

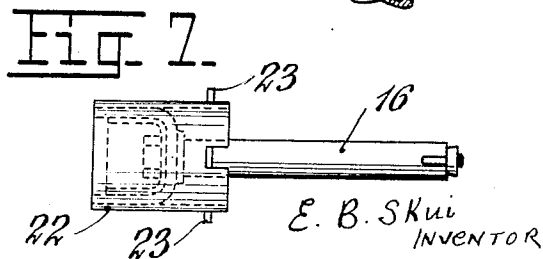
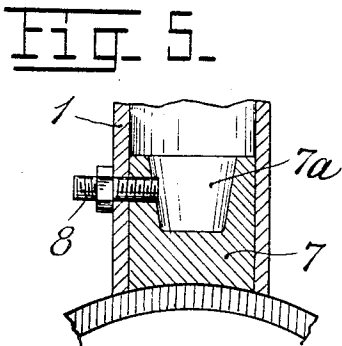
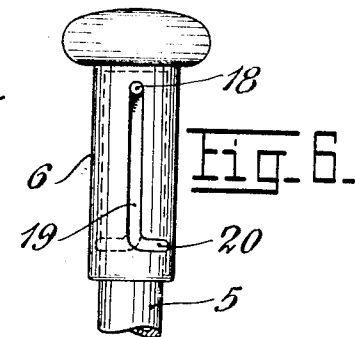
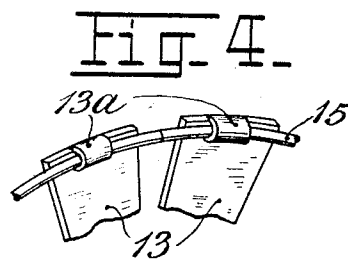
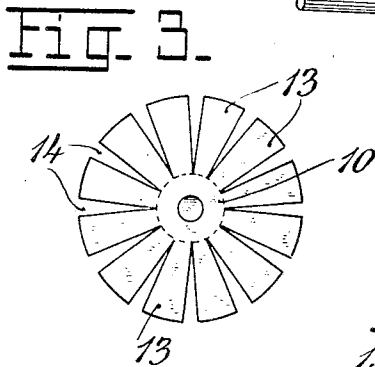
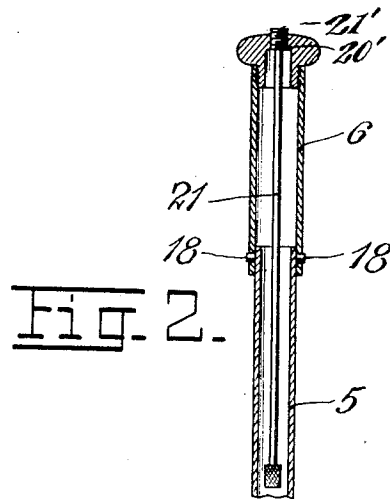
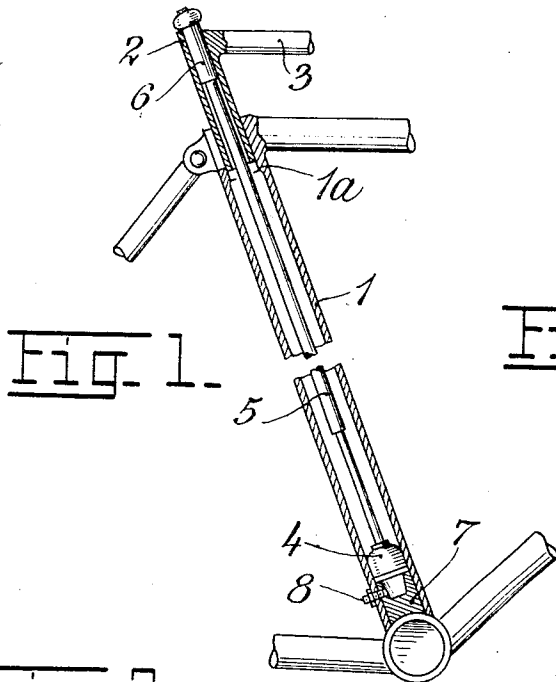
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AIR PUMP

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AIR PUMP

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7 Claims. (Cl. 208—155)

The present invention relates to improvements in air-pumps of the type which are arranged in a frame tube of cycles or other vehicles provided with pneumatic tires, where the tube in question is closed at one end and serves as a pump barrel in which reciprocates a piston rod having a bell-shaped elastic piston therein, which is provided with internal means, operable to expand the piston tightly against the inner surface of the barrel.

The invention also comprises special arrangements of the other parts of the pump, enabling the same to be adapted in already existing frame tubes and in such manner that the pump may be easily mounted, may be adapted for tubes of different lengths and so that the pump is effective in use.

The invention is by way of example illustrated in the accompanying drawing in which:

Fig. 1 shows the pump arranged in a frame tube of a bicycle.

Fig. 2 shows a transverse section through the piston and the rod secured thereto.

Fig. 3 shows a spring arrangement for the piston in extended condition.

Fig. 4 shows a detail arrangement.

Fig. 5 shows in section the bottom plug of the pump barrel.

Fig. 6 is a side view of a modification of the pump handle.

Fig. 7 is a side view of an arrangement for the mounting.

In the drawing 1 is a frame tube of a bicycle, which tube at its top end is provided with a strengthening interior 1a. 2 is the seat pin carrying a member 3 to which the seat is secured. A pump piston 4, secured to the lower end of a piston rod 5 is introduced into the tube 1 through the interior 1a. The piston rod is at its top provided with a handle 6 adapted to be adjusted longitudinally in relation to the piston rod. Said handle will be more fully described below. The bottom end of the tube 1 is closed by a plug 7 of elastic material, for instance, rubber, which forms the bottom of the pump barrel formed by the tube 1. As shown in Fig. 5 the plug is at its top provided with a recess 7a, the walls of which diverge upwardly, so that the top edge portions of the plug are relatively thin. By this arrangement the compressed air in the pump barrel during the pumping will press the walls of the plug outwardly against the tube and increase the tightening effect as the compression increases. A nipple 8 is screwed into the tube 1 for connection with the pump hose, and said nipple opens into

the recess 7a, so that it retains the plug without preventing the piston from being displaced fully down to the plug.

The bell-shaped piston packing 11 (Fig. 2) is retained between two plates 9 and 10 on a bolt 12, and is pressed against the barrel walls by means of a suitable spring device, which latter may consist of springy fingers 13 connected to the disc 10. As shown in Fig. 3 the disc 10 and the fingers 13 may be integrally formed from a circular piece of spring steel or the like of suitable elasticity, by providing the same with a central hole for the bolt 12 and cutting away a series of wedge-shaped portions 14 so that the fingers or arms 13 are formed.

If desired the spring action of the fingers 13 may be increased by connecting their other ends, for instance, by means of bent-over portions 13a, to a split spring ring 15 (Fig. 4).

The tube-shaped piston rod 5 is as illustrated in Fig. 2 divided into two parts of which the shorter lower part 16 may be telescopically displaced in the upper one, so that the length of the piston rod may be adjusted to fit tubes of different lengths. When the correct length of the rod has been adjusted the two tube parts are secured to each other by means of the arrangement illustrated at the drawing, Fig. 2. The tube part 16, the lower end of which rests against the disc 9, is at its upper end slotted and receives a conical nut 17 into which the end of the bolt 12 is screwed. By tightening the bolt 12 the slotted end of the tube 16 is expanded and is thereby secured in the tube 5.

The top end of the piston rod 5 is as above mentioned provided with a handle 6, and in order to obtain a sufficiently long piston stroke after the handle has been moved free of the seat pin 2, the handle is arranged slidable in relation to the tube 5. For this purpose the handle may be hollow and telescopically displaceable on the top end part of the tube 5. Said end part is provided preferably with two diametrically opposed pins 18 which extend into slots 19 in the handle 6. At the lower end each slot 19 is provided with an angularly directed slot 20, into which the pins 18 may be caused to pass by turning the handle, and thereby lock the handle from displacement longitudinally in relation to the tube 5 during the pumping. Instead of the just described arrangement any other suitable locking device may be used.

The top end of the handle 6 has a threaded opening 20' through which the pump hose 21 may be introduced into the hollow piston rod 5

when not in use. The end of the hose may be secured to the handle by means of a threaded head 21' which engages in the opening 20'.

In Fig. 7 is illustrated an arrangement for mounting of the pump, that is for insertion of the piston with its spring device through the interior 1a of the tube. The piston 4 is first introduced into a sleeve 22 of thin metal plate, the outer diameter of which is so chosen, that it may be passed down into the interior 1a. At its top the sleeve 22 is provided with bent over flaps 23 which engages the top of the barrel 1 and holds the sleeve 22 from moving into the barrel as the piston is pressed downwardly therein. It is obvious that as soon as the piston passes from the sleeve 22 it will expand and the sleeve can then be lifted from the barrel.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed I declare that what I claim is:

1. An air-pump comprising a vehicle frame tube open at its upper end, the other end of which tube is closed by a plug and provided with a discharge-orifice, an extensible piston rod, a bell-shaped piston attached to said rod and resilient means for expanding said piston against the inner surface of said tube.

2. An air-pump according to claim 1, in which the bell-shaped piston is secured between two discs, one of which is provided with radial springy fingers.

3. An air-pump according to claim 1, in which

the bell-shaped piston is secured between two discs, one of which is provided with radial springy fingers, said fingers being loosely connected to a ring-shaped spring, which increases the expansion of the piston.

4. An air-pump according to claim 1, in which the piston rod consists of inner and outer telescopically connected tubes, the piston being arranged at the free end of the inner tube and is secured thereto by means of a bolt screwed into a conical nut inserted in the other slotted end of said inner tube, so that tightening of the bolt expands the slotted end of the tube and thereby secures the same in the outer tube.

5. An air-pump according to claim 1, in which the piston prior to its mounting is inserted in a sleeve fitting into the narrowest part of the pump barrel, which sleeve is provided with abutments preventing the same from passing into the barrel when the piston is forced thereinto.

6. An air-pump according to claim 1, in which the piston rod is provided with a handle normally engaged therewith for adjustment in a longitudinal direction of the piston rod.

7. An air-pump according to claim 1 in which one end of the frame tube is closed by an elastic plug which in its top portion has a recess the thickness of the encircling walls of which decrease towards the top, the hose nipple of the pump communicating with said recess through an opening in the plug.

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