

(No Model.)

3 Sheets—Sheet 1.

J. E. DUNCAN.

REVERSING MECHANISM.

No. 352,862.

Patented Nov. 16, 1886.

Fig. 1.

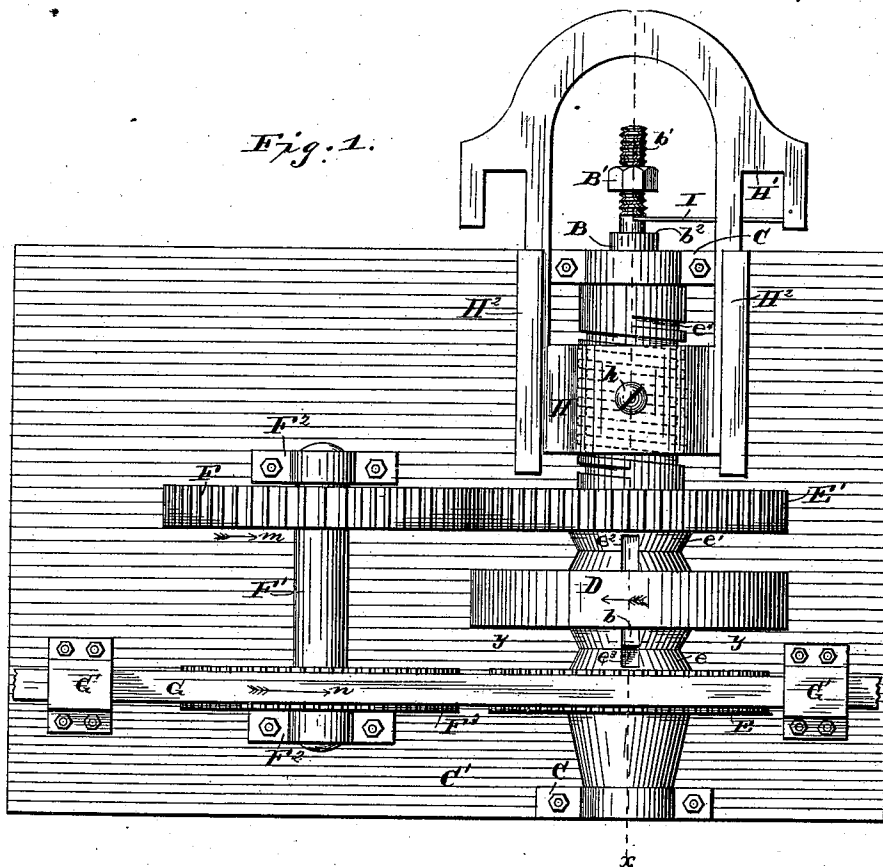
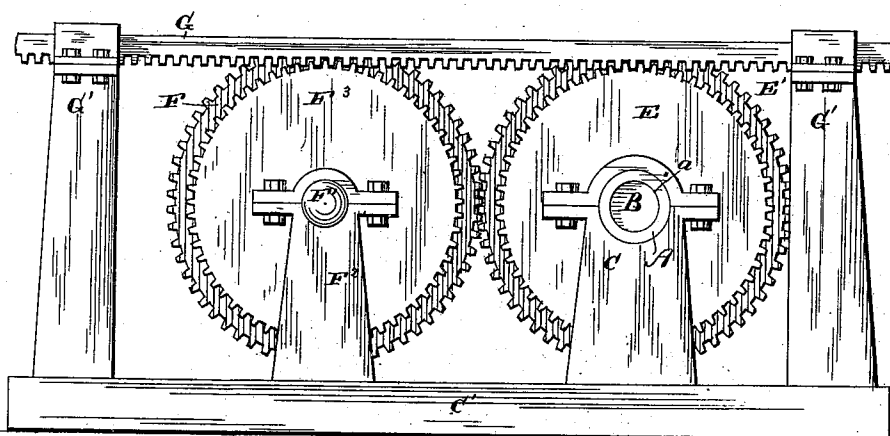


Fig. 2.



Witnesses.

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Fig. 3.

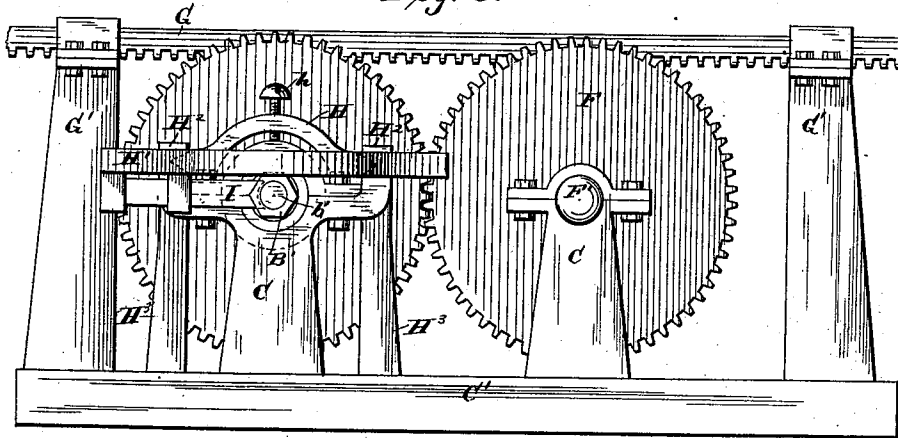


Fig. 4.

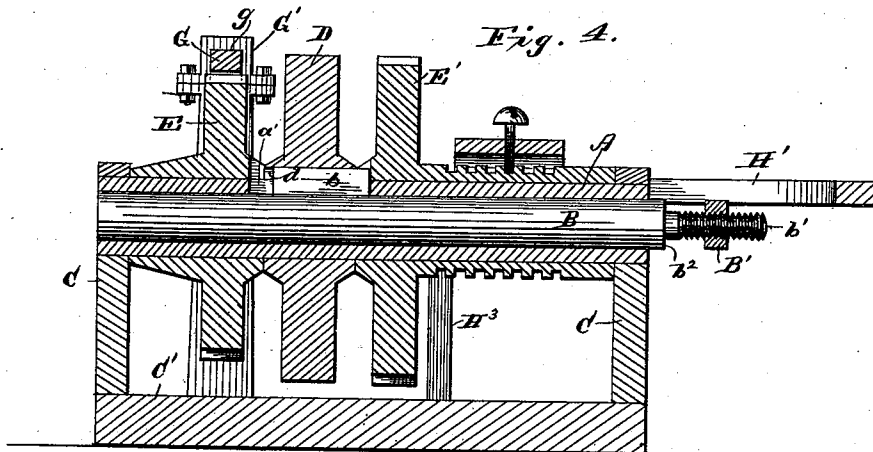
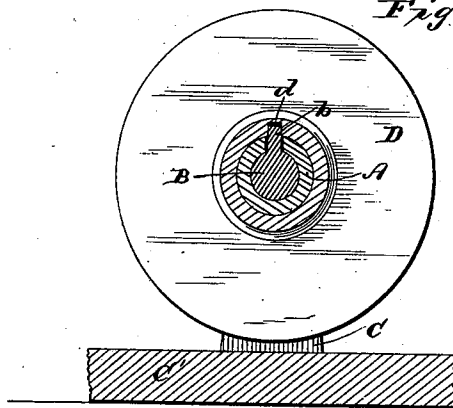


Fig. 5.



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Fig. 6.

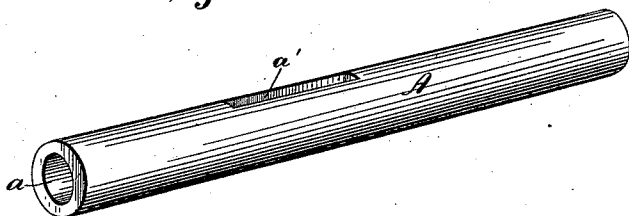


Fig. 7.

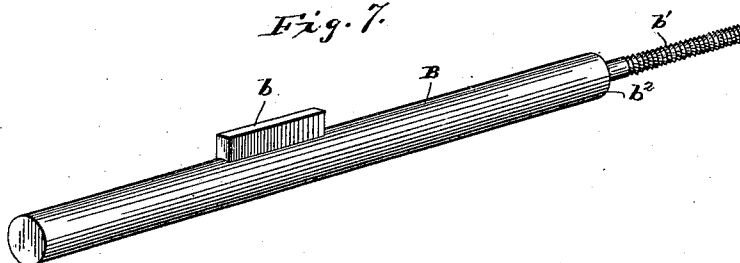
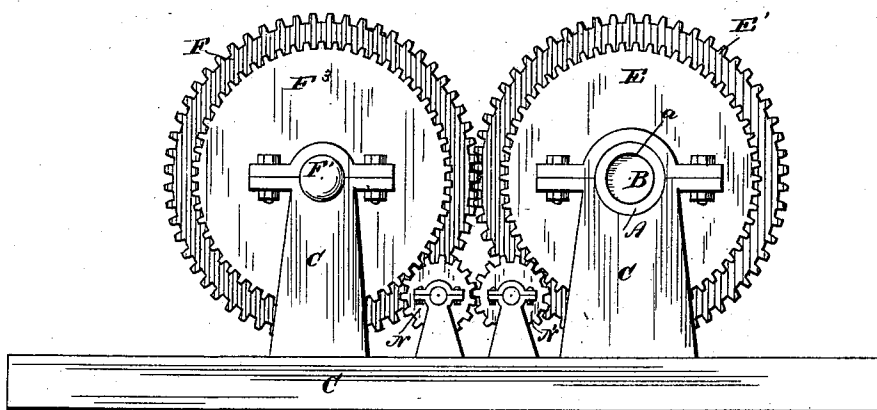


Fig. 8.



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UNITED STATES PATENT OFFICE.

JAMES E. DUNCAN, OF DUNBAR, ASSIGNOR OF ONE-HALF TO ARTHUR
BARING-GOULD, OF LISBON, DAKOTA TERRITORY.

REVERSING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 352,862, dated November 16, 1886.

Application filed May 18, 1886. Serial No. 202,552. (No model.)

To all whom it may concern:

Be it known that I, JAMES E. DUNCAN, a citizen of the United States, residing at Dunbar, in the county of Sargent and Territory of Dakota, have invented certain new and useful Improvements in Reversing Mechanisms, of which the following is a specification.

My invention relates to improvements in motion-reversing mechanisms, and has for its object the provision, in a device of the class named, of means whereby any desired extent of stroke (within certain limits) may be imparted to a reciprocating bed for different desired purposes—as, for instance, for use in metal planing and slotting machines in connection with the tool-holders thereof.

To the accomplishment of the above the invention consists in the construction, arrangement, and combination of the several parts for service, substantially as hereinafter described.

In the drawings, Figure 1 represents a plan view of a device embodying my invention. Figs. 2 and 3 represent elevations of the opposite sides thereof. Fig. 4 represents a transverse sectional view taken on the line *xx* of Fig. 1. Fig. 5 is a sectional view taken on the line *yy* through the main or driving-shaft. Figs. 6 and 7 represent detached detail perspective views of the hollow main or driving shaft and its contained key-shaft, respectively. Fig. 8 represents a modification of parts of the operating mechanism shown in Fig. 2.

Referring to the drawings, in which similar letters of reference denote similar parts, A designates the main or driving shaft, preferably having an axial bore, *a*, in which is placed and operates in longitudinal direction a shaft, B, that is provided with a key, *b*, which projects through a slot, *a'*, formed in the shaft A, for a purpose hereinafter described. The shaft A is journaled in bearing-blocks C, that project upwardly from the main bed C' at each side thereof.

D designates a driving-wheel mounted upon the shaft A, near one end thereof, and partially covering the slot *a'* of said shaft. I provide that the aperture at the middle or hub of the driving-wheel shall tightly fit the driving-shaft, and form in said hub a key-seat, *d*, the sides of which are in alignment with the sides of the slot *a'*, to permit the free backward

and forward motion of the key *b* of the shaft B, for reasons presently to be explained.

E E' designate spur-gear wheels, which are loosely mounted upon the shaft A, upon opposite sides of the wheel D, and bearing against the hubs thereof. One of said gear-wheels—to wit, E'—is of greater diameter than the remaining wheel E, and engages and rotates an equal-sized spur-gear wheel, F, that is rigidly secured upon one end of a short shaft, F', journaled in bearing-blocks F², that project from the bed C' in advance of the bearing-blocks *c*, as shown.

F³ designates a spur gear-wheel, which is rigidly secured upon the shaft F', at the end opposite that upon which the wheel F is secured. The wheel F³ is equal in diameter to the wheel E and operates in alignment therewith.

G designates a reciprocating rack-bar, that operates above and in engagement with the wheels E and F³, to move said wheels in unison, as hereinafter set forth. The bar G moves in guide-slots *g*, formed in bearing-blocks G', that project from the bed C'.

I provide the hubs *e e'* of the wheels E E' with short key-seats *e² e³*, to receive the key *b* of the shaft B. I preferably prolong the hub *e'* of the wheel E' at one side thereof, and provide the exterior of said prolongation with screw-threads *e⁴*—preferably square in cross-section—that is engaged by a pin, *h*, depending from a table, H, mounted upon a frame, H', that operates back and forth in guide-slides H², formed in blocks H³, that project from the bed C'. I provide one end of the shaft B, below the table H, with a projecting screw-threaded stud, *b'*, that receives a nut, B'.

I designate a leaf-spring secured at one end to the frame H', and projecting thence inwardly to a point between the shoulder *b²* and the nut B'.

The operation of the device is as follows: The key *b* of the shaft B being in engagement with one or the other of the wheels E E', as E', to cause said wheel to rotate in unison with the shaft A, motion is now imparted to said shaft in the direction of the arrow through the wheel D by a belt (not shown) from any desired motor, thereby rotating said wheel E', which in turn rotates the spur-wheel F in the direction

of the arrow m , thereby rotating the spur-gear wheel F^3 , rigid with said wheel F , and moving the rack-bar G forward in direction of arrow n , thus causing the gear-wheel E , now loose on the shaft A , to rotate in unison with the wheel F^3 , and in a direction opposite to that of the wheel E' . At the same time the table H will be drawn inward by the action of the screw-threaded hub of the wheel E' until the spring I strikes against the shoulder b^2 of the shaft B , forcing said shaft inward, and its key b into engagement with the key-seat of the wheel E , whereby the above-described motion of the gear-wheels will be reversed, said shaft A operating the wheel E' through the gear-wheels $E F^3 F$ and rack G , to move the table outward, which movement will cause the spring to be brought into contact with the nut B' , by which the movements of the gear-wheels and rack-bar will be changed to those first described. By adjusting the nut B' nearer to or farther from the shoulder b^2 the table H may be caused to move back and forth to a greater or less distance, as will be readily apparent.

In Fig. 8 I have shown a modification of the rack employed to give backward rotation to the wheel E' , such modification consisting in idle-gear wheels $N N'$, properly journaled upon the bed C' , and in gear with each other and the gear-wheels F^3 and E .

The device herein shown and described may be employed advantageously in connection with different machines—as, for instance, in metal-planers and shaping-machines—in which case the cutters may be secured to the table H and move therewith.

Without limiting myself to the exact construction of parts herein described, I claim—

1. In combination, a hollow shaft, a driving-wheel mounted thereon, continuously-rotating oppositely-moving spur-gear wheels upon said shaft at opposite sides of said driving-wheel, and means, substantially as described, whereby the movement of said spur-wheels is reversed, as and for the purpose set forth.

2. A hollow shaft having a key-slot, a driving-wheel mounted thereon, and continuously-rotating oppositely-moving spur-gear wheels upon said shaft at opposite sides of said driving-wheel, in combination with a shaft placed within said hollow shaft and provided with a key adapted to continuously engage said driving-wheel and to engage said spur-gear wheels alternately, substantially as described.

3. A hollow shaft having a key-slot and a shaft therein provided with a key, in combination with a driving-wheel mounted upon said hollow shaft, spur-gear wheels upon said shaft at opposite sides of said driving-wheel, and means, substantially as described, whereby said key is maintained in continuous engagement with said driving-wheel and is brought into alternate engagement with said spur-wheels, as and for the purpose set forth.

4. In combination, a hollow shaft having a key-slot, a shaft therein provided with a key, a driving-wheel mounted upon said hollow

shaft in constant engagement with said driving-wheel, continuously-rotating spur-gear wheels upon said shaft at opposite sides of said driving-wheel, and means, substantially as described, to move said key alternately into engagement with said spur-wheels and to rotate said wheels in opposite directions, as and for the purpose set forth.

5. In a device for converting motion, a hollow driving-shaft having a slot, a key-shaft having a key placed and operating within said hollow shaft, a spur-gear wheel loosely mounted upon said hollow shaft and provided with a screw-threaded boss or hub, in combination with a traveling table, substantially as described.

6. A hollow shaft having a slot, a shaft therein having a key, and continuously-rotating oppositely-moving spur-gear wheels loosely mounted upon said shaft and provided with key-seats, in combination with spur-gear wheels rigidly secured to a rotatable shaft, and a rack-bar, as G , substantially as described.

7. In a device for reversing motion, a hollow shaft having a slot, a shaft therein having a key, gear-wheels loosely mounted and continuously rotating in opposite directions upon said shaft and provided with key-seats, in combination with spur-gear wheels rigidly secured to a shaft rotating in a parallel plane with said hollow shaft, rack-bar, as G , and traveling table, as H , substantially as described.

8. In a device for converting motion, a traveling table having a depending pin, as h , in combination with a spur-gear wheel, as E' , having a screw-threaded hub, and means, substantially as described, for alternately rotating said wheel in opposite directions to move said table forward and backward.

9. A hollow shaft having a slot, a shaft thereon having a key, b , and a screw-threaded projection, b' , in combination with a spur-gear wheel mounted upon said shaft and provided with a screw-threaded boss or hub, and a table, H , provided with a spring, I , substantially as described.

10. In a device for reversing motion, a table, as H , having a spring, as I , and a depending pin, as h , in combination with a spur-gear wheel, as E' , having a screw-threaded hub, as e' , and mounted upon a hollow shaft having a key-slot, a shaft within said hollow shaft having a key, as b , and a screw-threaded projection, as b' , and an adjusting-nut, as B' , substantially as described.

11. In a device for reversing motion, a spur-gear wheel, as F^3 , rigidly secured to a shaft, as F' , in combination with a spur-gear wheel, as E , loosely mounted upon a shaft, as A , and a rack, G , for operating said wheels in unison, and means, substantially as described, to reverse the direction of rotation of said wheels.

12. A bed, as C' , having bearing-blocks C , a hollow rotatable shaft journaled in said blocks and provided with a slot and a longitudinally-moving key-shaft, and oppositely-rotating gear-wheels $E E'$, loosely mounted upon said

hollow shaft, in combination with a rotatable shaft, as F', gear-wheels, as F' F', rigidly mounted thereon, rack-bar C, and means, substantially as described, for rotating said wheels E E' in alternate opposite directions, as and for the purpose specified.

13. A hollow rotating shaft having a key-slot, a shaft therein having a key, and a projecting screw-threaded end having an adjustable nut thereon, in combination with oppositely-rotating spur-gear wheels loosely mounted upon said hollow shaft, and an adjustable stop to engage said nut to reverse the direction of rotation of said gear-wheels, substantially as described.

14. The combination of a stop adjustably se-

cured upon a longitudinal shaft having a key and held within a rotatable hollow shaft having a key-slot, and oppositely-moving spur-gear wheels mounted thereon at opposite sides of a driving-wheel, and a reciprocating table having a stop to engage the stop upon the longitudinal shaft to reverse the direction of rotation of said spur-gear wheels, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JAMES E. DUNCAN.

Witnesses:

JOHN J. TULLER,
GEO. F. GOODWIN.