Oct. 10, 1950 J. DASENBROCK 2,525,288

TOY PUFFING LOCOMOTIVE APPARATUS

Filed Feb. 25, 1944 2 Sheets-Sheet 1

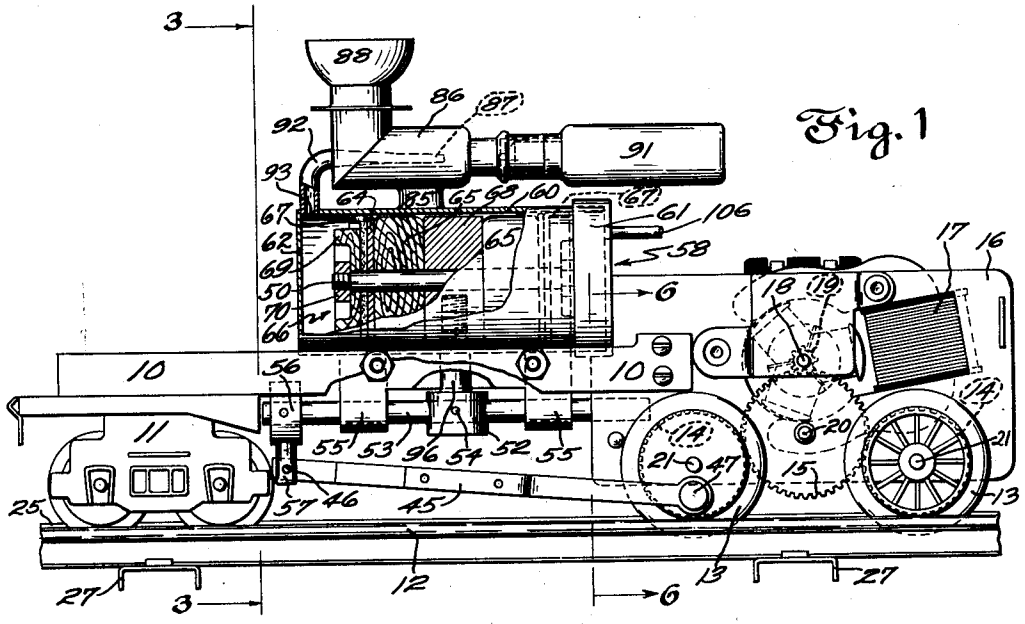


Fig. 1

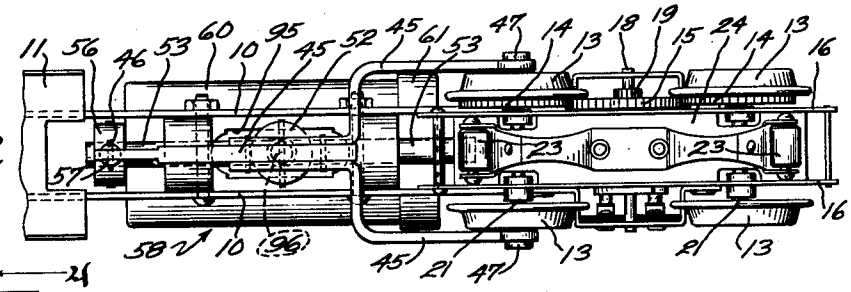


Fig. 2

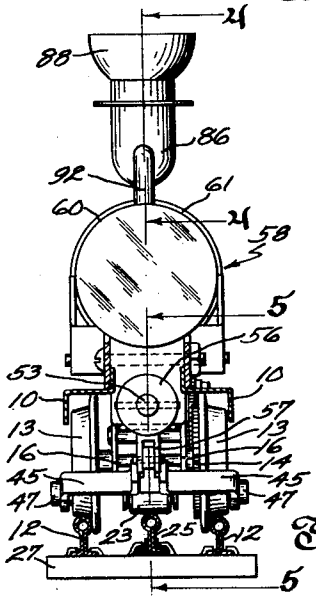


Fig. 3

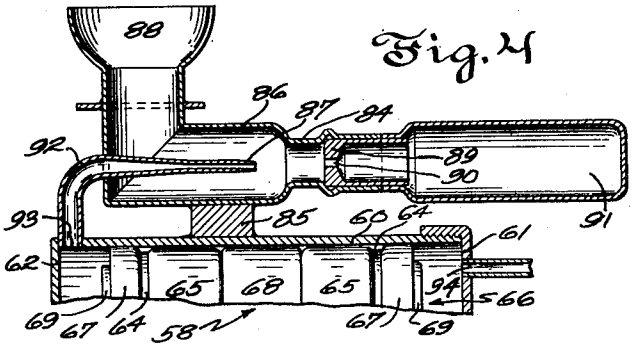


Fig. 4

INVENTOR
John Dasenbrock,
BY
ATTORNEY

Oct. 10, 1950 J. DASENBROCK 2,525,288

TOY PUFFING LOCOMOTIVE APPARATUS

Filed Feb. 25, 1944 2 Sheets-Sheet 2

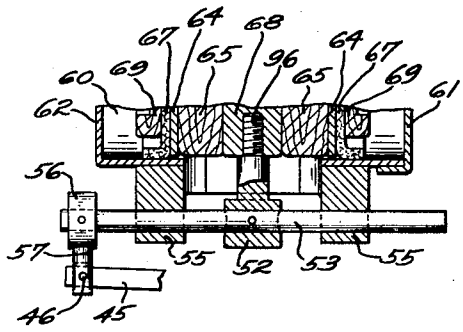


Fig. 5

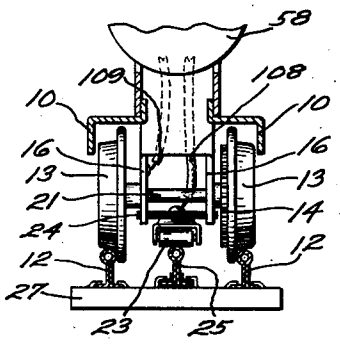


Fig. 6

INVENTOR
John Dasenbrock,
BY
ATTORNEY

Patented Oct. 10, 1950 2,525,288

UNITED STATES PATENT OFFICE

2,525,288

TOY PUFFING LOCOMOTIVE APPARATUS

John Dasenbrock, Poughkeepsie, N. Y., assignor to The A. C. Gilbert Company, New Haven, Conn., a corporation of Maryland

Application February 25, 1944, Serial No. 523,953

9 Claims. (Cl. 46—113)

1

This invention relates to electric toy or model trains and particularly pertains to electrically impelled toy locomotives fashioned in imitation of real steam locomotives and equipped with means for producing audible locomotive puffing effects to simulate the performance of a real steam locomotive. The present improvements further pertain to means for producing such puffing effects in connection with the operation of any toy.

A form of utilization of the invention is described and claimed in my co-pending application, Serial No. 523,952, filed February 25, 1944, now United States Patent No. 2,520,916, issued September 5, 1950.

An object of the present improvements is to project and fluctuate intermittent jets of air in a manner to increase the realism with which the noises produced thereby shall resemble the noises of real locomotive performance or the audible performance of any steam engine.

Another object of the present improvements is so to generate and play a jet of air upon the fixed edge of an orifice or other air flow fluctuating structure that a sibilance of sounds results which varies realistically when the pump operation is speeded up or slowed down.

These and other objectives will become clearer in connection with the following description of a preferred embodiment of the invention in which reference is had to the accompanying sheet of drawings wherein:

Fig. 1 shows in side elevation a toy locomotive incorporating the present improvements standing on a section of toy railroad track, its carried apparatus being in part broken away or shown in section to expose some of the interior construction.

Fig. 2 is a bottom plan view of the toy locomotive shown in Fig. 1.

Fig. 3 is an endwise view taken in section on the plane 3—3 in Fig. 1 looking in the direction of the arrows.

Fig. 4 is an enlarged fragmentary view of parts of the sound making apparatus taken in section on the plane 4—4 in Fig. 3 looking in the direction of the arrows.

Fig. 5 is a fragmentary view taken in section on the vertical plane 5—5 in Fig. 3.

Fig. 6 is a fragmentary view taken in section on the vertical plane 6—6 in Fig. 1.

As the present improvements concern principally the working apparatus carried by the locomotive for producing sound effects, it will suffice to describe the wheeled chassis of the locomotive

2

as composed of a frame 10 pivotally supported in part by a front wheel truck 11 and impelled along track rails 12 by the driving wheels 13 whose axles 21 are journaled in a fixed tractional power unit. Spur gears 14 are fixed on wheels 13, respectively, and are in mesh with a common power gear 15 whose shaft 20 is journaled in the side plates 16 of the said power unit whose electric motor 17 has an armature shaft 18 fixedly carrying a pinion 19 meshing with gear 15 for impelling the locomotive.

In the usual manner a current collector is employed, herein shown in the form of conductive rollers 23 resiliently mounted by means of conductive leaf springs on a bed plate 24 of insulative material carried by side plates 16 so that rollers 23 ride in conductive contact with the third or power rail 25. This rail is supported between track rails 12 upon toy sleepers 27 or other form of toy track bed structure and is shown to be insulated therefrom in conventional manner.

The sounder pump 58 as a means to force a flow of intermittent streams of air is composed of a horizontal cylinder 60 firmly supported on chassis frame 10 having a rear end cap 61 and a front end wall 62 serving to close cylinder 60 fluid tight except for an orifice 93 leading out of the top wall at the front end thereof and an orifice 94 in the flat wall of the cylinder cap 61. There is also an elongated cutaway 95 in the bottom wall of cylinder 60 which accommodates back and forth movements of a piston impelling spur stud 96 whose upper end is in rigid threaded engagement with the central piston block 68 to whose front and rear faces there are clamped like sets of parts forming in effect a single composite piston structure 66.

Each of the said sets of piston parts includes a spacer block 65 and face washer 64 against which is firmly clamped the central web of a flexible hat leather 67 by means of a retaining disc 69 held by nut 70. Each of nuts 70 has threaded engagement with opposite ends respectively of a tie rod 50.

The bottom end of piston impelling spur stud 96 has an enlarged head 52 transversely bored to snugly fit and receive a slide shaft 53 made fast to the studhead 52 by a pin 54. Shaft 53 is provided with slide bearings in two lugs 55 fixedly depending from chassis frame 10 and is reciprocated in lengthwise strokes through means of a collar 56 fixedly pinned on the front end of shaft 53 and fixedly carrying a depending stud 57. This stud is slotted and pivotally connected to pitman link 45 by a hinge pin 46. The opposite end of

link 45 is bifurcate and the branch arms thereof are coupled pivotally to two of the driving wheels 13 at 47 on each side of the locomotive.

For fluctuating intermittent jets of air pumped by piston 66 to produce sounds imitative of the puffing of a real steam locomotive, pump cylinder 60 carries externally mounted thereon by means of support 85 a horizontally elongated jet chamber 86 comprising one tubular portion of an elbow-shaped hollow structure the front end of which terminates in an upward directed communicating tubular portion opening to ambient air at the flaring funnel 88. The rear end of jet chamber 86 is fixedly plugged by a bushing 89 containing an air fluctuating or sounding orifice 90. Removably sleeving onto the projecting rear end of bushing 89 in air tight relation thereton there is a totally closed horizontal tubular cap or cover 91 for orifice 90 which affords a resonance chamber. The girth of an elongated portion of the jet chamber is reduced at 84.

For leading air from the sounder pump 58 and projecting it into sound producing relation to orifice 90 an L-shaped tubular nozzle 92 has its air receiving end tapped into the sound pump cylinder 60 at opening 93 and has a vent in its discharge end 87 and is tapered and directed toward the edge or lip of orifice 90 within the jet chamber 86 through the reduced portion 84 of the latter. The vent through nozzle end 87 may measure in the neighborhood of $\frac{1}{32}$'' across while orifice 90 may be about $\frac{1}{16}$'' in diameter. The passageway for streams of air through nozzle 92 progressively decreases in passage area to a minimum size at the said vent. This causes streams of air to be accelerated within the nozzle and produces jets of air from the vent which are of minimized flare and which therefore strike with augmented force that is concentrated in the immediate vicinity of sounding orifice 20.

Electrical connections, not fully shown, are partly indicated by insulated electric wires 108, 109 in Fig. 6 the former of which wires leads current from one electrical terminal of motor 17 to the current collector 23 which rolls on power rail 25 and the latter of which wires serves to "ground" the opposite electric terminal of motor 17 to the locomotive frame 10 whence through wheels 13 circuit from power rail 25 is completed through track rail 12.

In Fig. 1, the conduit 106 may lead to and furnish pneumatic pressure or suction for operating any sort of toy train equipment such as whistles, animated figures, bell ringers, uncouplers, smoke effects and the like.

In the operation of the apparatus disclosed in Figs. 1 to 6, inclusive, it will be understood that whenever motor 17 drives the wheels 13 to impel the locomotive along track 12 pitman link 45 is actuated by wheel 13 to reciprocate slide rod 53 longitudinally in its bearings 55 which rod through its stud 96 correspondingly reciprocates the double faced piston 66 in pump cylinder 60. At each stroke of this piston toward the left in Figs. 1 and 4 a stream of air is forced out of cylinder 60 through the elbow nozzle 92 and ejected as a jet of air issuing from the vent in nozzle end 87 which jet of air is directed toward and plays against the lip of orifice 90 in a manner to cause a fricative or puffing noise which sibilance varies according to the forcefulness with which the jet of air is ejected from the nozzle. The characteristics of the sound produced are also affected by reactance of the body of air confined in resonance chamber 91 so that there issues upward out of the jet chamber through its open funnel-shaped top 88 successive sounds occurring at each stroke of piston 66 toward the left. These sounds realistically simulate the puffing noise made by the escape of steam from the power cylinder discharged into the stack of a real locomotive to improve combustion draft. At each stroke of piston 66 air is free to enter or leave the cylinder 60 at the right face of this piston through aperture 94. This avoids loading the pump with the burden of any pneumatic work other than making the puffing noise, unless it be desired to make use of the alternate intake and outflow of air through conduit 106 to produce some other operating effects in the toy locomotive.

Modifications will be suggested by the disclosure hereof to those skilled in the art, wherefore the appended claims are intended to cover all equivalents of structure and arrangement hereing disclosed which come fairly within their terms.

I claim:

1. In apparatus for producing fricative noises simulating the puffing sounds of a steam engine, the combination of, a source of compressed air, a resonance chamber formed by walls pocketing a chamber-contained body of air and containing a sound orifice giving said body of air limited exposure to the interior of said chamber, a conduit extending from said source of compressed air including a tubular nozzle having a vent outside of said resonance box spaced away from said sound orifice, said nozzle pointing toward said orifice, and containing a passageway decreasing in passage area progressively toward said vent along its tubular length.

2. In apparatus adapted to be incorporated within a toy locomotive for producing fricative noises simulating steam puffing sounds, the combination with means to force a flow of air in intermittent streams of, a resonance chamber having a sounding orifice, and a tubular nozzle outside of said chamber pointing at said sounding orifice and having a terminal discharge vent spaced therefrom for projecting jets of air against said orifice toward the interior of said chamber, said nozzle containing an elongated passageway connected to receive and lead said streams of air to said vent progressively decreasing in passage area toward said vent whereby said streams of air are accelerated within said nozzle and said jets of air are projected with minimized flare thereby to strike with augmented force concentrated in the immediate vicinity of said sounding orifice.

3. In apparatus adapted to be incorporated within a toy locomotive for producing fricative noises simulating steam puffing sounds, the combination with means to force a flow of air in intermittent streams of, a resonance chamber having a sounding orifice, and a tubular nozzle outside of said chamber pointing at said sounding orifice and having a terminal discharge vent spaced therefrom for projecting jets of air against said orifice toward the interior of said chamber, said nozzle containing an elongated passageway connected to receive and lead said streams of air to said vent progressively decreasing in passage area toward said vent whereby said streams of air are accelerated within said nozzle and said jets of air are projected with minimized flare thereby to strike with augmented force concentrated in the immediate vicinity of said sounding orifice, together with a hollow structure forming a jet chamber arranged to house the said nozzle vent and opening freely to ambient air said chamber being of sufficiently

large girth to produce more space between the said tubular nozzle and said hollow structure than exists within the said passageway of the nozzle.

4. In apparatus adapted to be incorporated within a toy locomotive for producing fricative noises simulating steam puffing sounds, the combination with means to force a flow of air in intermittent streams of, a resonance chamber having a sounding orifice, and a tubular nozzle outside of said chamber pointing at said sounding orifice and having a terminal discharge vent spaced therefrom for projecting jets of air against said orifice toward the interior of said chamber, said nozzle containing an elongated passageway connected to receive and lead said streams of air to said vent progressively decreasing in passage area toward said vent whereby said streams of air are accelerated within said nozzle and said jets of air are projected with minimized flare thereby to strike with augmented force concentrated in the immediate vicinity of said sounding orifice, together with a hollow structure forming a jet chamber arranged to house the said nozzle vent and elongated in the close neighborhood of said vent in the direction in which said jets of air are projected by said nozzle, said chamber opening freely to ambient air at a point remote from said vent.

5. In apparatus adapted to be incorporated within a toy locomotive for producing fricative noises simulating steam puffing sounds, the combination with means to force a flow of air in intermittent streams of, a resonance chamber having a sounding orifice, and a tubular nozzle outside of said chamber pointing at said sounding orifice and having a terminal discharge vent spaced therefrom for projecting jets of air against said orifice toward the interior of said chamber, said nozzle containing an elongated passageway connected to receive and lead said streams of air to said vent progressively decreasing in passage area toward said vent whereby said streams of air are accelerated within said nozzle and said jets of air are projected with minimized flare thereby to strike with augmented force concentrated in the immediate vicinity of said sounding orifice, together with a hollow structure forming a jet chamber arranged to house the said nozzle vent, said chamber being elongated and reduced in girth in a portion relatively closely surrounding the said jets of air and opening freely to ambient air at a point relatively remote from said portion of reduced girth.

6. In apparatus adapted to be incorporated within a toy locomotive for producing fricative noises simulating steam puffing sounds, the combination with means to force a flow of air in intermittent streams of, a resonance chamber having a sounding orifice, and a tubular nozzle outside of said chamber pointing at said sounding orifice and having a terminal discharge vent spaced therefrom for projecting jets of air against said orifice toward the interior of said chamber, said nozzle containing an elongated passageway connected to receive and lead said streams of air to said vent progressively decreasing in passage area toward said vent whereby said streams of air are accelerated within said nozzle and said jets of air are projected with minimized flare thereby to strike with augmented force concentrated in the immediate vicinity of said sounding orifice, together with a hollow structure of plain elbow shape having only two branches, one of said branches forming a jet chamber arranged to house the said nozzle vent, and another of said branches being disposed at an angle to and joined to the first said branch and opening freely to ambient air.

7. In apparatus adapted to be incorporated within a toy locomotive for producing fricative noises simulating steam puffing sounds, the combination with means to force a flow of air in intermittent streams of, a resonance chamber having a sounding orifice, and a tubular nozzle outside of said chamber pointing at said sounding orifice and having a terminal discharge vent spaced therefrom for projecting jets of air against said orifice toward the interior of said chamber, said nozzle containing an elongated passageway connected to receive and lead said streams of air to said vent progressively decreasing in passage area toward said vent whereby said streams of air are accelerated within said nozzle and said jets of air are projected with minimized flare thereby to strike with augmented force concentrated in the immediate vicinity of said sounding orifice, together with a hollow structure forming a jet chamber arranged to house the said nozzle vent and joined in fluid tight relation to said resonance chamber.

8. In apparatus adapted to be incorporated within a toy locomotive for producing fricative noises simulating steam puffing sounds, the combination with means to force a flow of air in intermittent streams of, a resonance chamber having a sounding orifice, and a tubular nozzle outside of said chamber pointing at said sounding orifice and having a terminal discharge vent spaced therefrom for projecting jets of air against said orifice toward the interior of said chamber, said nozzle containing an elongated passageway connected to receive and lead said streams of air to said vent progressively decreasing in passage area toward said vent whereby said streams of air are accelerated within said nozzle and said jets of air are projected with minimized flare thereby to strike with augmented force concentrated in the immediate vicinity of said sounding orifice, together with a hollow structure forming a jet chamber arranged to house the said nozzle vent and reduced in girth in a portion relatively closely surrounding the said jets of air projected from said nozzle, said structure being joined in fluid tight relation to the said resonance chamber in the former's said portion of reduced girth.

9. In apparatus adapted to be incorporated within a toy locomotive for producing fricative noises simulating steam puffing sounds, the combination with means to force a flow of intermittent streams of air of, an elongated structure having a first tubular portion forming a jet chamber and having a communicating tubular portion open to ambient air, a plug filling and projecting from one end of said jet chamber containing a sounding orifice, a hollow closure cover for said orifice having a tubular end joining the outwardly projecting end of said plug in air-tight relation thereto in a manner to form a resonance chamber, a tubular nozzle in said jet chamber pointing at said sounding orifice and having a terminal discharge vent spaced therefrom for projecting jets of air against said orifice toward the interior of said resonance chamber, said nozzle containing an elongated passageway connected to receive and lead said streams of air to said vent and progressively decreasing in passage area toward said vent, whereby said streams of air are accelerated

within said nozzle and said jets of air are projected with minimized flare thereby to strike against said plug with augmented force concentrated in the immediate vicinity of said sounding orifice.

JOHN DASENBROCK.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
396,295	Schofield	Jan. 15, 1889
998,488	Ferguson	July 18, 1911
1,748,460	Petrie	Feb. 25, 1930
2,158,537	Garratt	May 16, 1939
2,317,974	Bastiansen	May 4, 1943
2,461,664	Smith	Feb. 15, 1949

FOREIGN PATENTS

Number	Country	Date
203,569	Great Britain	Sept. 13, 1923
485,566	Great Britain	May 17, 1938

Certificate of Correction

Patent No. 2,525,288 October 10, 1950

JOHN DASENBROCK

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows:

Column 4, line 28, for the word "interior" read *exterior*;

and that the said Letters Patent should be read as corrected above, so that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 26th day of December, A. D. 1950.

[SEAL]

THOMAS F. MURPHY,
Assistant Commissioner of Patents.