Nov. 8, 1938. H. L. LYON 2,135,520

ENGINE

Original Filed March 9, 1937

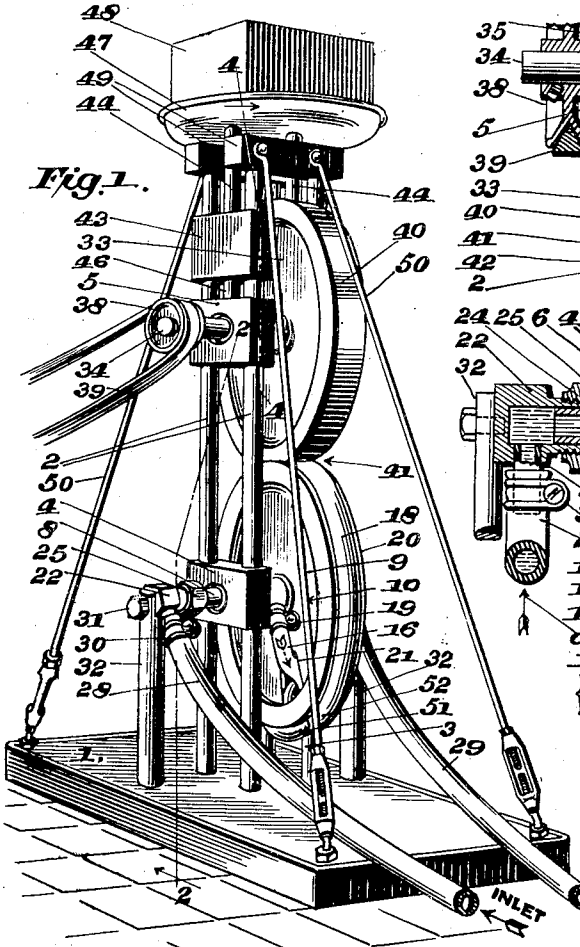


Fig. 1.

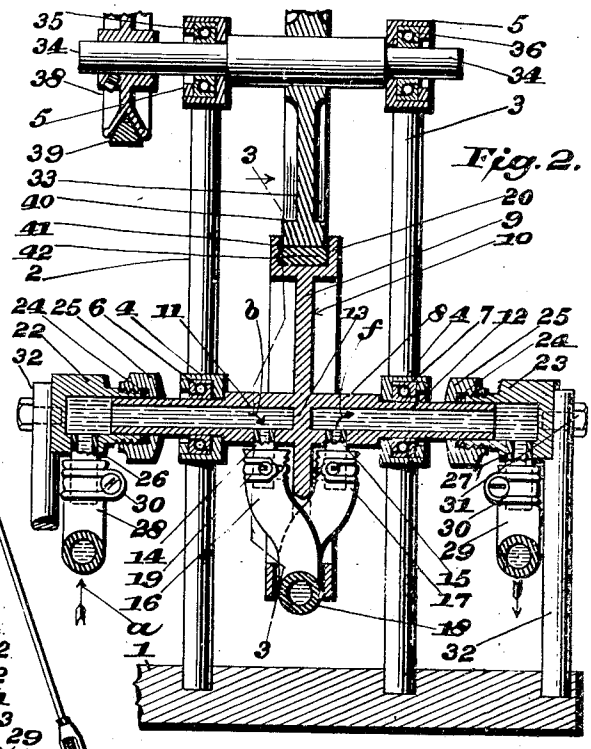


Fig. 2.

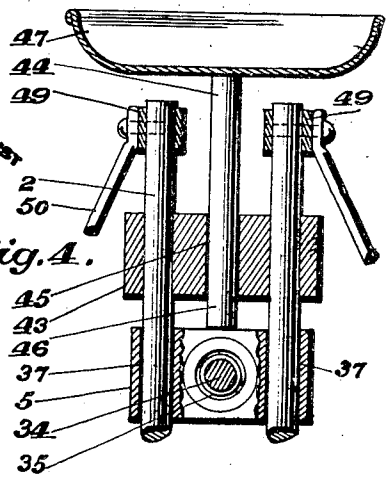


Fig. 4.

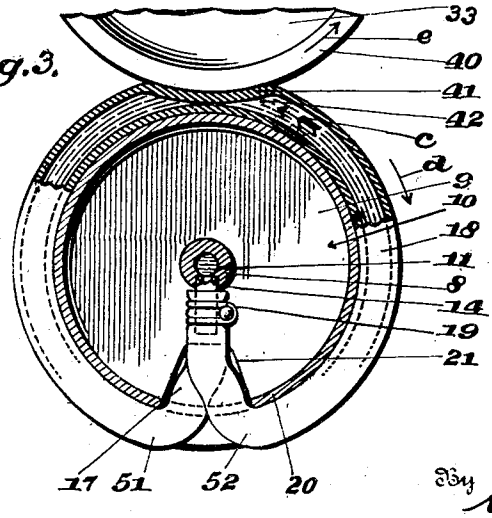


Fig. 3.

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ENGINE

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2 Claims. (Cl. 121—48)

This invention relates to improvements in engines, and its objects are as follow:

First, to provide an inexpensive power-yielding mechanism, herein simply designated an engine, wherein a pliable conduit, which has one end open and the other end connected to a source of pressure fluid, is passed between a revoluble cylinder and an abutment which is so closely situated to the cylinder as to compress or restrict said conduit at one place until it is closed, the resulting blocking of the passage of the pressure fluid and the reaction of the abutment producing revolution of said cylinder.

Second, to provide motion in the rotatable element of a mechanism by encircling a wheel or its equivalent, which is a part of said mechanism, with a pliable conduit into which a pressure fluid is introduced, the conduit being squeezed at one place until closed so as to produce a reaction as brought out below.

Third, to provide an engine of the foregoing description in which a pressure-propelled moving constriction in a pliable conduit is employed as the impelling force by which to revolve a rotatable element.

Other objects and advantages will appear in the following specification, reference being had to the accompanying drawing, in which:

Figure 1 is a perspective view of one embodiment of the invention,

Figure 2 is a detail cross-section of the engine taken on the line 2—2 of Fig. 1,

Figure 3 is a cross section of the engine taken on the line 3—3 of Fig. 2, and

Figure 4 is a detail cross section of the engine taken on the line 4—4 of Fig. 1.

As indicated by the foregoing statements of the objects of the invention, the latter comprises a simple and inexpensive mechanism which is adapted to yield power according to a novel principle which, it is thought, has been heretofore neglected. This principle is simply stated in the following language: When a pliable conduit, which has one end open and the other end connected with a source of pressure fluid so as to project said fluid into the conduit, is passed between a cylinder and an abutment which is situated so closely to the perimeter of the cylinder as to compress the conduit until its bore is closed at one place, the pressure of the fluid within the conduit against the constriction will turn said cylinder on its axis.

This principle is capable of a wide variety of applications. Inasmuch as this disclosure would be unduly burdened by an attempt to illustrate and describe even a small number of such applications, it is thought to be to the best advantage to illustrate and describe a simple form and to mention several deviations therefrom which can readily be visualized without the necessity of illustrations. Attention is therefore directed to the drawing. A base or foundation 1 of any appropriate type has pairs of standards 2, 3 upstanding therefrom. The first pair 2 is clearly seen in Fig. 1, the other pair being largely concealed by mechanism which is presently described. The relationship of the two pairs of standards to the base is better seen in Fig. 2.

Blocks 4 and 5 are mounted upon each pair of standards in spaced relationship to the base 1 and to each other. The blocks 4 are fixed to the standards (Fig. 2) and contain ball bearings 6, 7 upon which the hollow shaft 8 of a drive wheel 9 is journaled. The shaft 8 comprises the axle of the wheel, and the web 10 of the latter is appropriately secured to the axle. Said axle is bored in from each end to make it hollow as already stated, the bores 11, 12 stopping short of the center where a dividing wall 13 is left as shown.

At places closely adjacent to the wall 13 the hollow shaft has communicating nipples 14, 15 to the respective ones of which the ends 16 and 17 of a pliable conduit 18 are secured by clamps 19 or their equivalents. This conduit is applied to and extends around the grooved rim 20 of the drive wheel 9. The major part of the pliable conduit lies in said grooved rim, as plainly shown in Fig. 3, the only break in its continuity occurring at the place where the ends 16, 17 emerge at a hole 21 in the web 12 in order to reach the nipples 14, 15 through which the conduit is placed in fluid communication with the bores 11, 12.

Stationary chests or chambers 22, 23 provide for the inflow and exhaust of pressure fluid into and from the bores 11, 12. These chests are supplied with packings 24 and glands 25 by which fluid-tight joints are made around the remote ends of the hollow shaft 8 at the places where said ends revolubly project into the chests. The latter are equipped with nipples 26, 27 to which inlet and exhaust pipes 28 and 29 are secured by clamps 30. The two chests 22, 23 are firmly attached in any appropriate manner, for example by bolts 31, to mounts 32 which are fixedly upstanding from the base 1 as are the pairs of standards already mentioned. A rider-wheel or abutment 33 is mounted upon an axle 34 which is journaled upon ball bearings 35, 36 in the blocks 5. These blocks, unlike the blocks 4, are movable upon the pairs of standards 2, 3 as indicated at

37 (Fig. 4). These blocks constitute slides. The axle 34 carries a pulley 38 to which a belt 39 is applied for the transmission of power. The pulley 38 is shown on the axle 34 merely as one illustration of how power can be taken off from the engine. Inasmuch as the drive wheel 9 turns also, as is presently brought out, it is readily seen that the pulley 38 could be secured to the hollow shaft or axle 8, the only requirement being to make the axle long enough so as to enable mounting the pulley between one of the blocks 4 and the adjacent gland 25.

The rim 40 of the wheel 33 rides within the grooved rim 20 of the drive wheel 9 and upon the pliable conduit 18 so as to compress the latter at one place, designated 41 in Fig. 3, until its bore is closed at the point 42. In order to accomplish this purpose it is necessary that enough pressure be applied to the pliable conduit. The instant illustration shows the two wheels in vertical superimposition so that the weight of the rider-wheel or abutment 33 contributes largely to the foregoing compression of the pliable conduit. However, in order to insure said closure, provision is made for applying any additional weight required. The spacing blocks 43 which are rigidly mounted upon the standards 2, 3 also serve as guides for the upstanding rods 44, which slide freely in the holes 45 (Fig. 4) with their lower ends 46 riding upon the movable blocks 5 and their upper ends carrying a pan 47 or its equivalent to contain any necessary weight such as 48.

Bridge-pieces 49 (Fig. 1) connect the standards 2, 3 in the manner shown. The standards are stabilized by braces 50 which extend from the bridge pieces to the corners of the base 1.

From what has been stated so far it is readily understood that the slide blocks 5 always maintain the same positions relatively to each other by virtue of their being carried by the rigid standards 2, 3, thus insuring that the rider-wheel 33 will always rotate in the same plane as does the drive wheel 9. Both wheels are hung the same with respect to the standards, the only exception being that the nether supporting blocks 4 are fixed whereas the upper blocks 5 are slidable. The weight 48 is resorted to only in the event that the combined weights of the rider-wheel or abutment 33 and the blocks 5 by which it is carried are insufficient to compress the pliable conduit 18 to the extent of closure of its bore as depicted by Fig. 3.

The operation is readily understood. The engine is intended to be run by any commonly known pressure fluid such as steam, compressed air, or water under pressure. The latter is herein taken as the pressure fluid merely for example. Water under pressure entering the inlet pipe 28 by way of arrow *a* is directed into the bore 11 (Fig. 2) whence it passes into the end 16 of the pliable conduit 18 as indicated by arrow *b*. The right side of the conduit will be filled (Fig. 3). Pressure is imposed against the closure 42 as indicated by the arrow *c*. The effect is to force the constriction 41 to the left. But because of the free mounting of the drive and rider-wheels 9, 33, the latter will be rotated in the directions of the arrows *d* and *e* (Fig. 3).

When the bend 51 adjacent to the conduit-end 17 has passed under the rider-wheel 33 the pressure fluid in the pliable conduit will escape from the end 17 into the bore 12 (Fig. 2) as indicated by the arrow *f*. The spent fluid will be discharged through the exhaust pipe 29. At the same moment the bend 52 (Fig. 3) will have passed under the rider-wheel 33 and a new constriction will have formed in the pliable conduit, there will be a repetition of the foregoing operation until the new constriction is driven along the conduit to the place where a change-over occurs to the bend 51.

Rotation of the drive and rider-wheels 9, 33 will continue as described as long as pressure fluid is admitted to the pliable conduit 18 in the manner stated. If the pressure fluid is admitted to the pliable conduit by way of the nipple 15 (Fig. 2) all of the directions of movement described above will be reversed, an obvious requisite being that the opposite end of the conduit 18 shall be open to permit the discharge of the spent fluid when the time arrives.

At this point it is desired to say that the conduit 18 is to be considered in its broadest aspect. Generally it is made round in cross-section, as shown.

Anyone having the rider-wheel 33 in mind can readily understand that its replacement with a cylinder of any desired length would constitute a modification within the spirit of this disclosure. This cylinder can be made to compress one or more pliable conduits in the manner already emphasized.

I claim:

1. An engine comprising fixed upright standards, bearing blocks fixedly carried by the standards, a hollow shaft revoluble in the bearing blocks and having a partition, a drive wheel carried by the shaft, a pliable conduit on the circumference of the drive wheel and having its ends connected to the shaft bore at the opposite sides of the partition, couplings at the ends of the shaft for the admission and discharge of pressure fluid to and from the conduit, bearing slides movably carried by the standards, an axle journalled in said slides and carrying an abutment wheel the rim of which is imposed upon the crest of the conduit to compress it to the point of closure, means by which to impose weight upon the slides, and means secured to the standards and providing guides for parts of the weight-imposing means.

2. An engine comprising a base, pairs of standards fixed in the base and extending upright therefrom, two blocks fixed in bridging positions on each pair of standards, serving to hold the standards spaced, the bottom blocks being bearings and the top blocks having holes to provide guides, a hollow shaft revoluble in the bearing blocks and having a partition, a drive wheel carried by the shaft, a pliable conduit on the circumference of the drive wheel and having its ends connected to the shaft bore at the opposite sides of the partition, means by which to admit and discharge pressure fluid to and from the conduit at the ends of the shaft bore, bearing slides movably carried by the pairs of standards, an axle journalled in said slides and carrying an abutment wheel the rim of which is imposed upon the crest of the conduit, and weight-imposing means to compress the conduit to the point of closure, said means including rods riding in the guide holes and bearing loosely upon the bearing slides.

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