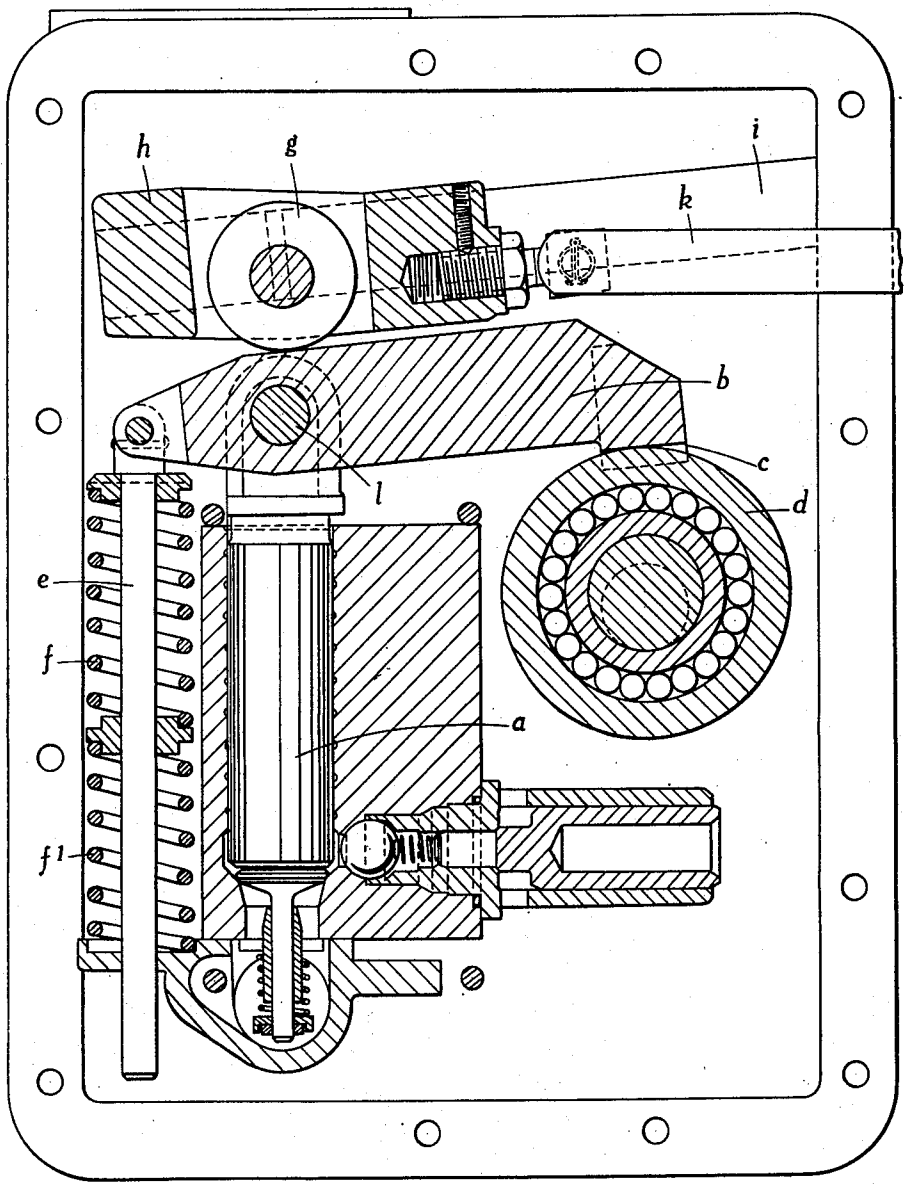
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RECIPROCATING RAM PUMP

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RECIPROCATING RAM PUMP

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1 Claim. (Cl. 103—38)

This invention is concerned with means for varying the ram stroke in a reciprocating ram pump of the kind comprising a rocking lever and a shiftable fulcrum for the same said fulcrum bearing against the outer longitudinal face of the lever and being guided in its movement therealong.

The object of the present invention is to provide a stroke varying means of the above type which will enable each discharge stroke to be completed with the inner end of the ram at the same distance from the opposing end of the pump bore so that the clearance between such opposing surfaces may be as small as possible.

Broadly the present invention consists of means of the type specified above for varying the ram stroke in a reciprocating ram pump wherein the face on the lever with which the shiftable fulcrum contacts and the fixed path along which the fulcrum is guided when moved to vary the stroke are disposed in such relationship to each other that said face always assumes substantially the same position relatively to the said longitudinal axis of said path of movement at the completion of each inward stroke of the ram for each position of the fulcrum so that on each inward stroke of the ram its end always comes to rest at the same distance from the opposing end of the pump bore.

The path of movement of the fulcrum may either be inclined in relation to the axis of the associated ram or at right angles thereto.

In order to ensure that the termination of the discharge stroke is as described above at all variations of the stroke, it is essential that at all positions of the fulcrum the contacting face of the lever shall be parallel with the path of the fulcrum at the termination of the discharge stroke.

The face of the lever which makes contact with the periphery of the eccentric roller bearing, is preferably made parallel with the other face of the lever which makes contact with the fulcrum.

Stroke varying means according to the present invention are particularly suitable for use in connection with pumps having a low clearance volume and to enable the invention to be put into practical effect an embodiment of the same incorporated in such a pump will now be described, by way of example, by aid of the accompanying drawing which shows the same in part sectional elevation.

Referring to the drawing the means illustrated is of the shiftable fulcrum type and comprises, for each ram *a*, a rocker arm or lever *b*, one end *c* of which bears upon the outer ring *d* of an eccentrically mounted ball or roller bearing whilst the opposite end is attached to an eye-bolt *e* which extends through a bracket attached to or forming part of the pump casing said bracket serving to support a pair of springs *f*, *f'* which act to centralise the lever and also to effect, automatically the suction stroke of the ram.

The fulcrum for the lever comprises a roller *g* carried by a mounting *h* which is shiftable longitudinally within opposing inclined guide slots, one of which is shown in the drawing and indicated at *i*, through the medium of a pull-rod *k*, or other suitable means.

By suitably shifting the fulcrum roller *g* in relation to the pivotal connection *l* between the ram and the lever, it is possible by means of the above means to vary the throw of the ram from zero to a maximum which is greater than the throw of the eccentric.

Further, as a result of the inclination of the path of movement of the fulcrum roller imparted by the guides *i*, the limit of the inward stroke of each ram remains constant whatever variation is made in the length of the stroke, thus ensuring that the ram always almost completely fills the inner end of the pump bore on each discharge stroke. The same effect is also obtained when the path of movement of the fulcrum roller is at right angles to the axis of the ram provided as aforesaid the lever is so arranged that it always assumes a position where its contacted face is parallel to the said path of movement at the termination of each inward movement of the ram.

This application is a division of our copending application Serial No. 146,038, filed June 2, 1937, now Patent No. 2,168,850 entitled Reciprocating ram pumps.

What we claim is:

In a reciprocating ram pump, means for varying the stroke of the ram comprising, in combination, a rocking lever, a pivot adjacent one end of said lever and serving to connect the lever to the outer end of the pump ram, a bearing surface forming the outer longitudinal edge of said lever, said surface being normally inclined to the axis of the pump ram, a fulcrum for said lever, said fulcrum bearing against the normally inclined surface on said lever, a mounting for said fulcrum, a fixed guide for the slidable reception of said mounting, said guide being inclined so as to be parallel to the normal inclination of the outer longitudinal edge of the lever, means for moving said mounting along said guide to vary the stroke of the pump ram, means of oscillating the rocking lever in the direction necessary to impart a discharge stroke to the pump, said means comprising

a ball or roller bearing which is mounted directly upon a driven circular eccentric, the periphery of said bearing being in rolling contact with the rocking lever at the end which is remote from the pump ram, and further means engaging the opposite end of the rocking lever for effecting the return movement of the lever and the suction stroke of the pump ram, the arrangement being such that for every position of the fulcrum the inner end of the pump ram always comes to rest at the same distance from the opposing end of the pump bore on each discharge stroke whilst the angular thrust on the ram is on one side of the ram during the inward stroke and on the opposite side of the ram on the return stroke.

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