

(No Model.)

CONSTANTYN PIETER HOLST. GZOOM.
DEVICE FOR EQUALIZING RECIPROCATING MOTION.

No. 535,827.

Patented Mar. 19, 1895.

Fig. 1.

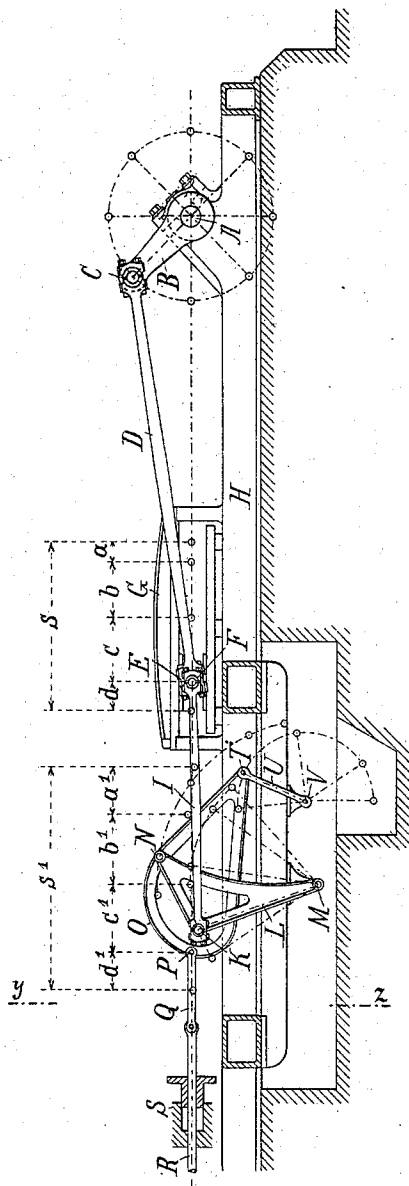


Fig. 2.

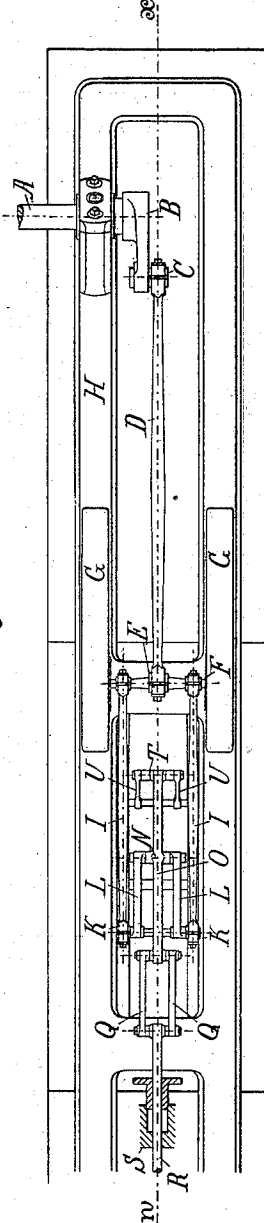
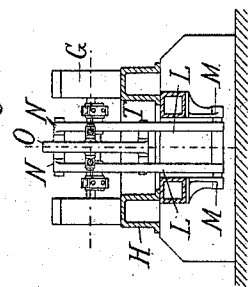


Fig. 3.



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UNITED STATES PATENT OFFICE.

CONSTANTYN PIETER HOLST. GZOOM, OF AMSTERDAM, NETHERLANDS.

DEVICE FOR EQUALIZING RECIPROCATING MOTION.

SPECIFICATION forming part of Letters Patent No. 535,827, dated March 19, 1895.

Application filed October 13, 1894. Serial No. 526,306. (No model.)

To all whom it may concern:

Be it known that I, CONSTANTYN PIETER HOLST. GZOOM, of Amsterdam, in the Kingdom of the Netherlands, have invented certain new and useful Improvements in Devices for Equalizing Reciprocating Motion, of which the following is a specification.

This invention relates to a device for changing the constant revolving motion of a crank into a nearly even reciprocating motion of a piston rod, which is moved by the crank through a connecting rod and its cross head. Such a device will be of service for certain purposes, for example in driving piston pumps, that are arranged for giving a continuous flow of fluid at a nearly uniform velocity.

In the accompanying drawings, Figure 1 is a longitudinal sectional view of a frame with the device, taken in the plane of the line $w-x$, Fig. 2; Fig. 2, a ground plan of same, and Fig. 3 a transverse sectional view of same, taken in the plane of the line $y-z$, Fig. 1.

Similar letters of reference indicate corresponding parts.

The motion of the crank shaft A is transmitted through the crank B, the crank pin C and the connecting rod D to the cross head E, which slides in the guides G G, being provided with slide blocks F. Between the cross head E and the piston rod R the following device is placed: Under the frame H suitable blocks or bearings are fixed at M, in which the two swinging bell cranks L L are pivoted. The pins K K of the bell cranks L L are connected to the cross head E by means of the links I I. At the corners N N of the bell cranks L L an oscillatory bell crank O is pivoted, which is connected at P by means of the links Q Q to the piston rod R and is guided at T by the links U U. The latter are pivoted at V in suitable blocks or bearings under the frame H. The bell crank O is so formed as to leave space for the cross bar between the bell cranks L L at K. The piston rod R is guided by the stuffing box S or some other means.

The bell cranks L L and O and the links U U are so arranged, that the point P of the bell crank O is guided nearly in a straight line. When the distances at these parts are so chosen, that the point P is practically guided in a straight line, the links Q Q may

be omitted, in which case the piston rod R is linked direct to the bell crank O.

In Fig. 1 several positions of the crank B are marked by dotted lines set at forty-five degrees to each other. To these positions of the crank B correspond those of the cross head E, marked by points, which are at the distances of a , b , c and d , the stroke comprising the space indicated by the arrows at s . To these positions of the cross head E again correspond those of the points K and N at the bell cranks L L and those of the points P and T at the bell crank O, which are marked by dotted circles, lines and points. As Fig. 1 shows, the stroke s' of the piston rod R is different from that of s of the cross head E.

Provided that the length of the connecting rod D be five times that of the crank B, the positions of the cross head E on the one hand are as follows: $a=0.12$, s , $b=0.33$, s , $c=0.375$, s , and $d=0.175$, s . Taking the bell cranks L L and O and the links U U in the proportions shown in Fig. 1, the positions of the point P on the other hand will be as follows: $a'=0.215$, s , $b'=0.311$, s , $c'=0.301$, s , and $d'=0.173$, s . On comparing these positions of the point P with those given above for the cross head E, it will be obvious, that the velocity of the point P and consequently also that of the piston rod R is reduced in the middle of the stroke and increased near the ends of the same. Besides this the motion of the piston rod R is also much more nearly uniform than that of the cross head, as a glance at Fig. 1 will show.

The above positions of the point P may be altered by changing the distances at the bell cranks L L and O and at the links U U to suit the purpose.

Having described my invention, I declare that what I claim as new and of my own original invention is—

1. The combination, with a cross head, means for reciprocating the same, and a piston, of a swinging bell crank connected to the piston, a link pivoted at one end to the swinging bell crank and at the other end to a fixed point, an oscillatory bell crank attached to the swinging bell crank, and mechanism connecting the oscillatory bell crank to the cross head, substantially as set forth.

2. The combination, with a cross head, means for reciprocating the same, and a piston, of a swinging bell crank, a link connecting the swinging bell crank to the piston, a
5 link connecting the swinging bell crank to a fixed point, an oscillatory bell crank attached to the swinging bell crank, and mechanism connecting the oscillatory bell crank to the cross head, substantially as set forth.
- 10 3. A device for equalizing reciprocating motion comprising bell cranks, L, links, I, for connecting said bell cranks, L, at the one corner, K, to the cross head, E, a bell crank, O, pivoted to said bell cranks, L, at the other

corners N, and connected at its one corner, 15 P, to the piston rod, R, and links, U, fulcrumed on the same side of the piston rod as said bell cranks, L, and guiding said bell crank, O, at its other corner, T, substantially as and for the purpose set forth. 20

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

CONSTANTYN PIETER HOLST. GZ00N.

Witnesses:

AUGUST SIEGFRIED DOCER,
ALARDUS JACOB TELJER.