the tubular rivets indicated at 39.

For insulating the coils formed by the resistance wire I have herein shown the coils embedded in a laminated sheet of insulating material. To this end I have provided sheets 41 and 43 of mica between which the coils are secured. As shown these sheets are secured together by tubular rivets 45, those at the left hand end of the heating element as viewed in Fig. 9 passing through the ends of the strips 31 so as to secure the latter in position relatively to the sheets. For holding the strips 31 in spaced relation at their right hand ends as viewed in Fig. 16, I have

herein illustrated the strips as passing through slots 47 formed in a sheet 49 of insulating material, as for example mica, which sheet 49 is positioned between the sheets 41—43 as indicated in Figs. 8 and 9, a pair of the rivets 45 passing through the sheet 49 so as to hold it in position relatively to the sheets 41—43. It will be observed that by this construction the strips 31 are fixed to sheets 41—43 only at one of their ends thereby permitting free expansion of the strips.

As herein illustrated the heating element constructed according to Figs. 8 and 9 is held against the boiler shell by means of a plate 51 (Figs. 1, 4 and 7) the body of which is curved to conform approximately to the shape of the shell as is indicated in Fig. 4, and is provided with marginal flanges 53 secured to the frame by means of screws 55 extending through slots 57 (Fig. 7) formed in the marginal flanges.

For holding the resistance element to the plate 51 I have shown one end of said plate as provided with a tab 59 which is bent over the body of the plate so that the end of the heating element may be slipped under it. At that end of the plate 51 opposite the tab 59 I have shown the plate punched out to provide raised portions or tabs 61 (Figs. 7 and 11) which engage the sides of the heating element thereby permitting expansion of the plate relatively to the heating element.

Referring particularly to Figs. 4, 5 and 6 I have herein illustrated the bottom of the portion 9 of the casting as closed by a heat insulating shield which herein comprises the plates 63 carrying a sheet 65 of heat insulating material, as for example a piece of sheet asbestos. As illustrated the plate 61 at opposite edges is bent to form the upstanding marginal walls 67 which extend toward the bottom side walls 23 of the portion 9 of the casting. The marginal walls 67 herein are offset relatively to the edges of the plate 63 to form channels 69 into which the edges of the sheet 65 may be sprung or inserted. At opposite ends the plate 69 is provided with the downturned marginal flanges or walls 71 which are secured to the legs 17 in any suitable manner, as for example by means of screws indicated at 73. For stiffening the plate 73 adjacent opposite sides I have herein shown the plate as pressed to form beads 75 extending the length of the plate.

In the end wall 21 of the portion 9 of the frame I have shown a pair of contact prongs 77 which in practice are inserted in a socket connected by means of a cord and plug to a lamp socket of a house circuit, the prongs as will be understood by those skilled in the art being received in suitable insulating bushings 79 (Fig. 10) for insulating them from each other and from the frame. As herein illustrated one of the terminal strips 37 of the heating element is secured to the inner

end of one of the prongs 77, while the other terminal strip 37 is secured to a stud 81 carried by the end wall 21 of the portion 9 of the frame, the stud 81 being insulated from the wall 21 by means of a third insulating bushing 79 similar to those used in connection with the prongs 77. As shown the stud 81 is placed in communication with the adjacent prong 79 by means of a spring 83 which as illustrated is formed at one end integrally with a head 85 non-rotatably carried by the stud 81. I have shown the end of a spring 83 as carrying at its outer end a link 87 of insulating material, as for example fiber, having a head 89 which extends into the space between a pair of lugs 91 of heat conductive material (Figs. 1 and 5) welded to the boiler shell. The head 89 and lugs 91 are provided with aligned perforations through which, as illustrated, passes a piece of fusible wire 93. The spring 83 is so constructed that it normally tends or is biased to assume its position illustrated by dotted lines in Fig. 5, in which position the circuit through the resistance coils will be interrupted. When in the full line position illustrated by Fig. 5 the circuit is maintained. The lugs 91 are situated below the level of safe water line of the boiler, as for example at the extreme bottom of the boiler, so that when the water is all or nearly evaporated heating of the boiler shell will melt the fusible wire 93 and permit the circuit to be interrupted.

Although I have described for purposes of illustration several specific embodiments of my invention it is to be understood that I am not limited thereby to the particular mechanical details, but that within the scope of my invention wide deviations may be made therefrom without departing from the spirit of my invention.

Claims:

1. A toy steam engine having in combination, a frame having an open top and bottom, a boiler substantially closing the top of said frame, an electrical resistance heating element adjacent the under side of said boiler, and a shield of heat insulating material closing said frame below said heating element.

2. A toy steam engine having in combination, a frame having side and end walls and an open top and bottom, a boiler substantially closing the top of said frame, an electrical resistance heating element adjacent the under side of said boiler, and a shield of heat insulating material closing said frame below said heating element.

3. A toy steam engine having in combination, a frame having an open top and bottom, a boiler substantially closing the top of said frame, an electrical resistance heating element adjacent the under side of said boiler, and a shield comprising a metal plate

carrying heat insulating material closing said frame below said heating element.

4. A toy steam engine having in combination, a frame having side and end walls and an open top and bottom, a boiler substantially closing the top of said frame, an electrical resistance heating element adjacent the under side of said boiler, and a shield comprising a metal plate carrying heat insulating material closing said frame below said heating element.

5. A toy steam engine having in combination, a frame comprising an upper portion with side and end walls and an open top and bottom, legs supporting said upper portion, a boiler substantially closing the top of said frame, an electrical resistance heating element adjacent the under side of said boiler, and a shield of heat insulating material carried by said legs.

6. A toy steam engine having in combination, a frame comprising an upper portion with side and end walls and an open top and bottom, legs supporting said upper portion, a boiler substantially closing the top of said frame, an electrical resistance heating element adjacent the under side of said boiler, a plate carrying heat insulating material secured to said legs below said side walls, and said plate having marginal walls substantially closing the space between said side walls and plate.

7. A toy steam engine having in combination, a frame comprising an upper portion with side and end walls and an open top and bottom, legs supporting said upper portion, a boiler substantially closing the top of said frame, an electrical resistance heating element adjacent the under side of said boiler, a plate carried by said legs below said side walls, an asbestos sheet on said plate and means formed integrally with said plate for securing said sheet thereto.

8. A toy steam engine having in combination, a frame comprising an upper portion with side and end walls and an open top and bottom, legs supporting said upper portion, a boiler substantially closing the top of said frame, an electrical resistance heating element adjacent the under side of said boiler, a plate carried by said legs below said side walls, upwardly extending marginal walls formed integrally with said plate, said marginal walls being offset adjacent said plate to form channels along the margin of said plate, and a sheet of heat insulating material carried by said plate and having opposite edges recessed by said channels.

9. A toy steam engine having in combination, a frame having side walls and an open top and bottom, a boiler substantially closing the top of said frame, an electrical resistance heating unit at the under side of said boiler, a sheet of insulating material substantially closing said frame below said

heating element, supporting means for said sheet comprising a member secured to said frame and having portions forming channels for receiving the edges of said sheet adjacent the sides of said frame.

10. A toy steam engine having in combination, a frame having a top opening, a horizontal boiler carried by said frame with its lower portion inserted in said opening in spaced relation to the longitudinal sides thereof, an electrical resistance heating element at the under side of said boiler, a curved plate carrying said heating element, said plate detachably secured to said frame at opposite sides of said opening, and means securing said boiler to said frame.

In testimony whereof, I have signed my name to this specification.

WILLIAM RITCHIE.

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