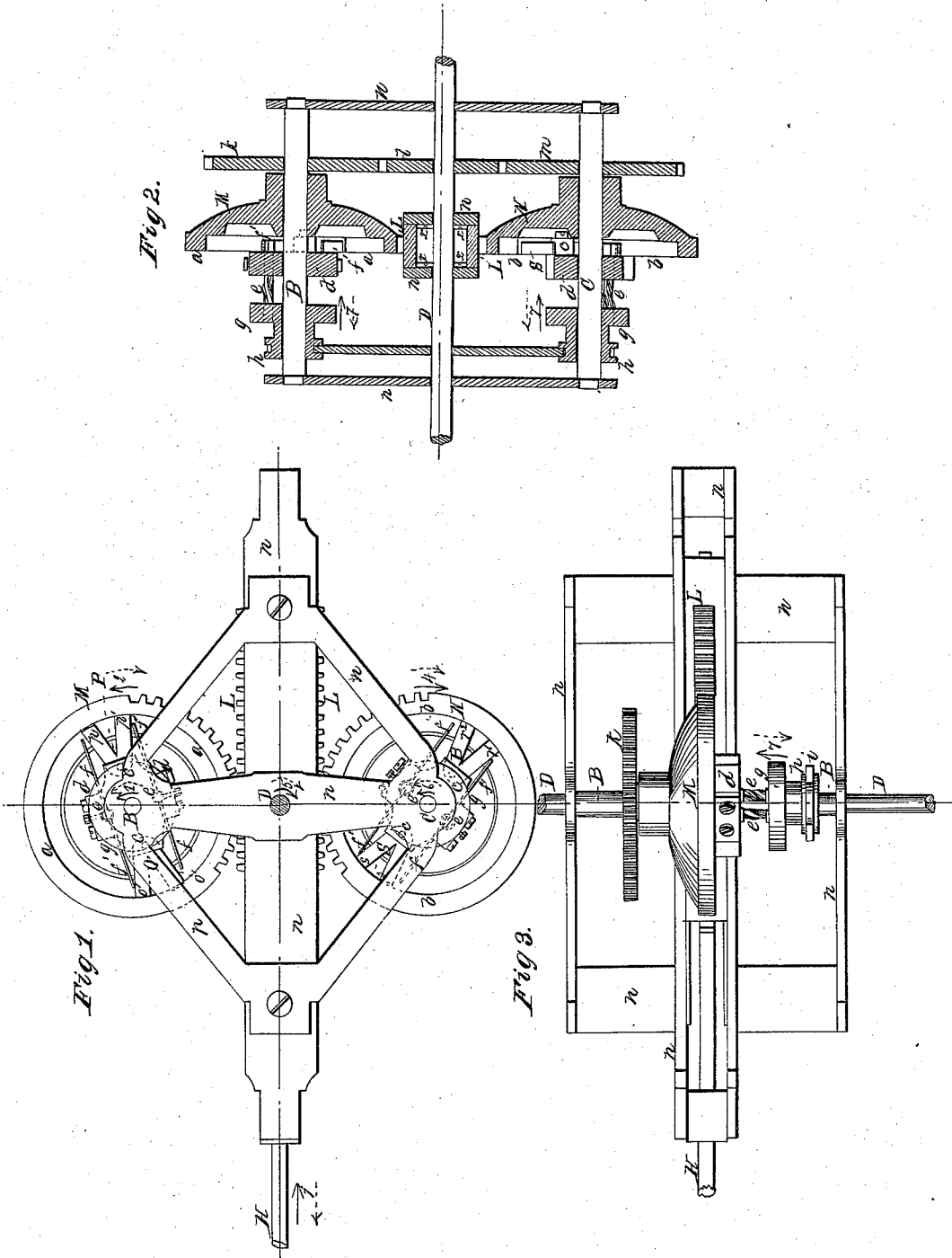


*G. Juengst,  
Converting Motion.*

*N<sup>o</sup> 15,697.*

*Patented Sep. 9, 1856.*



# UNITED STATES PATENT OFFICE.

GEORGE JUENGST, OF NEW YORK, N. Y.

## REVERSING-GEAR.

Specification of Letters Patent No. 15,697, dated September 9, 1856.

*To all whom it may concern:*

Be it known that I, GEORGE JUENGST, of New York, in the State of New York, have invented certain new and useful Improvements in Reversing-Gear, of which the following is a specification.

The nature of my invention consists in a contrivance for reversing the action of the "nipper-pawl" or friction-pawl—a device used instead of the pawl and ratchet. In the following specification I have shown this contrivance applied to a machine for converting reciprocating into rotatory motion, but it is evident that it may be applied wherever the nipping-pawl is employed.

The piston rod H is firmly attached to a double rack L, L which is free to slide within the frame *n*. The sides of the rack are slotted as seen at *x x* so as to allow the main shaft D to pass through without interfering with the vibrations of the rack. The cog wheel *l* is fast on shaft D which has its bearings in frame *n*. The cog wheel *l* meshes with two other cogwheels *k* and *m* which latter are fastened to shafts B and C, which shafts have also their bearings in frame *n*. Hubs *d, d* are also fast on said shafts B and C and two forks P, O and R, S are pivoted to said hubs in *c, c, c, c* and are free to turn about said pivots. These forks are arranged within the projecting rims *a* and *b* of two cogwheels M and N which sit loosely on the shafts B and C and the cogs of which are in gear respectively with the upper and lower cogs of rack L, L. Only part of the circumferences of the wheels M and N is cogged so as to correspond to the length of the cogged part of the rack. The length of the arms of the forks O, P, R, S is such that there will be slight play between their outer ends and the inner surface of the rims *a* and *b*, when a line drawn through the pivots *c* and half way between the outer ends of each two arms of the forks, coincides with the diameter of the rims drawn through the centers B or C. But when the forks are slightly thrown to either side of said line through the pivots *c*, the arm of each fork nearer to the said line will come to abut against the inner circumference of the rim (see arms *o*<sup>1</sup>, *p*<sup>1</sup> and *s*<sup>1</sup>, *r*<sup>1</sup> Fig. 1) whereas the other arm will be entirely clear of said circumference (see arms *o*<sup>2</sup>, *p*<sup>2</sup>, and *s*<sup>2</sup>, *r*<sup>2</sup> Fig. 1). The forks being held in this position by the

slight pressure of springs *f*<sup>1</sup>, *f*<sup>1</sup> (hereafter to be described), it will be understood that the revolution of the wheel and rim M *a* in the direction of arrow 2 will cause the forks P and O together with hub *d* and shaft B, to revolve with the said wheel M by reason of the arms *p*<sup>1</sup> and *o*<sup>1</sup> abutting against the rim *a*. It will also be understood that the revolution of the other wheel N in the direction of arrow 4 will not communicate motion to the forks R, S, and hub *d* and shaft C, but rim *b* will slide over the ends of arms *r*<sup>1</sup> and *s*<sup>1</sup> and shaft C with the parts fastened to it will be allowed to be turned in the direction of arrow *b* by reason of cog wheel *k* rotating the cogwheel *l* and the cog wheel *l* rotating the cog wheel *m* in the direction of arrows 5 and 6. The revolutions of the cogged rims *a* and *b* are produced by the forward stroke of the piston rod H and rack L in the direction of arrow 1. As soon as the backward stroke of the piston begins (see dotted arrow 1) the revolutions of wheels M, N will be reversed (see dotted arrows 2 and 4) but the revolutions of the parts *d, d*, B, C and D will continue in the same direction as before (see dotted arrows 3, 5 and 6). This time the rim *b* will take effect on the arms *r*<sup>1</sup>, *s*<sup>1</sup> whereas the rim *a* will slide over the ends of arms *p*<sup>1</sup>, *o*<sup>1</sup>. Thus it will be seen that the revolution of the main shaft D will be uniformly in the direction of arrow 5, during the forward as well as backward stroke of the piston.

The springs *f*<sup>1</sup> *f*<sup>1</sup> are fastened (midways between their ends) to pivots *e* which project through holes in the hubs *d*. The outer ends of said pivots *e* are square and have a slight screw twist, and pass through square holes in disks *g* which disks sit loosely on the shafts B and C and may be thrown in or out (see arrows 7) by means of their necks *h*, fork *i* and a proper hand lever (not shown in the model and drawings). The effect of drawing them out (see dotted arrow 7) will be to turn the pivots *e* slightly by reason of their screw twist and thus to relieve the forks O, P, R, S of the pressure of the ends *f*<sup>1</sup> of the springs and to submit them to the pressure of the ends *f* of the springs; the forks will be slightly turned on their pivots *c* in consequence of said pressure of springs *f*, the arms *o*<sup>2</sup>, *p*<sup>2</sup>, *r*<sup>2</sup>, *s*<sup>2</sup> will be brought into contact with their respective rims *a* and *b* and the arms *o*<sup>1</sup>, *p*<sup>1</sup>,

$r^1, s^1$  will be thrown off the said rims. The reciprocation of the piston rod and rack and the revolutions of the cogged rims in the direction of arrows 1, 2, and 4, will now  
5 have the effect of revolving the hubs  $d$  and shafts B, C and D in directions opposite to arrows 3, 5 and 6 causing the main shaft D to revolve continually in a direction opposite to what it did before. Thus it will be  
10 seen that by throwing the disks  $g$  in or out, the revolutions of the main shaft can be reversed at will, which is a matter of importance especially in marine engines.

15 It will also be seen that this apparatus is entirely independent of the length of stroke of the piston; the main shaft will continue to revolve in the desired direction without interruption during the slightest vibrations of the piston as well as during full stroke.

I do not claim the above described mode 20 of converting motion as it is well known—neither do I claim the substitution of the nipping-pawl for the ordinary pawl and ratchet as that is also well known. But

What I do claim and desire to secure by 25 Letters Patent of the United States is—

The above described arrangement of the disks  $g$ —the screw-pivots  $e'$  and the springs  $f f$  or their several equivalents whereby the action of the nipping pawl is reversed, and 30 the motion communicated by it changed in direction, without any change of direction, or cessation of motion, in the moving-power.

GEORGE JUENGST.

Witnesses:

CHARLES RICHTER,  
JOHN LEWIS HETTERICK.