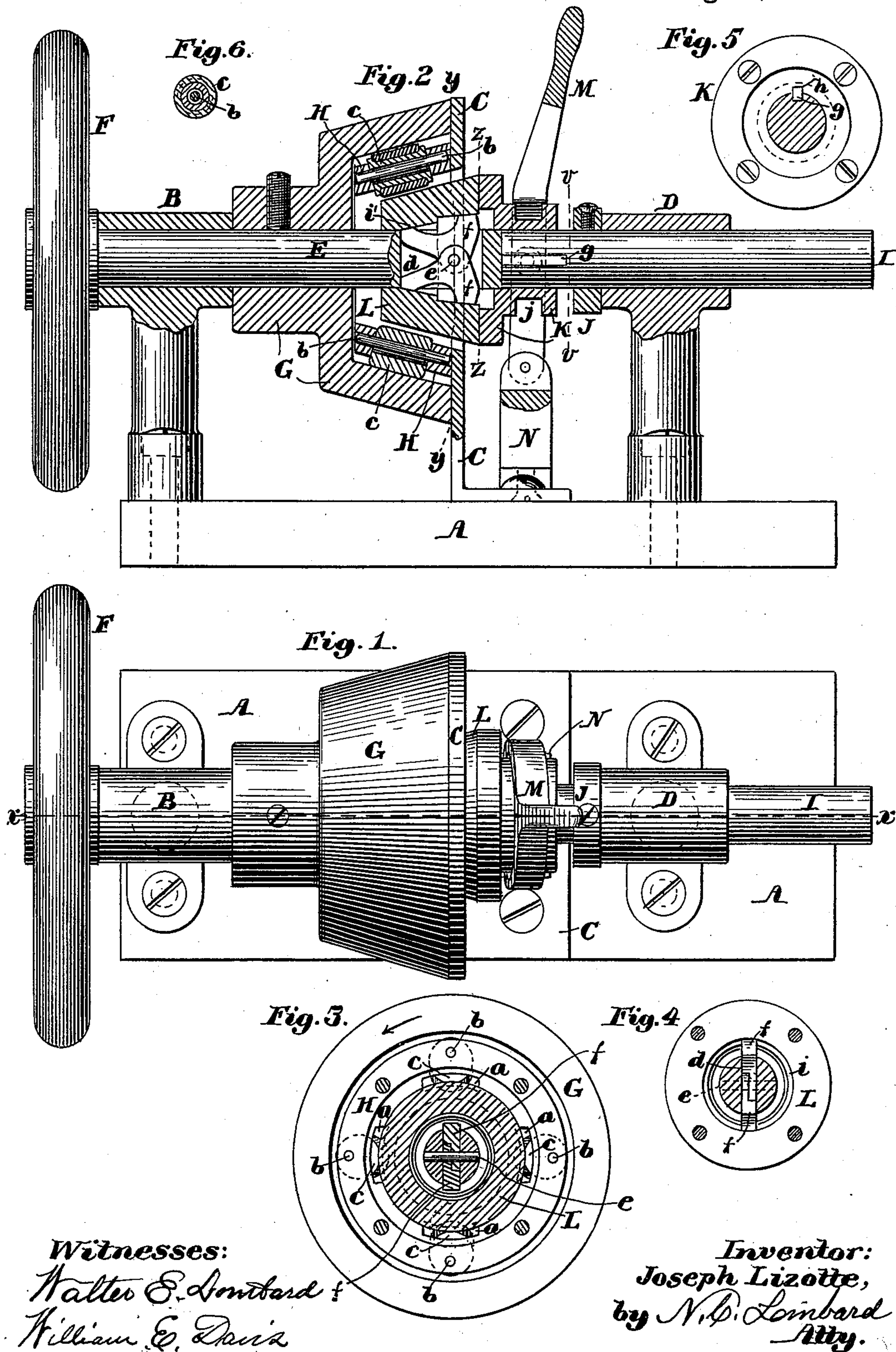


(No Model.)

J. LIZOTTE.  
REVERSING MECHANISM.

No. 587,319.

Patented Aug. 3, 1897.



Witnesses:  
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# UNITED STATES PATENT OFFICE.

JOSEPH LIZOTTE, OF QUINCY, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO  
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## REVERSING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 587,319, dated August 3, 1897.

Application filed April 13, 1897. Serial No. 631,889. (No model.)

*To all whom it may concern:*

Be it known that I, JOSEPH LIZOTTE, of Quincy, in the county of Norfolk and State of Massachusetts, have invented certain new  
5 and useful Improvements in Reversing Mechanisms, of which the following, taken in connection with the accompanying drawings, is a specification.

My invention relates to reversing mechanisms, is especially adapted to use in operating lathes, screw-propeller shafts, or other revolving shafts that are in axial line with the operating-shaft, especially when said operating-shaft is driven by a power-engine  
15 that cannot of itself be reversed; and it consists in certain novel features of construction, arrangement, and combinations of parts which will be readily understood by reference to the description of the accompanying  
20 drawings and to the claims hereto appended, and in which my invention is clearly pointed out.

Figure 1 of the drawings is a plan of a machine illustrating my invention. Fig. 2 is a  
25 sectional elevation of the same, the cutting-plane being on line *xx* on Fig. 1. Fig. 3 is a vertical section on line *yy* on Fig. 2, looking toward the left of said Fig. 1. Fig. 4 is a sectional elevation of the driving-shaft and  
30 the central cone, the cutting-plane being on line *zz* on Fig. 2. Fig. 5 is a transverse section of the driven shaft on line *vv* on Fig. 2 and showing an end elevation of the central cone and shipper-hub. Fig. 6 is a transverse section  
35 of one of the friction-rolls carried by the fixed intermediate cone.

In the drawings, A is the bed of the machine, upon which are firmly secured the stands B, C, and D, and E is the driving-  
40 shaft, mounted in the stand B and having secured to its outer end the fly-wheel F, by which said shaft may be revolved.

The fly-wheel F would in practice have a crank-pin set therein, or the shaft E would  
45 be provided with an independent crank or other suitable means of transmitting motion from a gas or explosive engine or other motive-power machine that could not conveniently have its motion reversed; but as the means  
50 employed for imparting a rotary motion to the driving-shaft is no part of my present in-

vention it is not illustrated or further described herein, the fly-wheel F, used as a hand-wheel, serving every necessary purpose of illustrating my invention. The shaft E  
55 also has firmly secured thereto, so as to revolve therewith, the hub G, having a frusto-conical chamber formed in its inner end concentric with the axis of said shaft, as shown in Figs. 2 and 3.

The stand C, against which the inner end of the hub G abuts, has a circular opening cut through it concentric with the axis of said hub G and has firmly secured thereto or  
60 formed thereon the frusto-conical ring H, which projects into the chamber in said hub and has its outer and inner surfaces parallel to the inner surface of said chamber, but removed therefrom, as shown in Fig. 2.

The ring H has cut transversely through it  
70 a plurality of rectangular openings *a a*, in each of which is loosely mounted upon a pin *b* a friction-roll *c*, having a longitudinal opening through it of considerably larger diameter than the pin *b*, so that said roll may be movable outward or inward and also be revoluble  
75 about said pin *b*.

When in operation, the shaft E and hub G are revolved in the direction indicated by the arrow on Fig. 3.

The shaft E has a rectangular slot *d* cut transversely through it near its inner end in which are mounted upon a common pivot-pin  
80 *e* a pair of dogs or elbow-levers *f f*, as shown in Figs. 2, 3, and 4.

I is the shaft to be driven, is mounted in a bearing in the stand D in axial line with and abutting against the inner end of the shaft E, and is prevented from being moved away from said shaft E by the collar J, secured  
90 thereto at the inner end of said stand D, as shown in Figs. 1 and 2.

The shaft I has mounted upon its inner end the flanged hub K in such a manner that it may be moved endwise thereof and revolved  
95 therewith, said shaft having set therein the spline *g*, which engages the slot or keyway *h*, formed in said hub, as shown in Figs. 2 and 5.

The flange of the hub K has firmly secured thereto the hollow frustum of a cone L, which  
100 projects into the frusto-conical ring H with its peripheral surface parallel to the inner



conical surface of said ring, but removed therefrom, as shown.

The cone L has a central opening through it from end to end, the smaller end of which embraces and has a bearing upon the shaft E, while the opposite end portion *i* of which is considerably larger in diameter and slightly conical, with the peripheral surface of which the dog ends of the elbow-levers *f* engage to compel the shaft I to revolve with the shaft E when the cone L is moved toward the right of Figs. 1 and 2, and the middle section *i'* of said opening in said cone is somewhat more conical or tapering and acts upon the longer arms of the elbow-levers *f f* to move them about their common pivot and cause the dog ends of said levers to engage the inner surface of the larger section of said opening, as before described.

M is a shipper-lever pivoted to the stand N, spanning the hub K and having a pair of anti-friction-rolls mounted upon studs set in said shipper and entering a peripheral groove *j*, formed in said hub K, all as shown in Figs. 1 and 2, said studs and anti-friction-rolls being shown only in dotted lines in Fig. 2.

The rolls *c*, mounted in the frusto-conical ring H, may be made as shown in Fig. 6 and in the upper portion of Fig. 2, in which it is composed of a metal spool-like core and a covering of rubber, leather, or any other suitable frictional material, or they may be made entirely of metal, as shown in the lower portion of the ring H in Fig. 2.

The operation of my invention is as follows: The parts being in the positions shown in the drawings, with the shipper moved to the extreme of its movement toward the right of Fig. 2, the dogs *f f* are forced into firm engagement with the inner surface *i* of the frustum of a cone L by the action of the surface *i'* of said cone upon the longer arms of said dogs, and if power is applied to the shaft E, through the fly-wheel F or otherwise, to revolve said shaft in the direction indicated by the arrow on Fig. 3 the shaft I will be revolved in unison with and in the same direction as the shaft E. If now the shipper-lever M be moved to the extreme of its movement toward the left of Fig. 2, the dogs *f f* will be disengaged from contact with the surface *i*, and the frustum of a cone L will engage the rolls *c c*, force them outward into contact with the wall of the frusto-conical chamber in the hub G, when they will revolve, and acting upon the outer conical periphery of the cone L will cause it and the shaft I to be revolved in the reverse direction to that of the shaft E.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. The combination of a driving-shaft and a shaft to be driven mounted in suitable bearings in axial line with each other and their adjacent ends in near proximity to each other; means for rotating said driving-shaft in a given direction; a cam-operated dog-gripping

mechanism for coupling said shafts to cause said driven shaft to revolve in unison with and in the same direction as the driving-shaft; a frictional coupling mechanism constructed and arranged to rotate said driven shaft in a direction opposite to the rotation of said driving-shaft, both of said coupling mechanisms being mounted upon and revoluble with said shafts; and a shipping mechanism constructed and arranged to throw one of said coupling mechanisms out of action as the other coupling mechanism is thrown into action and vice versa.

2. The combination of a driving-shaft and a shaft to be driven mounted in suitable bearings in axial line with each other with their adjacent ends in near proximity to each other; means for rotating said driving-shaft in a given direction; a pair of pivoted dogs or elbow-gripping levers carried by said driving-shaft and revoluble therewith; a shipper-hub mounted upon, movable endwise of, and revoluble with said shaft to be driven; a tubular hub or sleeve secured to said shipper-hub and movable therewith and inclosing said dogs, and provided with an annular inclined or cam surface to act upon and move said dogs about their fulcrums and cause them to engage the inner perimeter of said tubular hub; and a shipper-lever for moving said hub endwise of said shafts to couple or uncouple the same.

3. The combination of a driving-shaft and a shaft to be driven mounted in suitable bearings in axial line with each other and with their adjacent ends contiguous to each other; means for revolving said driving-shaft in a given direction; a hub firmly secured upon and revoluble with said driving-shaft, and having a frusto-conical chamber in its end toward the shaft to be driven; a pair of pivoted dogs or elbow-gripping levers carried by said driving-shaft, and revoluble therewith; a shipper-hub mounted upon, movable endwise of and revoluble with the shaft to be driven; a tubular frustum of a cone secured to and movable with said shipper-hub and projecting into the frusto-conical chamber in the hub secured upon the driving-shaft, and inclosing said dogs and provided with an annular inclined or cam surface to act upon said dogs to move them about their fulcrums; a frusto-conical ring mounted in a fixed or non-revoluble position between the outer peripheral surface of said frustum of a cone, and the inclined walls of the frusto-conical chamber of the hub carried by the driving-shaft but removed from contact with both of said surfaces, and provided with a plurality of transverse openings through the same; a plurality of friction-rolls mounted in said openings and having diameters greater than the thickness of said ring; and a shipper-lever for moving said shipper-hub and frustum of a cone endwise of said shafts as and for the purposes described.

4. The combination of the shafts E and I;



the stands B, C, D and N; means for rotating the shaft E in a given direction; the conically-chambered hub G carried by the shaft E; the grip-levers or dogs *f, f*, pivotally mounted in  
5 a slot in said shaft E; the shipper-hub K; the tubular frustum of a cone L provided with the annular inclined or cam surface *i'*; the frusto-conical ring H secured in a fixed position to the stand C and provided with a plu-  
10 rality of transverse openings *a, a*; the pins *b, b*, set in said ring and spanning said openings *a, a*; the rolls *c, c*, mounted upon said pins but provided with longitudinal bores of greater

diameters than said pins; and the shipper-lever M pivoted to the stand N, and engaging 15 said hub K, all constructed, arranged and operating substantially as described.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 6th day of 20 April, A. D. 1897.

JOSEPH LIZOTTE.

Witnesses:

N. C. LOMBARD,

GEORGE H. BROWN.