J. T. DICKSON.

PNEUMATIC CLUTCH.

APPLICATION FILED JULY 18, 1911.

1,048,299. Patented Dec. 24, 1912.

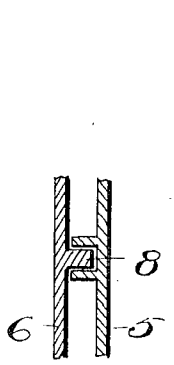

Fig. 2

Fig. 1.

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UNITED STATES PATENT OFFICE.

JAMES T. DICKSON, OF LOS ANGELES, CALIFORNIA.

PNEUMATIC CLUTCH.

1,048,299. Specification of Letters Patent. Patented Dec. 24, 1912.

Application filed July 18, 1911. Serial No. 639,196.

To all whom it may concern:

Be it known that I, JAMES T. DICKSON, a citizen of the United States, and a resident of the city and county of Los Angeles, State of California, have invented certain new and useful Improvements in Pneumatic Clutches, of which the following is a specification.

My invention pertains to clutches, and it has special reference to clutches of the pneumatic type, wherein a low pressure of air will produce an immense pressure.

The prime object is to provide a clutch which can instantly be released, but which may be set gradually, by the operator. It is also constructed in such a manner that it is very light and at the same time powerful in action.

A further object is to provide a clutch which may be attached to the exhaust of an explosion engine, all of which will now be set forth in detail.

In the drawings Figure 1 is a side view partly in section, showing the clutch and its connection with an explosion engine, and Fig. 2 is a section on line 2 of Fig. 1.

In the drawings I show a side or edge view, partly in section, of my improved clutch in which the axle or drive shaft 1 is shown provided with a pair of sleeves 2, 3, one of which (2) is fixed to the shaft, either by a key 4 or otherwise, the inner ends of these sleeves being slightly separated. The other sleeve 3 is loose on the shaft so it may be moved longitudinally thereon a limited distance. Each sleeve has at its inner end a disk 5, 6, the perimeter of each disk having an angled annular flange 7, the angle of this flange being approximately 10 degrees. The disks 5, 6, have one or more pairs of splines 8, so arranged that they will operate together, and so that there is, at all times, a space, as at 9, between the two disks. The two disks are flexibly attached to each other by means of two leather rims 10, the outer edges of which are secured together at proper intervals by rivets 11, and the inner edges of these leather rims are each attached to one of the disks 5, 6, by rivets 12, so that the disks may thus have a limited movement to and from each other. The leather rim thus described is a simple form of constructing the bellows mechanism.

The casing for the mechanism comprises a pair of sleeves 13, 14, which are loosely mounted on the sleeves 2, 3. The sleeve 13 has a flanged end, as at 15, by means of which it may be attached to either the drive or driven shaft. The inner ends of the sleeve 13, 14, do not contact with the disks 5, 6, so that the disks may separate a limited distance during gripping operation. Each sleeve has a disk 16, which extends out a sufficient distance to cover the inner disks each outer case disk having an annular rim or perimeter 17 which is the same angle as the flanged face 7 of the disks 5, 6. In practice leather 18, or other similar gripping surface, is placed between the two angled surfaces 7, 17. An annular flange 19, projecting out from each perimeter 17, serves as the meeting point for the two disks, which thus serve as a casing or cover for the clutch mechanism.

In order to supply air or compressed gas to the clutch the shaft 1 is provided with an axial duct 21, which conveys air from any source of pressure to the space 9, between the two disks 5, 6, and it is obvious that with the large area thus provided between the disks a very low air pressure will produce a tremendous pressure against the disks 5, 6, causing them to move outwardly, and bind against the leather bushing 18, on the angled surfaces 7, 17, and when sufficient pressure is thus exerted the disks 5, 6, will turn with the outer disks 13, 14.

I show, diagrammatically, an explosion engine 22, which has an exhaust pipe 23 leading from an auxiliary exhaust port and connected up with the duct 21, as at 24. A check valve 25 is in the line of this pipe so that air or gas in the clutch cannot return to the engine. An upwardly-extending pipe 26 extends up from the T connection at 24 terminating in a control valve 27. It will be understood that this pipe 23 does not connect with the regular exhaust port 28 of the engine. It is obvious that by this arrangement, if the valve 27 is open a portion of the gases from the explosion engine will escape by way of the pipe 26, and that the closure of the valve, or a partial closure will cause the compressed gas to enter the clutch and thus actuate the disks 5, 6, as described.

The pipe 26 between the valve 27 and check valve 25 serves as a pulsometer for the compressed gases, so as to regulate, in a measure, the pulsating stroke of the engine.

Owing to the large area of the clutch disk a very small gas pressure is sufficient to actuate the clutch, and I have found in actual

practice that two pounds per square inch is sufficient for operative purposes in an automobile.

It will be noted that the casing is loosely mounted for both rotative and longitudinal movement on the sleeves 2 and 21. When fluid is admitted to the space between the disks 5, and 6, disk 5 is actuated so that its friction surface contacts with the friction surface 18. This pushes the casing longitudinally to the right so that the friction surface on the disk 6 and the coöperating part of the casing come into engagement.

What I claim as new, is:—

1. In a pneumatic clutch, a shaft, a pair of disks thereon one of them rigidly secured thereto, and the other having a longitudinal movement on the shaft, means to prevent the loose disk from turning independently of the fixed disk, a flexible air tight connection between the perimeters of the disks, and having an air inlet through the shaft between the two disks, and friction surfaces to coöperate with the disks.

2. In a pneumatic clutch, a shaft, a fixed and loose disk provided with sleeves and mounted thereon, means to prevent the loose disk from turning independently of the other disk, means to supply air to the space between the disks and a flexible means between the perimeters of the disks to retain air therein, and an exterior shell loosely mounted on the disk sleeves, said disks and shell having annular, angularly disposed frictional contact faces, and means on said shell for attaching it to a separate shaft.

3. In a pneumatic clutch, a shaft, a pair of disks mounted thereon, one of them fixed and the other longitudinally movable, means for flexibly securing together the perimeters of the disks, and provided with a duct through the shaft, to the space between said disks, means for supplying fluid pressure to the space between the disks and means for controlling the fluid pressure.

4. In a pneumatic clutch, a shaft, a pair of opposed sleeves thereon, one fixed to the shaft, and the other loose, each sleeve having a disk at its inner end integral therewith, the perimeter of each disk having an annular flange angularly disposed, said disks being flexibly secured together at their perimeters, and an external casing, having annular angularly-disposed surfaces adapted to be in frictional contact with the annular flanges of the disks, said external casing having sleeves integral therewith, and revolubly mounted on the disk sleeves, and means for supplying a fluid pressure to the space between said disks.

Signed at the city and county of Los Angeles, State of California, this 12th day of July, 1911, in the presence of witnesses.

JAMES T. DICKSON.

Witnesses:
H. D. HANSCOM,
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