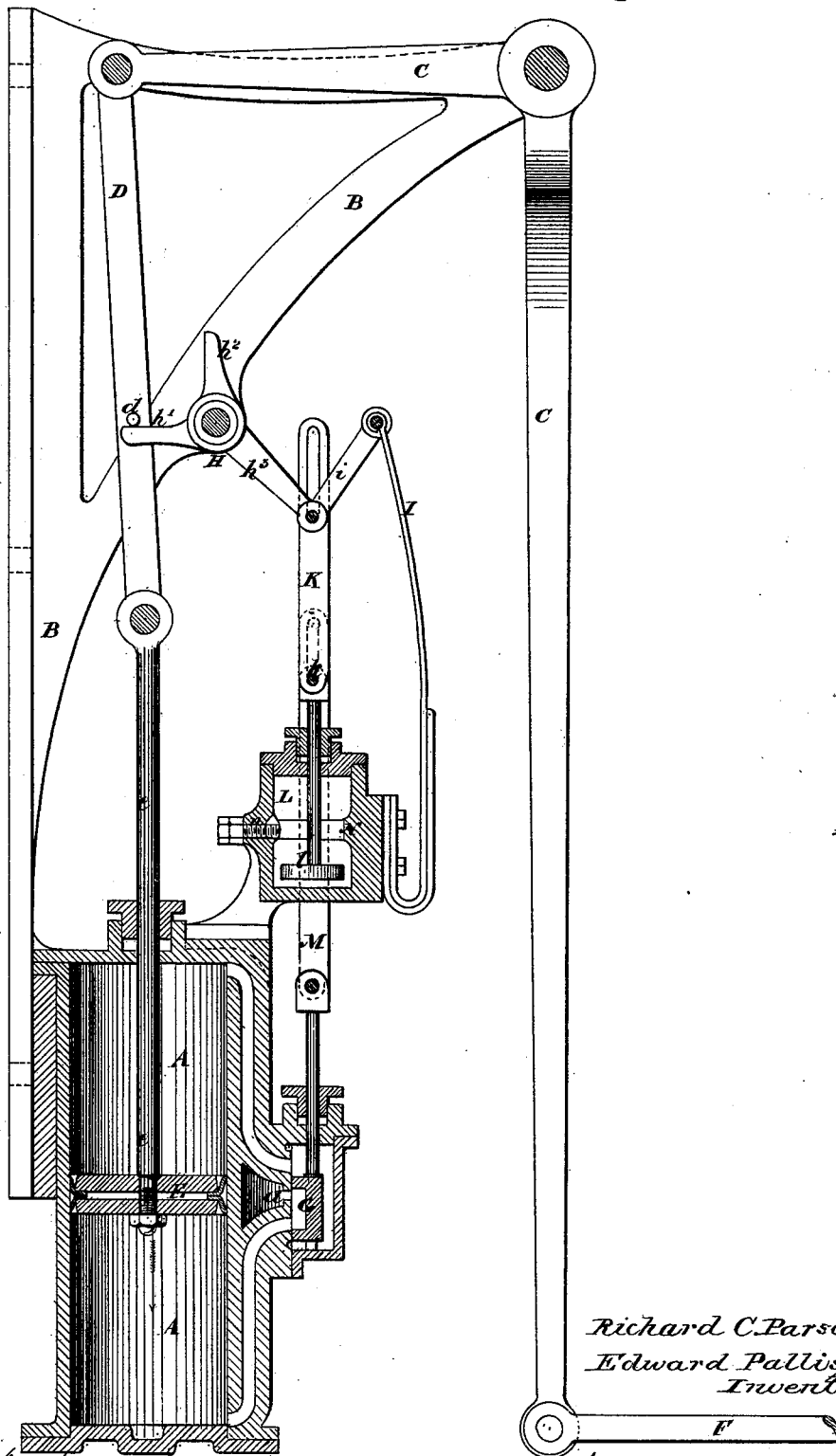


R. C. PARSONS & E. PALLISER.
 Apparatus for Working Punkahs.
 No. 206,895. Patented Aug. 13, 1878.



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UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN APPARATUS FOR WORKING PUNKAS.

Specification forming part of Letters Patent No. **206,895**, dated August 13, 1878; application filed
June 11, 1878; patented in England, April 5, 1878.

To all whom it may concern:

Be it known that we, RICHARD CLERE PARSONS, of Connaught Place, and EDWARD PALLISER, of Charleville Road, Kensington, in the county of Middlesex, England, have invented an Improved Apparatus for Working Punkas by Fluid-Pressure; and do hereby declare that the following description, taken in connection with the accompanying drawing, hereinafter referred to, forms a full and exact specification of the same, wherein we have set forth the nature and principles of our said improvement, by which our invention may be distinguished from others of a similar class, together with such parts as we claim and desire to secure by Letters Patent—that is to say:

Our invention relates to apparatus for working punkas by steam or compressed air or other fluid under pressure, or by atmospheric pressure acting against rarefied air. Apparatus for this purpose have been already employed in which the fluid-pressure acted on a piston connected by levers and rods to a set of punkas in an apartment, causing them to swing; but this apparatus was defective in consequence of the valve-gear for effecting the reciprocation of the piston sometimes failing to act, especially when variations occurred in the pressure of the working-fluid.

The object of our invention is more particularly to improve the construction and action of the valve-gear employed in such apparatus; and this we effect as we will describe, referring to the accompanying drawing, which is a vertical section, showing the cylinder, slide, and valve-gear of apparatus for working a set of punkas by fluid-pressure.

The cylinder A is conveniently placed upright against the end wall of the apartment in which the punkas are hung, being secured to a bracket, B, which is bolted against the wall. The upper part of the bracket projects, forming a bearing for a bent lever, C, the shorter arm of which is linked by the connecting-rod D to the rod *e* of the piston E, and the longer arm is linked by a rod, F, to the first of the range of punkas, which are linked to one another. So far this arrangement is old, the punkas being caused to swing backward and forward by the up-and-down reciprocation of the

piston E, acted on by compressed air, steam, or other fluid under pressure, or by the atmospheric pressure on its one side against a partial vacuum made by rarefying the air on the other side, by connecting the discharge-port *a* with a chamber in which a partial vacuum is maintained.

The admission of the working-fluid alternately to each end of the cylinder A and its emission therefrom are determined by a slide, G, of ordinary construction, governing the cylinder-ports in the usual way. It is to the gear by which this slide is worked from the movement of the piston that our invention applies, this gear being so arranged that the period of reciprocation can be regulated, and that the piston is caused to reciprocate even if there be very considerable variation in the pressure of the working fluid, the effect of a reduction of pressure being not to stop, but to diminish, the stroke of the piston and of the punkas worked by it.

The gear which we employ for this purpose is constructed and arranged as follows: H is a three-armed tumbling-lever mounted on the bracket B. Between two of the arms, *h*¹ *h*², there is a stud or tappet, *d*, fixed on the connecting-rod D, so that as the connecting-rod moves upward or downward at or near the middle of its stroke either way the stud *d* strikes one or other of the two arms, *h*¹ *h*², as shown in the drawing, the piston being in the act of descending, the stud *d* is just bearing on the arm *h*¹ and tending to turn the lever H round on its pivot. The third arm, *h*³, is linked by a radius-rod, *i*, to a strong spring, I, which resists the movement of the lever H until it has passed the middle of its stroke, when *h*³ and *i* are in line with one another, after which the recoil of the spring I causes the lever H to tend to complete its stroke rapidly. The arm *h*³ has a pin working in a slotted hole in a connecting-rod, K, which is jointed by a pin, *k*, to the rod of a piston, *l*, working in a cylinder, L. The pin *k* works in slotted holes in side rods M, which are jointed to the rod of the slide G.

The cylinder L is at each end larger than the piston *l*, which fits it only along a portion of its middle, where the cylinder is narrowed by a projecting shoulder, N. At one part of

his shoulder there is a slit through it, into which projects an adjustable screw, *n*, that can be set so as to increase or diminish the area of passage through the slit.

The cylinder being filled with oil or other suitable liquid, the action of the apparatus is as follows: As the piston E descends the stud *d*, acting on the arm *h*¹, turns the lever H until the arm *h*³ has passed the horizontal position in line with *i*, whereupon the spring I causes the arm *h*³ rapidly to continue its movement. But as the pin of *h*³ has already arrived at the end of the slot in K, the continued movement of *h*³ is imparted to the piston *l*, which for a certain distance can move freely through the liquid in the cylinder L until it comes to the narrow part of the cylinder at N, where its motion is retarded by the throttling of the passage for liquid from the one side of the piston to the other. While the piston *l* is thus retarded the pin *k* reaches the end of the slots in M, and then, by the further movement of the piston *l*, (which is rapidly performed after passing N,) the slide G is moved, so as rapidly to change the flow of the working-fluid to and from the two ends of the cylinder A. The piston E then ascends and the slide-gear acts according to a like series of movements in the opposite direction. Thus the continued reciprocation of the piston and punkas is maintained, and, if there be sufficient supply of working-fluid to move the piston E so far in either direction that the lever H is made to pass the middle of its stroke, the reciprocation is secured. By the adjustment of the screw *n*, determining, by its more or less throttling the passage for liquid, the retardation or pause of the piston *l* at the middle of its stroke, the period of the reciprocation can be regulated as desired.

Having thus described the nature of our invention, and the best means we know of carrying it into practical effect, we hereby declare that we make no general claim to apparatus for working punkas by compressed air or other fluid under pressure acting on a piston in a cylinder, and causing it to reciprocate therein, and thereby effecting the reciprocation of punkas connected by levers and rods or otherwise to the said piston; but

We claim in apparatus of this kind—

1. The combination of the slide G and its side rods M, the piston *l* working in the narrowed cylinder L, charged with liquid, and its connecting-rod K, with the tumbling-lever H, the stud *d* on connecting-rod D, and the spring I and its radius-rod *i*, constructed and operating substantially as herein described.

2. The combination of the cylinder L, narrowed in the middle, with the piston *l*, working in liquid as means of effecting retardation or pause in the movement of the said piston, with the piston E and its piston-rod *e* and their connections, substantially as shown.

3. The combination of the slide-valve G and piston *l* with the cylinder L, provided with the projection N and adjusting-screw *n* as a means of regulating the retardation or pause in the movement of the piston *l*, substantially as herein described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses this 27th day of May, 1878.

RICHARD CLERE PARSONS.
EDWARD PALLISER.

Witnesses:

CHAS. D. ABEL,
JOHN IMRAY.