2 Sheets—Sheet 1.

P. F. HODGES.

Stop-Motion Gear.

No. 223,806. Patented Jan. 27, 1880.

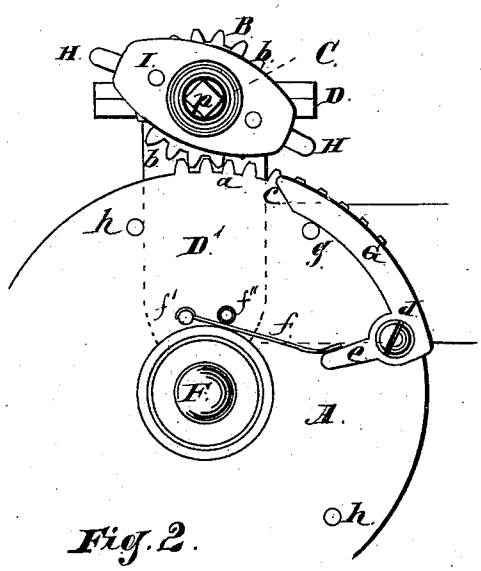


Fig. 2.

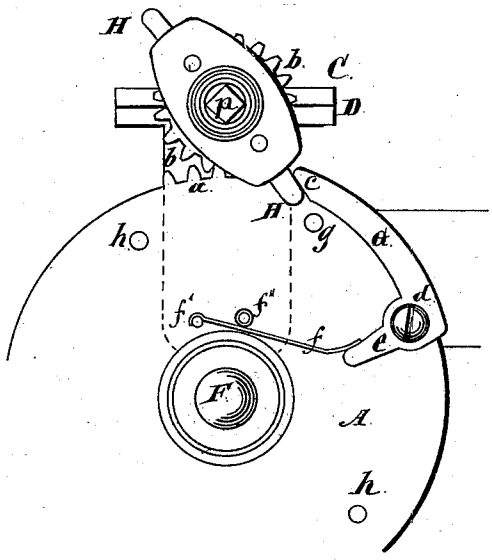


Fig. 1.

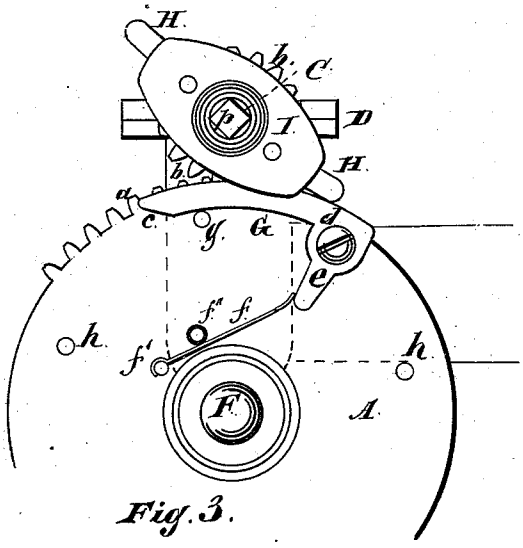


Fig. 3.

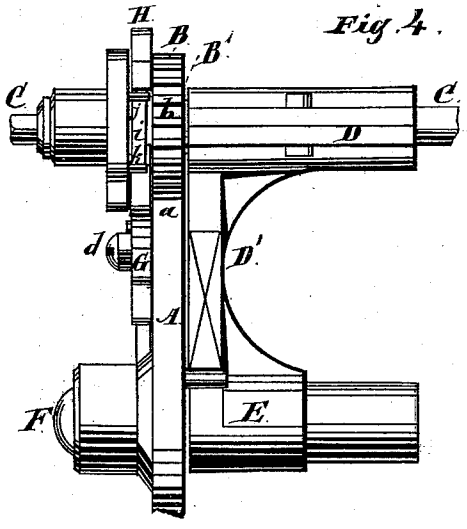


Fig. 4.

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2 Sheets—Sheet 2.

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Stop-Motion Gear.

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Fig. 7.

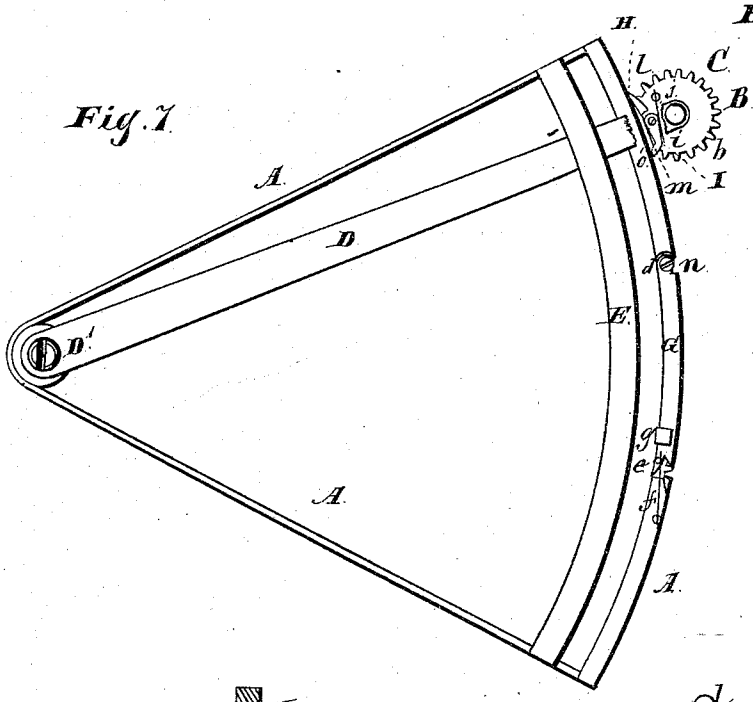
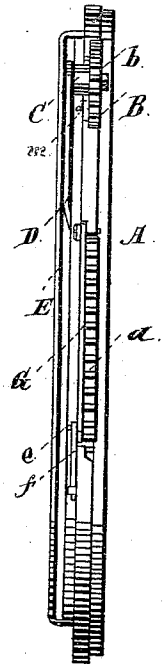


Fig. 8.



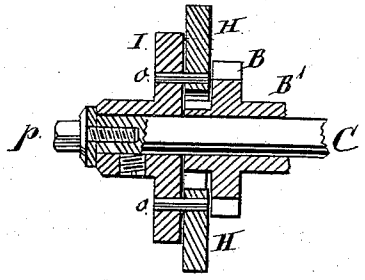


Fig. 5.

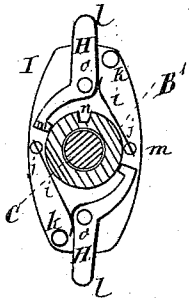


Fig. 6

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UNITED STATES PATENT OFFICE.

PLINY F. HODGES, OF CHICAGO, ILLINOIS, ASSIGNOR TO HIMSELF AND WILLIAM DEERING, OF SAME PLACE.

STOP-MOTION GEAR.

SPECIFICATION forming part of Letters Patent No. 223,806, dated January 27, 1880.

Application filed September 29, 1879.

To all whom it may concern:

Be it known that I, PLINY F. HODGES, residing at Chicago, in the county of Cook and State of Illinois, and a citizen of the United States, have invented new and useful Improvements in Stop-Motion Gears, of which the following is a full description, reference being had to the accompanying drawings, in which—

Figures 1, 2, and 3 are top or plan views, showing one mode of applying the device for producing a stop-motion to a driving-wheel and pinion, the different figures showing the several positions of the stop and movable flange or bridge in operation; Fig. 4, a side elevation of the parts in the position shown in Fig. 3; Figs. 5 and 6, details showing the interlocking devices; Fig. 7, a top or plan view, showing the device applied to a pinion and reciprocating rack; Fig. 8, a side elevation of the same.

This invention has for its object the production of an intermittent rotary motion in one direction only from a reciprocating or vibrating movement; and its nature consists in providing a movable flange or bridge for preventing rotary motion, except by the reciprocating or vibrating movement in one direction; in providing a stop for automatically operating the movable flange or bridge to produce an engagement when required; in constructing and arranging the stops so that they will serve as pawls or catches for locking the shaft and its pinion when a loose pinion is used; in providing springs for returning the movable flange, after it has been operated on by the stop, to its normal condition, and for keeping the stop in proper position when acting as a locking device; and in the several parts and combination of parts hereinafter set forth as new.

The invention may be applied to a reciprocating or vibrating rack, wheel, or other mechanism, in connection with a stationary or loose pinion which imparts an intermittent rotary movement to a shaft or other device; or the wheel, rack, or other mechanism may be stationary, and the pinion may be made to have a reciprocating or vibrating movement, and is designed for use in mechanisms where a rotary movement in one direction only is required.

In the drawings the devices are shown applied to two forms of mechanism; but it can be used in other constructions.

Figs. 1 to 6, inclusive, show the devices in connection with a loose pinion and a vibrating or reciprocating driving-wheel.

A represents the reciprocating or vibrating driving-wheel; B, the pinion; B′, the hollow shaft or collar to which the pinion is attached or connected; C, the shaft, which is to be given an intermittent rotary motion; D, the head or box, forming a bearing for the shaft B′; D′, the connecting-piece; E, the collar or bearing for the pin or journal of the driving-wheel; F, the pin or journal of the driving-wheel A; G, the movable flange or bridge; H, the stops, also serving, as shown, for the means for locking the pinion to the shaft; I, the collar or head supporting the shaft; *a*, the cogs on the wheel A; *b*, the cogs on the pinion B; *c*, the inclined face on the free end of the flange G; *d*, the pivot for the flange; *e*, the arm or extension of the flange or bridge; *f*, the spring for returning the flange or bridge; *f′ f′*, the pins for holding the spring *f*; *g*, the pin or stop on which the free end of the flange or bridge rests when in its normal condition; *h*, the stops or pins by which the movements of the driving-wheel are limited; *i*, the springs for throwing and holding the inner ends of the pawls or locking devices into engagement; *j*, the studs or pins to which the outer ends of the springs *i* are secured; *k*, the pins or stops for preventing the stops from being thrown out of position; *l*, the outer ends of the stops; *m*, the engaging or locking hooks or projections on the inner ends of the stops; *n*, the notch or opening in the shaft B′; *o*, the pivots of the stops; *p*, the set-screw on the end of the shaft C.

The wheel A may be of any required size and form of construction, and may be reciprocated by any of the well-known means, its movements being limited by the pins *h* on its face striking the head or support D E, or in any other suitable manner. The teeth or cogs *a* may extend entirely around its periphery or only partially around, as shown.

The pinion B may be of any suitable form

of construction, located and arranged to have its cogs or teeth *b* mesh with the cogs or teeth *a* of the wheel A. As shown, the pinion B is rigidly secured to a hollow shaft or collar, B′, having its bearing in a head or box, D, suitably formed for the purpose, and the wheel A has its support or pin located in a head or bearing, E, connected with the head D by a piece, D′.

The shaft C, to which an intermittent rotary motion is to be given, has its bearing in the hollow shaft B′, and extends beyond both ends thereof, the end projecting beyond the head D in the form shown being the one to which the devices to be operated are connected.

The movable flange or bridge G is made of suitable metal, and is curved so that its outer face will conform to or nearly to an arc of a circle coincident with that of the wheel A. As shown, it is pivoted at *d* to the face of the wheel at one end, leaving its other end free or movable, and this free end rests, when the flange or bridge is in its normal condition, on a pin, *g*, so located on the face of the wheel as to preserve the unity between the flange and wheel, and has an incline, *c*, to facilitate the passage of the stop. At the pivotal end of the flange or bridge is an arm or extension, *e*, with which a spring, *f*, located on the face of the wheel A and held in position by pins *f′ f″*, engages, for the purpose of returning the flange or bridge after the stop has passed its free end.

The pinion B, being loose upon the shaft C in the construction shown, must be locked thereto in order to communicate motion, which in this instance is done by so forming and locating the stops H that their outer ends will serve as stops and their inner as locking-pawls. These pawls H are pivoted at *o* to a plate or head, I, which is secured to the end of the shaft C by means of a set-screw or otherwise, so that it cannot turn, but will be held firmly, and, as shown, a set-screw, *p*, is used to prevent its slipping from the shaft.

The outer ends, *l*, of these stop-pawls project beyond the edge of the head or plate I a sufficient distance to engage with the outer face of the flange or bridge, and their inner ends are provided with hooks or projections *m*, so arranged as to engage with a notch, *n*, in the collar of the pinion B, so that when the hook *m* and the notch *n* are engaged the pinion B will be locked with the shaft C. These pawl-stops H are located between the head I and the pinion B, and their movement in one direction is limited by pins or stops *k* on the plate I, against which the outer ends will strike, and in the other direction by their inner ends coming in contact with the collar of the pinion B, (see Fig. 6,) and their hooks *m* are made to engage with the notch *n* by the action of a spring, *i*, one end of which engages the inner end of each stop, and the other end is attached to a pin or stud, *j*, on the face of the head I.

Two stops, H, in the form of construction shown, are used, so that the pinion and shaft are only locked together to produce a half-revolution of the shaft at each engagement. If one stop were used, an entire revolution of the shaft C would result.

In operation, with the parts in the position shown in Fig. 3, the pinion moving toward the free end of the bridge or flange G, and the point or hook *m* engaged with the notch *n*, the movement given to the pinion from the wheel will be transmitted to the shaft C, because the stop, pinion, and shaft are locked together, and the shaft must revolve with the pinion. Such revolution continues until the parts are in the position shown in Fig. 1, at which time the end *l* will come in contact with the incline *c* and the end of the flange will be moved out of the path of *l*, so that the stop can pass the flange, and the parts will be in the position shown in Fig. 2, the action of the spring returning the flange or bridge to its normal condition as soon as the stop passes its end. A reverse movement is then given to the wheel A, rotating the pinion B in the opposite direction; but such rotation will not be communicated to the shaft C, because the rotation of the pinion will bring the end *l* of the stop into contact with the outer face of the flange or bridge G, disengaging the hook *m* from the notch *n* and disconnecting the pinion B from the shaft C, so that the pinion can revolve, but the shaft will remain stationary, the shaft and pinion maintaining this relation as long as the stop and flange or bridge are engaged, or until the wheel A completes its return movement and is again carried forward, when the spring *i* will throw the hook *m* into engagement with the notch *n*, connecting the shaft C, pinion B, and stop H, so that the movement of the pinion will be communicated to the shaft, and these movements will continue as long as the wheel A is reciprocated.

The wheel A might be given a complete revolution before being reversed, and other forms of mechanism than a loose pinion and central shaft to be driven can have the movable flange and stop applied to produce a rotary movement in one direction only.

Figs. 7 and 8 show the movable flange or bridge and a stop applied to a stationary rack and a reciprocating mutilated gear or pinion to produce an intermittent rotary movement. A represents the rack-frame; B, the mutilated gear or pinion, which is to be reciprocated in any well-known manner, the rack-frame being stationary; C, the arbor or shaft to which the pinion B is rigidly secured; D, the reciprocating bar carrying the pinion; E, the guiding and retaining bar for keeping the bar D in position. These parts may be of any of the well-known forms of construction, arranged and operating in the usual manner, the pinion having its cogs or teeth *b* in mesh with the cogs or teeth *a* of the rack for revolving the pinion.

G is the movable flange or bridge, having an inclined face, *c*, and pivoted at *d* to the rack-frame in the same relation to the rack as to the wheel A. This flange, when in its normal condition, rests on a pin, *g*, on the face of

the rack, and is returned, after it has been raised for the passage of the stop, by the spring *f*, one end of which is secured to a pin, *f'*, on the rack, and the other engages a pin, *e*, secured in the free end of the flange or bridge, and operates in the same manner as before described for the wheel A.

H is the stop, rigidly secured to the pinion at the point where the teeth are removed, and having an end, *l*, projecting beyond the periphery of the pinion a sufficient distance to come in contact with the outer face of the flange, and to come beneath the incline *c* and raise the flange or bridge out of its path when the pinion is revolving.

I is the movable dog or latch, pivoted at one end to the face of the pinion, and having its other end provided with a hook or catch, *m*, to engage with a notch, *n*, in the edge of the flange, near its pivotal end, for throwing the pinion into mesh with the rack, the hook being thrown into engagement with the notch by the action of the spring *i*, one end of which engages with the dog or latch, and the other is attached to a stud or pin, *j*, on the face of the pinion.

The pinion B, in this construction, is not loose upon its shaft or arbor, and the stop H is rigidly attached to the pinion, and does not act as a pawl to lock the pinion to the shaft, but operates only as a stop to prevent the rotation of the pinion when the flange is engaged with the stop; but the essential feature of my invention—a movable flange or bridge—operates similarly in both attachments or forms of construction shown, and can be applied to produce a rotary movement with other devices in one direction only, and intermittently.

What I claim as new, and desire to secure by Letters Patent, is—

1. A movable bridge or flange arranged and operating with a reciprocating device, substantially as and for the purposes specified.

2. A movable bridge, in combination with a reciprocating device and a stop operating with said bridge, to impart an intermittent rotary motion in one direction only, substantially as described.

3. A movable bridge and a stop, in combination with a rack and pinion arranged and operating to produce an intermittent rotary movement in one direction only from a reciprocating movement of either the rack or pinion, substantially as described.

4. The stop H, provided with a hook or projection, *m*, in combination with a loose pinion, B, provided with a notch, *n*, a movable flange or bridge, G, and a reciprocating mechanism, whereby an intermittent rotary motion in one direction only will be imparted, substantially as specified.

5. The flange or bridge G, provided with a pin or arm, *e*, and spring *f*, in combination with the stop-pawl H and stop *k*, arranged relative to each other on a pinion, and a reciprocating rack or wheel, substantially as and for the purposes specified.

6. The combination of the rack or wheel A, the pinion B, one or more stops, H, and the latch or bridge G, as and for the purposes specified.

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