J. BUCK.

OPERATING MECHANISM FOR GEAR CUTTING MACHINES.

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1,163,503. Patented Dec. 7, 1915.

Fig. 1.

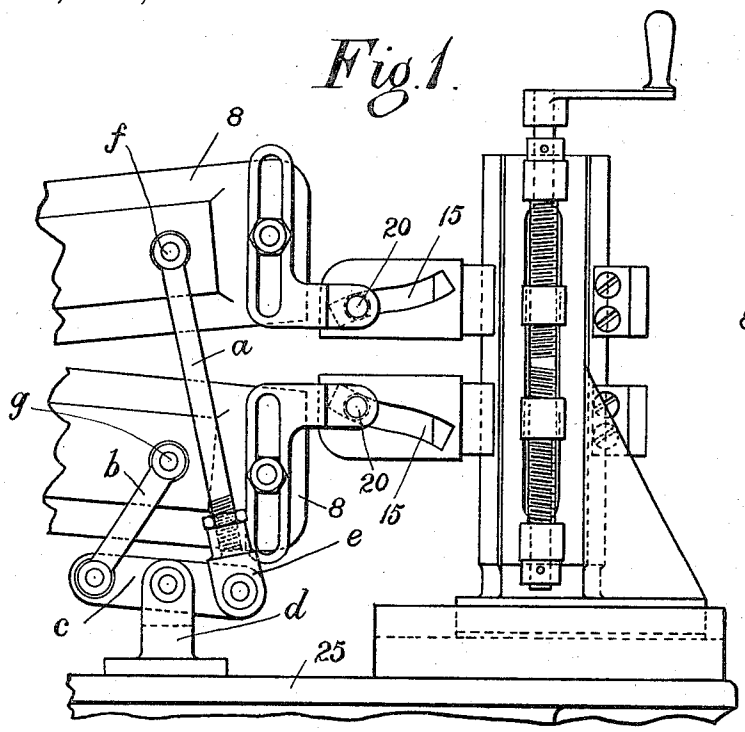


Fig. 2.

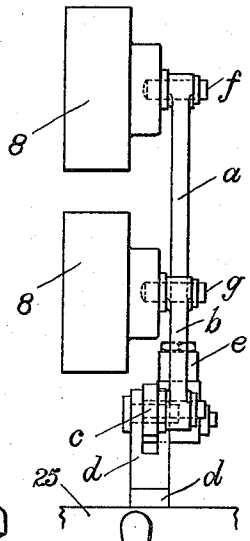
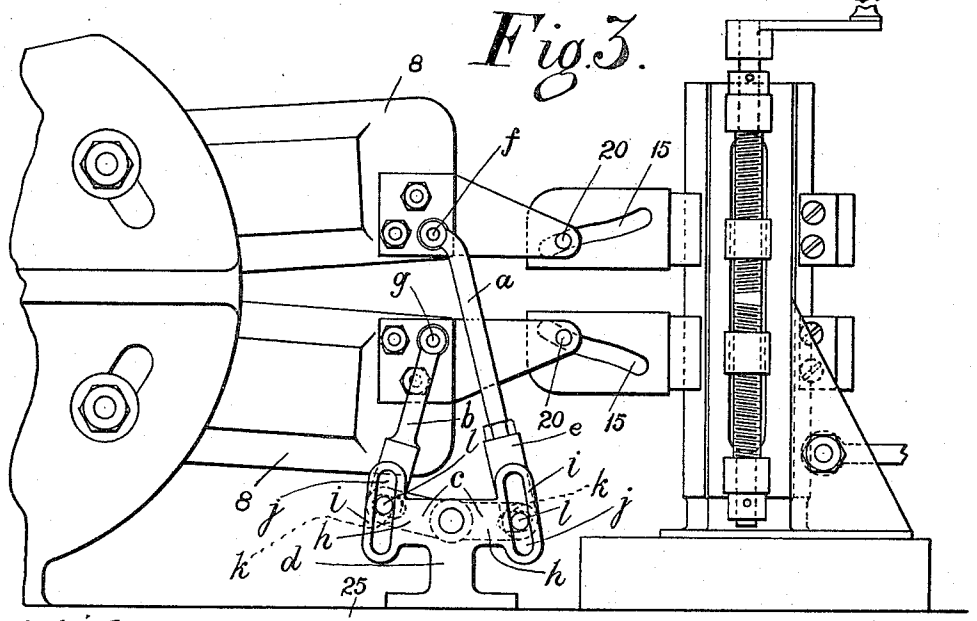


Fig. 3.



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OPERATING MECHANISM FOR GEAR-CUTTING MACHINES.

1,163,503. Specification of Letters Patent. Patented Dec. 7, 1915.

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To all whom it may concern:

Be it known that I, JOHN BUCK, a subject of the King of Great Britain, residing at Lincoln, England, have invented certain new and useful Improvements in Operating Mechanism for Gear-Cutting Machines, of which the following is a specification.

The present invention relates to mechanical movements, and particularly to a construction of improved appliance for use in connection with bars, rods, plates, levers, or the like, which are suitably arranged to be moved in unison, and preferably, with a movement relative to each other, and capable of actuating other mechanism, or causing a definite action or series of actions of said mechanism.

It is the object of this invention to produce means whereby the bars, rods, plates, levers, or the like, are balanced in all positions they may occupy and during their operation, so that the work which is effected by said operation is done with the greatest possible accuracy and evenness without fear of slip or disconformity and without the use of weights, pullevs, coil springs, or the like contrivances heretofore used.

For the purpose of this invention, the latter will be described and illustrated as for use in connection with my bevel wheel cutting machine shown and described in my British Patent No. 22,132 of 1913, and in my United States application Serial No. 817,030, filed February 6, 1914, but it is to be understood that the present invention for balancing the moving parts can be applied to other classes of machines in which a similar to and fro movement of two elements hinged or pivoted together, or to another appliance, is required to perform a definite action or series of actions of mechanism connected with said elements while the elements are at rest.

The invention further consists in a certain construction, arrangement and combination of parts hereinafter more fully described and finally pointed out in the appended claims.

Figure 1 is a side elevation of one form of the invention as applied to a portion of the machine set forth in the above-mentioned patent. Fig. 2 is an end view of Fig. 1. Fig. 3 is a view similar to Fig. 1, however, illustrating a slightly modified construction of the present invention.

In carrying my invention into practice, means are provided for balancing the two backing or grooved plates carrying the cutter slides and holding them in the position placed by the slots of the formers engaging the tracer pins of the adjustable pieces upon the back of the grooved plates. The said means consist, as shown in Fig. 1, of the two rods or bars *a* and *b* pivoted to each of the two back or grooved plates 8, said rods having their opposite ends pivotedly connected to the opposite ends of a rocking lever *c* pivotedly mounted and supported intermediate its ends, and preferably at its center, to an arm or post *d* secured to the frame 25 of the machine, or to some suitable fixed part thereof. The rod *a* is considerably longer than the rod *b* and is pivoted to the backing plate 8 farthest away from the post *d*, both rods may be screw-threaded in a socket, as shown at *e*, however, as here shown, the rod *a* is connected with the socket *e*, which latter is pivotedly connected with the opposite end of the lever *c*. The socket *e*, together with the nut *e'*, permit a longitudinal adjustment of the rod or the distance between the pivot points *f* and *g* to be varied to suit the position of the rocking lever *c* and the post *d*, the rocking lever *c* normally lying at substantially right angles to the rods *a* and *b*.

By the above construction of levers, a perfect balance of the back or grooved plates 8 can be had and thus keep the tracers 20 in proper contact with their respective patterns 15 without the use of heavy weights, pulleys or springs, and consequently, effecting the work to be done with great accuracy and evenness and minimizing a possible imperfect operation of the cutting mechanism.

In order to obtain perfect synchronization of the moving bodies, such as the parts 8, the post or arm *d*, carrying the rocker lever *c*, may be formed with the horizontal extensions *h* having their ends provided with the vertical extensions *i*. The extensions *i* are formed with the substantially vertical and relatively converging slots *j* and the ends of the rocking lever *c* are formed with the slots *k* which are arranged at substantially right angles to the slots *j* and approximate in position with said latter slots *j* formed in the extensions *i*. The pivot pins *l* of the rods *a* and *b* pass through the slots *k* and the vertical or diagonal slots *j*, thereby upon movement of the rocking lever *c*, the pivot pins *l*, or their equivalent in the rods *a*

and *b*, will ride along the slots *k* of the rocking lever *c* and along the slots *j* of the extension *i* of the post *d*. Thus, the rods will partake of equal vertical movements at their ends and, consequently, effect the obtainment of a perfect synchronization of the moving bodies.

The pivot pins *l* of the rods *a* and *b* may be positioned in guide blocks which may be fitted in the slots to give them a larger bearing surface.

The post *d* carrying the rocker lever *c* may be fitted below the moving bodies, as is shown in the drawings, in which case, the weights on the connecting levers are in compression, or, if desired, the post *d* may be mounted above the moving bodies, in this case, the levers are in tension.

Only one half of the pattern 15 may be employed, if desired.

Having thus described my invention, it is believed that a full and clear understanding of the same may be had, however, it is to be understood that certain changes as to the precise construction, combination and arrangement of parts may be resorted to that fall within the legitimate scope of the appended claims.

I claim:—

1. The combination with two parts of an operating mechanism, said parts being adapted to move together in unison and with a movement relative to each other, of a lever pivoted intermediate its ends and formed with a slot in each end thereof extending in a direction longitudinal of the lever, a bar connected with each respective part, a projection on each bar and adapted to be loosely received in the slots in the opposite ends of the lever, guides arranged adjacent the ends of said lever and extending in a direction substantially at right angles to said slots, the projection extending into the said slots being adapted to extend into and be guided by the adjacent guide, substantially as described.

2. The combination with two parts of an operating mechanism, said parts being adapted to move together in unison and with a movement relative to each other, of a supporting post, a lever centrally pivoted on said supporting post and formed with slots in its opposite ends and extending longitudinally thereof, extensions formed on said post and formed in the ends thereof with guide slots approximating each of the slots of said lever and extending substantially at right angles thereto, bars connected to each of said operating parts, and a projection formed on each of the bars and loosely extending into the slot in the opposite ends of said lever, said projection also extending into the adjacent guide slot of said extension, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

JOHN BUCK.

Witnesses:
T. W. Rose,
J. Wilkinson.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."