

No. 897,121.

PATENTED AUG. 25, 1908.

C. I. MATSON.  
AMUSEMENT APPARATUS.  
APPLICATION FILED OCT. 30, 1907.

Fig. 1.

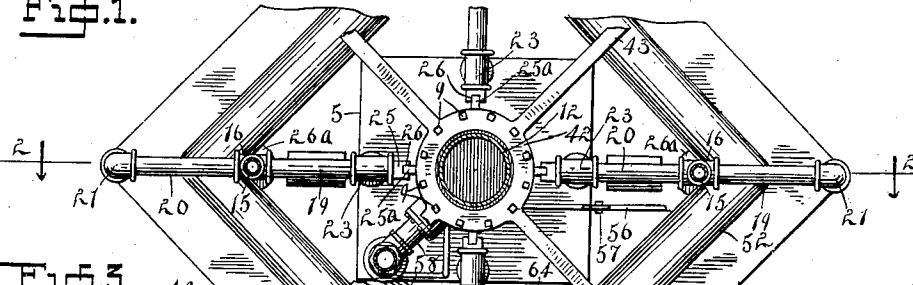


Fig. 3.

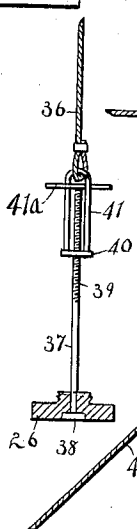


Fig. 4.

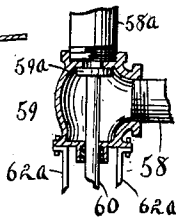
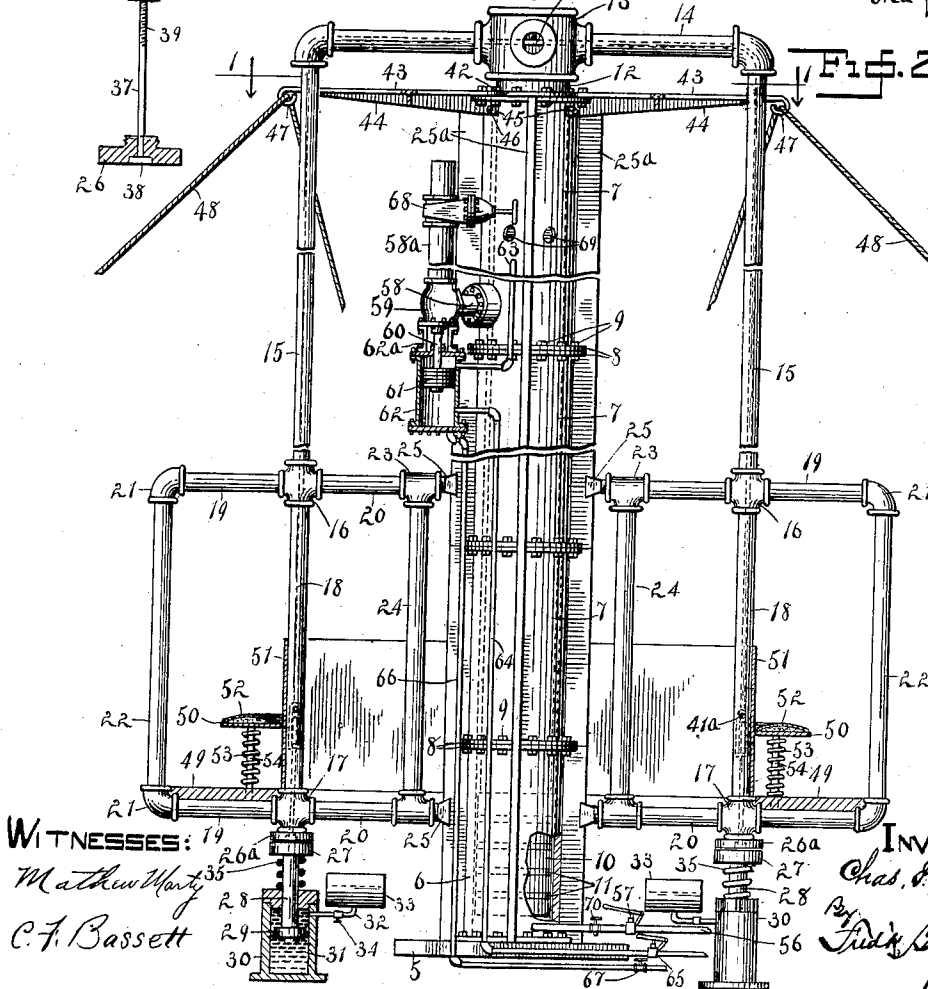


Fig. 2.



WITNESSES:

Matthew W. Hart  
C. F. Bassett

INVENTOR

Chas. I. Matson  
By Fred L. Benjamin  
ATTY.

# UNITED STATES PATENT OFFICE.

CHARLES I. MATSON, OF CHICAGO, ILLINOIS.

## AMUSEMENT APPARATUS.

No. 897,121.

Specification of Letters Patent.

Patented Aug. 25, 1908.

Application filed October 30, 1907. Serial No. 399,928.

*To all whom it may concern:*

Be it known that I, CHARLES I. MATSON, citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Amusement Apparatus, of which the following is a specification.

My invention relates to appliances designed to interest and amuse by producing unusual and unexpected sensations, the desired results in the present instance being effected by allowing a car and passengers to fall through a given space, proper provision being made for receiving the impact upon an elastic medium so as to insure the safety of the passengers by a proper retardation of the velocity of the falling mass.

The improvements which form the subject matter of this application are particularly applicable to the type of such apparatus covered by Letters Patent issued to me, No. 817,381 and the chief objects of said improvements are, to provide a structure adapted for the purpose stated that may be erected entirely above the ground level thus avoiding the trouble and expense of making deep excavations, permitting ready access to all parts of the mechanism for the purposes of inspection and repair, and increasing the durability of those portions which would be liable to corrosion when sunken in the earth.

Other objects of my improvements are to provide a vertical slideway with which members of the car engage, thus maintaining the car in its line of travel and preventing undue lateral movement; to furnish an improved structural arrangement and design for the car frame which results in a strong construction, having the requisite rigidity without unwieldiness or a detrimental increase in the weight, and to supply a provisional safety device to prevent fragments of the tubular elements of the framework from becoming precipitated to the ground if any part should become broken.

Further objects attained in the present appliance are the provision of means for preventing unnecessary jar when the car is brought to rest at the initial position; to furnish means for attaching cables and guy ropes to the superstructure thus affording additional security; to supply means for regulating the speed of the car when de-

scending, and to provide a pneumatic arrangement for retaining the relief valve upon its seat.

I accomplish the above and other important results by employing an apparatus which consists in general of a vertically disposed cylinder in which reciprocates a piston, the piston rod extending beyond the cylinder, and having fixed upon its outer end a cross-head with extended arms, from which is suspended a car built around the said cylinder and sliding upon vertical guiding flanges, inlet pipes connecting a compressed air reservoir with the cylinder outlet pipe, and the necessary valves for controlling the air supply. Such an apparatus is illustrated in the accompanying drawing which forms a part of this application and in which—

Figure 1 is a sectional plan view taken on the line 1—1 of Fig. 2; Fig. 2 is a vertical section on the line 2—2 of Fig. 1; Fig. 3 is a view of the cable adjusting device, and Fig. 4 is a vertical section of the venting valve.

Referring to the drawing in detail, the numeral 5 indicates a base plate, or foundation, upon which is erected a vertical cylinder 6 formed of sections 7, having fastening flanges 8, secured together by bolts 9 in the usual manner for large pipe construction. I prefer to make these sections in comparatively short lengths to facilitate boring, the inside surfaces being finished so as to provide a smooth interior for the movement of a piston 10, provided with packing rings 11 which fit snugly within the bore of the cylinder. I prefer to make this piston of considerable length compared to its diameter, thus conducing to an even movement and preventing any tendency to bind, which might otherwise occur.

The piston is provided with a stem or rod 12, constructed of sections of pipe, screwed together at the junctions to form a continuous tube, which projects above the upper end of the cylinder 6 when the piston 10 is at its lowest position. Upon the upper end of said piston rod 12 is mounted a double cross 13, the piston rod having a threaded connection therewith, and from the double cross project lateral arms 14, from the ends of which depend vertical members 15 and upon these the framework of a car is suspended. The arms 14 and the suspension members 15 are preferably of tubular construction as well as

the framework of the car, which is assembled in the following manner. The pendent members 15 are long enough to extend from the arms 14 to within a short distance of the ground when the piston is in its lowest position and are furnished with crosses 16, 17, placed at a suitable distance apart, and connected by a section of pipe 18. In the horizontal apertures of these crosses are screwed pipe sections 19, 20, which project radially with reference to the center of the structure, the outer sections 19 terminating in elbows 21, which are connected by vertical pipes 22. The sections 20 are supplied with tees 23, said tees being connected by vertical pipes 24. The inner apertures of the tees 23 are engaged by the threaded ends of guide lugs 25 which have grooves 26 in their inner faces, said grooves being adapted to be engaged by and slide upon, vertical flanges 25<sup>a</sup> which are cast, or otherwise formed, integral with the cylinder sections 7. These flanges 25<sup>a</sup> extend further from the body of the sections than the fastening flanges 8, and are in alinement when the cylinder is assembled so as to form continuous slideways upon which the car frame rides during the movements of the piston. Projecting downward from these crosses 17 are contact plugs 26 which engage buffer plates 27 mounted upon the ends of piston rods 28, connected to pistons 29 which reciprocate in cylinders 30. These cylinders are completely filled with water or other suitable liquid 31, and are connected by pipes 32 with tanks or reservoirs 33. These tanks are open to the atmosphere, and the pipes 32 are supplied with valves 34 which serve to regulate the flow of the liquid through said pipe, such regulation serving to vary the cushioning effect of the buffer connected therewith. Each piston rod is surrounded by a coiled spring 35, which restores the piston to its initial position.

As a precautionary measure to prevent dropping of pipe fragments in case one of the frame members should become broken from any cause, such as an inherent flaw or through an accident to the structure, I provide a cable 36 which is passed longitudinally upward through a section 18, and the vertical supporting pipe 15, and is then carried through the arms 14 and down the opposite pendent support 15 and section 18. There are thus four of these safety cables, crossing each other at right angles and terminating at each end in adjusting devices each constructed as follows. A bolt 37 is passed upwardly through the contact plug 26, its head 38 being received in a socket so as to be flush with the surface. The body of the bolt is furnished with threads 39 engaged by a nut 40 to which is attached a loop or stirrup 41 and the end of the cable 36 is attached thereto in any convenient manner. A pin or

bolt 41<sup>a</sup> is passed transversely through the pipe section 18 at a point where it will engage the stirrup 41, and thus prevent the cable from twisting when the bolt is tightened.

As a means of steadying the entire structure, I provide an annular plate 42 which corresponds in size with the fastening flanges 8, and is bolted securely to the topmost flange of the cylinder 6. This plate has laterally projecting arms 43 strengthened by vertical ribs 44, formed integral therewith, and having flanges 45, which abut against the cylinder wall and are fastened thereto by bolts 46. The arms 43 may be separate from the plate 42, but I prefer to form them integral, as shown in the drawing. The free ends of said arms are furnished with eyes 47, to which are attached guy ropes or cables 48.

I have shown in the drawing no covering for the car framework or railings for the front of the car since any suitable roof may be supplied and a lattice work or other structure may be attached to the car wherever necessary to insure the safety of the passengers. I have shown, however, a floor 49, which rests upon the lower frame sections 19, and fills the lateral interval between the vertical members 18 and 22. I prefer to make this floor of heavy oak or other suitable timber, and upon this is carried a seat 50 furnished with a back 51 and cushions 52. The seat is supported on springs 53 which embrace guiding posts 54, said posts entering apertures in the floor in order to allow compression of said springs.

The rectangular construction of the car and frame leaves an open space 55 between the location of the seat and the cylinder and a portion of this space is occupied by the necessary pipes and valves, thus rendering the latter accessible and yet not interfering with the free movement of the car upon its guide ways 25.

A main supply pipe 56 is connected with the bore of the cylinder 6 at some point below the lowest position of the piston 10. This pipe is provided with a manually operated quick-acting valve 57, and said pipe is connected to a reservoir or tank containing air under pressure such air supply not being shown in the drawing. An outlet or vent pipe 58 of greater capacity than the said supply pipe 56, is attached to the cylinder 6 at a sufficient distance above its lower end to afford the required space for the formation of a suitable air cushion to receive the impact of the piston and attachments. This outlet pipe 58 is supplied with a valve 59, the variety commonly termed an angle globe valve being preferred, and this valve is operated automatically in the following manner: The valve stem 60 of the valve 59 bears upon its upper end a valve disk 59<sup>a</sup> which controls the outlet port to the branch pipe 58<sup>a</sup>. The

said stem 60 is prolonged downward and attached to a piston 61 which reciprocates in a cylinder 62, supported by brackets 62<sup>a</sup>.

In order to retain the valve disk 59<sup>a</sup> upon its seat while the main piston is rising a pipe 66, furnished with a valve 67, connects the space below the piston 61 with the main air supply. When this valve is opened the piston will be raised and hold the valve disk 59<sup>a</sup> firmly upon its seat. At some point above the opening of the pipe 58 a comparatively small pipe 63 leads from the cylinder 6 to the valve operating cylinder 62, entering said cylinder above the highest position of the piston 61.

As soon as the main piston 10 uncovers, during its ascent, the opening into the pipe 58 the air under maximum pressure will enter the chamber of the valve 59 and press directly upon the valve disk 59<sup>a</sup>, thus supplementing the action of the piston 61. The piston 10 will continue to rise until it passes the orifice of the pipe 63, when the compressed air will pass through said pipe into the valve-operating cylinder 62 and force its piston downward, opening the valve 59 and permitting the air from the cylinder 6 to escape through the pipes 58 and 58<sup>a</sup>, the venting capacity of these pipes being sufficient to cause a comparatively rapid fall of the piston 10 and attached car, which is the result sought. It is necessary to provide a vent below the piston 61 and for this purpose a pipe 64, is tapped into the cylinder at a point a little above the lowest position of the piston 61, and is then led to any convenient place, where it is furnished with a quick-acting valve 65. The opening of this valve to vent the cylinder should take place after the main piston 10 has passed the aperture of the pipe 58 on its upward movement and before it has ascended above the valve operating pipe 63, and at the same time the valve 67 in the pipe 66 must be closed. Since the pressure upon the valve disk 59<sup>a</sup> and that in the cylinder 62 are from the same source it is necessary to give the piston 61 a greater area than the said valve disk in order to disengage it from its seat. The space below the opening of the pipe 64 becomes a closed chamber as soon as the said opening is covered by the descending piston and the confined air acts as a cushion to prevent jar or shock from the sudden opening of the valve 59<sup>a</sup>. Since it may be desirable to vary the rate of descent of the car when the relief valve 59 is opened a throttle valve 68 is located in the pipe 58<sup>a</sup>, and by adjusting this valve the movement of the piston is under perfect control. In case the vent valve fails to open for any reason the piston 10 would continue to rise unless stopped by cutting off the air supply beneath the piston or by venting the cylinder by some automatic means. The latter plan is preferred, and is accomplished in a very

simple manner by supplying a series of openings 69 located in the cylinder at a short distance above the entrance of the pipe 63, so that in case the valve 59 fails to operate the air will escape freely through these openings as soon as the piston has uncovered them, and it will be impossible to elevate the piston 10 above this point by air pressure.

The method of operating the apparatus as a whole may be briefly stated as follows: The proper connections having been made between the inlet pipes and a source of air supply under sufficient pressure and the various mechanisms being in positions shown in the drawing, the valve 57 is opened and the compressed air enters the cylinder 6 below the piston 10, raising said piston and attached car at a rate proportioned to the air supply. As soon as the piston 10 has risen above the aperture of the vent pipe 58 the air will enter said pipe and press with full force against the valve 59. The valve 65 is then opened to vent the cylinder 62 and at the same time the valve 67 is closed. The piston 10 continues to ascend until the orifice of the pipe 63 is uncovered when the motive fluid will pass through this pipe, depress the piston 61 and open said valve. The piston and attachments will immediately descend and continue to fall until checked by the air cushion formed by the compression of the air below the opening of the vent pipe 58. The effect of this cushion will be first to bring the piston to a gradual stop, and then through the reaction of the confined fluid the piston will rebound carrying the car upward again and the car will thus be subjected to gradually decreasing oscillations until brought to rest at a short distance above the initial position. This vibratory movement can be prolonged by opening and closing the valve 57 synchronously with the oscillatory movement. The car is then lowered to the starting point by opening a relief valve 70 in the supply 56.

Having thus described my invention what I claim as new, is:—

1. In apparatus for the purpose specified, the combination with a cylinder having induction and eduction pipes and valves, a piston slidably mounted in said cylinder, and a piston rod, of a pendent framework supported upon the said piston rod and a car attached to said framework.

2. In apparatus for the purpose specified, the combination with a cylinder having induction and eduction pipes and valves, a piston slidably mounted in said cylinder, and a piston rod, of a pendent framework supported upon the said piston rod and a car attached to said framework and surrounding said cylinder.

3. In apparatus for the purpose stated, the combination with a cylinder having induction and eduction pipes and valves, a piston

slidably mounted in said cylinder, and a piston rod, of a pendent framework supported upon the said piston rod and surrounding said cylinder, a car supported upon said framework and embracing said cylinder, and slideways for said framework and car.

4. In an apparatus for the purpose stated, the combination with a cylinder having induction and eduction pipes and valves, a piston slidably mounted in said cylinder, and a piston rod for said piston, of a pendent framework supported upon the said rod and surrounding said cylinder, a car supported upon said framework and embracing said cylinder, slideways for said framework, and guy members for the said cylinder.

5. In an apparatus for the purpose stated, the combination with a vertical cylinder having induction and eduction pipes, and valves, and a piston and piston rod adapted to slide in the cylinder, of a car for passengers suspended below the upper end of the said piston rod, said car provided with seats mounted upon resilient supports, and yielding buffers arranged beneath said car.

6. In an apparatus for the purpose stated, the combination with a vertical cylinder having induction and eduction pipes and valves and a piston and rod adapted to slide in said cylinder, of a tubular framework suspended from the upper end of said rod, safety cables arranged in the tubular members of said framework and means for adjusting said cables longitudinally.

7. In an apparatus of the class described, the combination with a vertical cylinder, a piston and piston rod adapted to slide therein, a car suspended from said piston rod and surrounding said cylinder, an inlet pipe provided with valves, a vent pipe for the cylinder, an escape valve for said vent pipe, of retaining means for holding said escape valve upon its seat, and means for releasing said retaining means.

8. In an apparatus of the class described, the combination of a vertical cylinder, and a piston and rod adapted to slide therein, a frame suspended from the said rod, an inlet pipe provided with valves, a vent pipe for the cylinder, an escape valve for said vent pipe,

means for automatically operating said escape valve, said means consisting of a piston arranged in a cylinder and attached to said valve, a pipe leading from the space below said piston and supplied with a valve, a valved vent pipe also connected to the cylinder below the piston and a third pipe connecting the space above said piston with the said vertical cylinder.

9. In apparatus of the class specified, the combination with a vertical cylinder provided with inlet pipes and valves, and a piston and piston rod adapted to slide in said cylinder, of vertical flanges attached to said cylinder, a frame suspended from said piston rod and adapted to slide upon said flanges buffers located beneath said frame, guy ropes for said vertical cylinder, a vent pipe for said vertical cylinder, an escape valve for said vent pipe, means for automatically opening said valve when said piston has reached a predetermined height, and means for normally retaining said escape valve upon its seat.

10. In apparatus of the class described, a cylinder having induction and eduction pipes, a piston slidably mounted in said cylinder, a piston rod, a car suspended from said piston rod and surrounding the cylinder, a guide way for said car, means for controlling the admission of motive fluid to said cylinder, means for controlling the emission of the motive fluid from said cylinder, and a series of buffers to receive the impact of the descending car.

11. In apparatus of the class described, a cylinder having induction and eduction pipes, a piston and rod slidably mounted in said cylinder, a frame suspended from said rod and surrounding the cylinder, a car carried on said frame, a slideway for said frame and car, means for controlling the admission of motive fluid to said cylinder, an automatically controlled valve for the eduction pipe, and a throttle valve for said pipe.

In testimony whereof I affix my signature in the presence of two witnesses:

CHARLES I. MATSON.

Witnesses:

MILDRED SAMMONS,  
CHAS. F. BASSETT.