

(No Model.)

2 Sheets—Sheet 1.

J. G. A. KITCHEN.
FLUID PRESSURE BRAKE.

No. 579,272.

Patented Mar. 23, 1897.

FIG. 1.

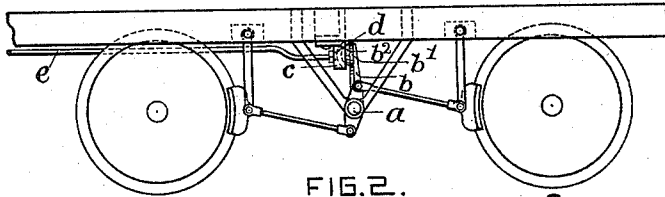


FIG. 2.

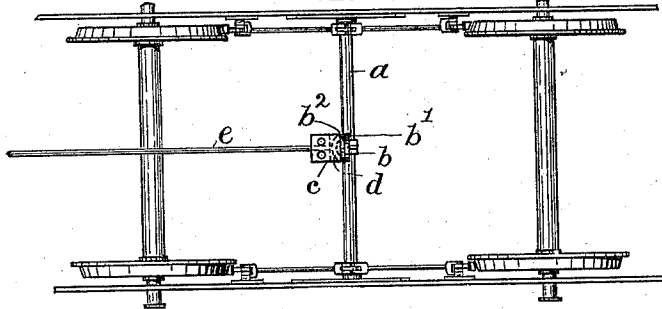


FIG. 3.

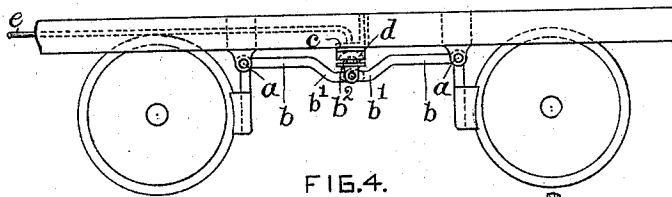
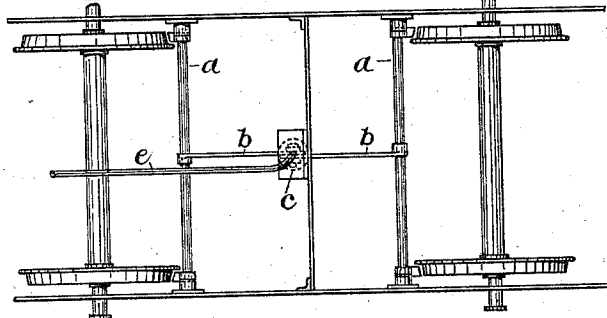


FIG. 4.



Witnesses

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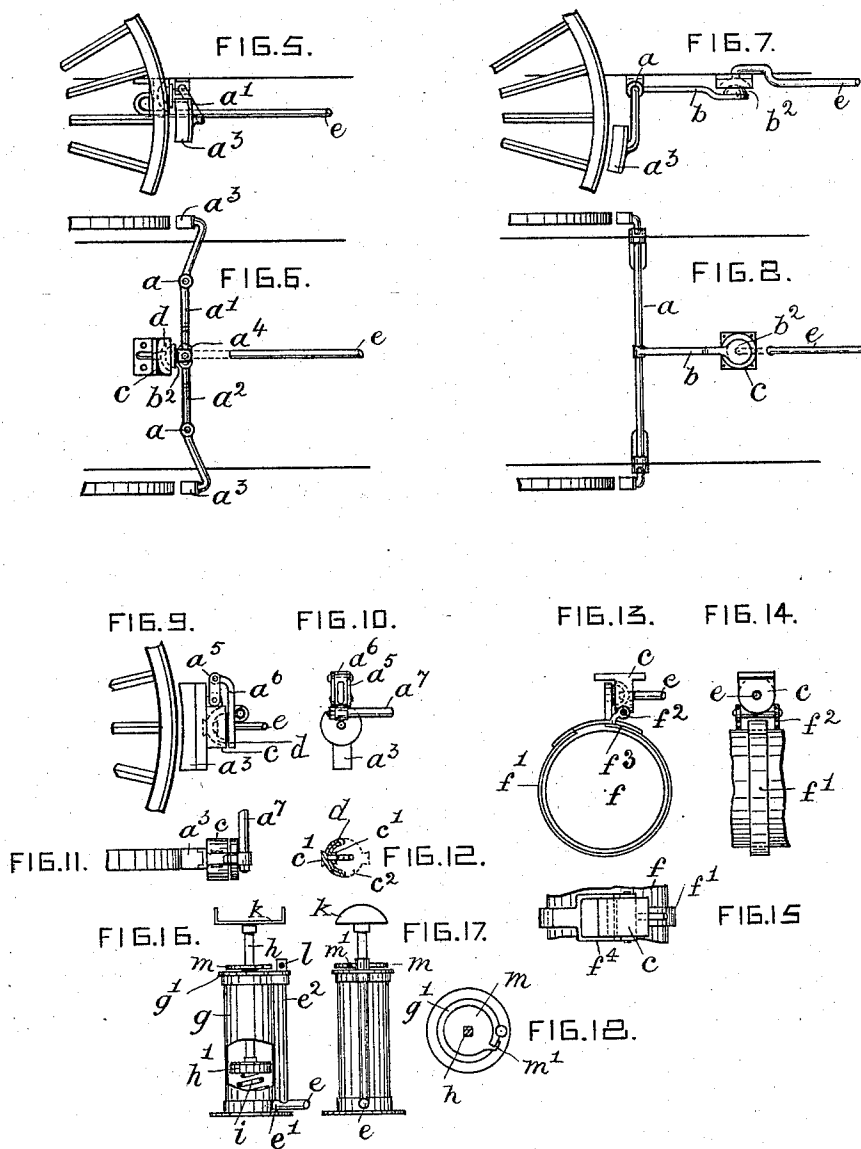
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2 Sheets—Sheet 2.

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UNITED STATES PATENT OFFICE.

JOHN GEORGE AULSEBROOK KITCHEN, OF MANCHESTER, ENGLAND.

FLUID-PRESSURE BRAKE.

SPECIFICATION forming part of Letters Patent No. 579,272, dated March 23, 1897.

Application filed December 4, 1895. Serial No. 571,029. (No model.)

To all whom it may concern:

Be it known that I, JOHN GEORGE AULSEBROOK KITCHEN, a subject of the Queen of Great Britain, and a resident of Manchester, in the county of Lancaster, England, have invented certain new and useful Improvements in Fluid-Pressure Brakes, of which the following is a specification.

This invention relates to wheel-brakes applied by fluid-pressure produced by hand and foot power; and it consists in the improved application of means for using fluid-pressure and in the particular constructions of parts of the brake apparatus, by which improvements fluid-pressure brakes are rendered suitable and more effective than ordinary hand and foot applied lever-brakes in application to road-vehicles and in other cases where hand or foot power brakes are required.

In fluid-pressure wheel-brakes operated by hand, and for which I obtained Letters Patent in the United States, No. 530,693, and dated December 11, 1894, improvements in brake apparatus for cycles and other road-vehicles, I proposed to use a flexible shoe or brake-block having a face of metal or other hard substance, such flexible shoe or brake-block being capable of distention in the direction of the tire or other part of the wheel from its normal position and state by forcing a fluid—air in some cases—into a cavity formed in the flexible shoe or block by means of a pump worked by the hand of the operator.

In place of using a distensible shoe or brake-block, according to this invention I so apply a distensible chamber or body that it acts upon the brake block or shoe through lever brake apparatus of ordinary or modified ordinary construction or design and forces the shoe against the wheel or its equivalent when fluid-pressure is applied to the distensible chamber or body.

In some cases I propose to so dispose the distensible body that it shall act directly upon the brake block or shoe, a carrier in each case supporting the distensible body and which may form a thrust piece or bearing.

The distensible body I connect, by means of a pipe, with a pump or forcing arrangement which is designed to be worked by the

hand in some cases and by the foot in other cases.

In a convenient position, so as to be readily worked by the operator and in the line of communication between the distensible body or its equivalent, I arrange a back-pressure valve or automatic non-return valve, which is so constructed that it will release the back pressure in the brake-pipe at the will of the operator.

It is preferable to use atmospheric air for applying the brake; but a liquid, such as water, may be used with advantage in some cases.

In the drawings attached to this specification several constructive arrangements of brake apparatus in which the power is applied to such brakes or brake apparatus by means of a distensible chamber or body charged with a fluid under pressure are illustrated. Only the parts necessary to illustrate the practical application of my improvements are shown, and it is obvious that the particular construction of the parts illustrating my improvements and the manner of application of such parts to brake apparatus of any known construction may be varied without departing from my invention.

Referring to the drawings, Figure 1 represents a side view, and Fig. 2 a plan looking from above the under frame, of a lever brake apparatus to which my improvements are applied. Figs. 3 and 4 represent also similar views of another form or arrangement of lever brake apparatus with my improvements applied. The vehicle illustrated is one adapted to run on rails, to which such arrangements of brake apparatus are particularly applicable. Fig. 5 represents a side view, and Fig. 6 a plan looking from the under side of my improved brake apparatus applied to the rear wheels of a common road-vehicle; and Figs. 7 and 8, similar views of a modified arrangement so applied. Figs. 9, 10, and 11 represent several views of my improved brake apparatus of modified construction in which the distensible body or chamber is applied directly to the brake block or shoe. Fig. 12 represents a section view of one form of distensible chamber or body which I may use. Figs. 13, 14, and 15 represent three different

views of my improvements applied to band-brakes; Figs. 16, 17, and 18, also different views of the forcing apparatus or pump which I prefer to use for producing the pressure. It will be seen that for simplicity's sake the forcing apparatus is shown in separate views instead of in each view showing the other part of the brake apparatus.

Referring first to Figs. 1 to 4, in which are illustrated well-known designs of brake apparatus modified so as to make my invention applicable to them, to the rocking shaft or its equivalent a is fixed an arm or arms b , the end or ends b' of which is or are fixed or connected to a circular plate or plug b^2 in the position shown in the several figures. This circular plate may be of any suitable form according to the form of distensible body, but is hereinafter shown having a hemispherical face in conjunction with a spherical distensible body. Opposite the face b^2 is fixed to the under frame or body of the vehicle a cup or shell c of corresponding shape, but somewhat larger, and in the cavity of the cup or shell c is fixed the distensible body or chamber d , (indicated by dotted lines.) A pipe e , communicating between the expansible body d and the forcing apparatus illustrated in Figs. 16, 17, and 18, are hereinafter described.

In Figs. 5 and 6 my improvements are shown applied to another lever arrangement of brake apparatus in which the levers a' a^2 , carrying the brake blocks or shoes a^3 , are hinged upon the pivots a . The ball-faced plug b^2 is connected to and carried by the ends a^4 of the levers a' a^2 . The cup or shell c , carrying the distensible chamber d , is fixed in position opposite the plug b^2 to the body or frame of the vehicle.

In Figs. 7 and 8 the brake apparatus is similar in construction to that illustrated in Figs. 3 and 4, but is shown applied only to the two rear wheels, say, of a common road-vehicle. The angle of the arm b may be varied from the horizontal (shown in Figs. 7 and 8) to suit the form of body or under frame of vehicle to which in each case it may be applied.

Referring now to Figs. 9, 10, and 11, which represent three different views of a modified application of my improvements, in which the brake shoe or block a^3 is formed with the cup c and suspended or supported by links a^5 from the carrier a^6 , which latter is fixed to the body of the vehicle by, say, the bar a^7 . The ball-faced plug c is also formed or fixed to the carrier a^6 . The expansible body or chamber d , which is fixed in the cup c and indicated by dotted lines, is also shown in section in Fig. 12 in its normal or collapsed state. Its opposite faces are preferably formed with dove-tailed projections c' , which fit into cavities in the cup and plug and thereby retain it in position. When the distensible body d is expanded by fluid-pressure, it tends to assume the spherical form indicated by the dotted lines c^2 . I do not confine myself to this par-

ticular form or construction of distensible chamber, as it is obvious that its equivalent may be constructed in different forms.

Figs. 13, 14, and 15 illustrate in three views one form of application of my improvements to band-brakes. The cup c or its equivalent is a fixture to the body or frame of the vehicle. Upon the drum, hub, or other rotating part f is arranged a band f' , one end f^2 of which is jointed, preferably, to the cup c . The other end f^3 of the band f' is fixed to or formed with the ball-faced plug b^2 and arranged in the position shown, the ends f^2 f^3 of the bands crossing by means of the forked formation f^4 of the band f' . I may also vary the particular construction of the band-brake apparatus illustrated, provided the distensible body acts directly upon the band. It is obvious also that the positions of the cup or shell and the ball-faced plug illustrated in the several views of the drawings may be reversed with equal effect, so that the cup may be formed upon the end of the lever-arm or part moving with the brake shoe or block and the ball-faced plug be fixed to the body or frame of the vehicle.

Figs. 16, 17, and 18 illustrate in three views the forcing apparatus which I prefer to employ. This consists of a cylindrical pump-cylinder g , having a preferably square or angular section piston-rod h and a cupped piston h' . Beneath the piston is disposed a coiled spring l' , and the head of the piston-rod is disposed a coiled spring l' , and the head of the piston-rod is formed with a foot-plate k , preferably of the form illustrated. The brake-pipe e leads into the cylinder at e' and has a branch pipe e^2 , leading to a release-valve l . To open the release-valve l , a disk or its equivalent m , having a finger m' , is arranged upon the cylinder end g' in such a manner that by turning or twisting the foot-plate k and piston-rod the disk m turns with it and the finger m' comes in contact with the valve and opens it, thereby releasing the pressure in the brake-pipe e . I may use any suitable valve for this purpose and may modify the means for opening the valve by the turning of the piston-rod. The disk m may be prevented from rising and falling with the piston-rod in any convenient way. In cases where it is desirable to work the pump or forcing apparatus by hand the foot-plate k is replaced by a handle of any suitable form.

I am aware that heretofore distensible and contractible chambers have been proposed for brakes and consisting substantially of metal parts and membranes stretched over them and held by clamp-rings bolted to the metal parts, and therefore I do not claim, broadly, such a construction, but a different construction, as hereinafter set forth in the claims.

I claim—

1. The combination with a vehicle of a distensible and contractible chamber formed en-

tirely of rubber, and fixed to a carrier attached to the vehicle, a pump operated by the foot in one direction and by a spring in the other direction, a pipe connecting said chamber and pump and provided with a release-valve; a metal disk fixed to the free side of said chamber and bearing against the end of a lever and a brake operated by the movement of said lever.

10 2. The combination with a vehicle and a brake thereon of a distensible and contractible chamber formed entirely of rubber, and fixed to said vehicle and operating said brake by its distention and contraction, a pump

operated by human power and having an angular piston-rod, a plate revolubly connected to the said pump and embracing said piston-rod, a pipe connecting said pump and chamber and a release-valve fitted to said pipe and operated by turning the piston-rod and plate. 15 20

In testimony whereof I have hereunto set my signature in the presence of two witnesses.

JOHN GEORGE AULSEBROOK KITCHEN.

Witnesses:

CARL BOLLÉ,

R. J. URQUHART.