(No Model.) 4 Sheets—Sheet 1.

E. J. FLATHER.

CHANGE GEAR LATHE.

No. 595,562. Patented Dec. 14, 1897.

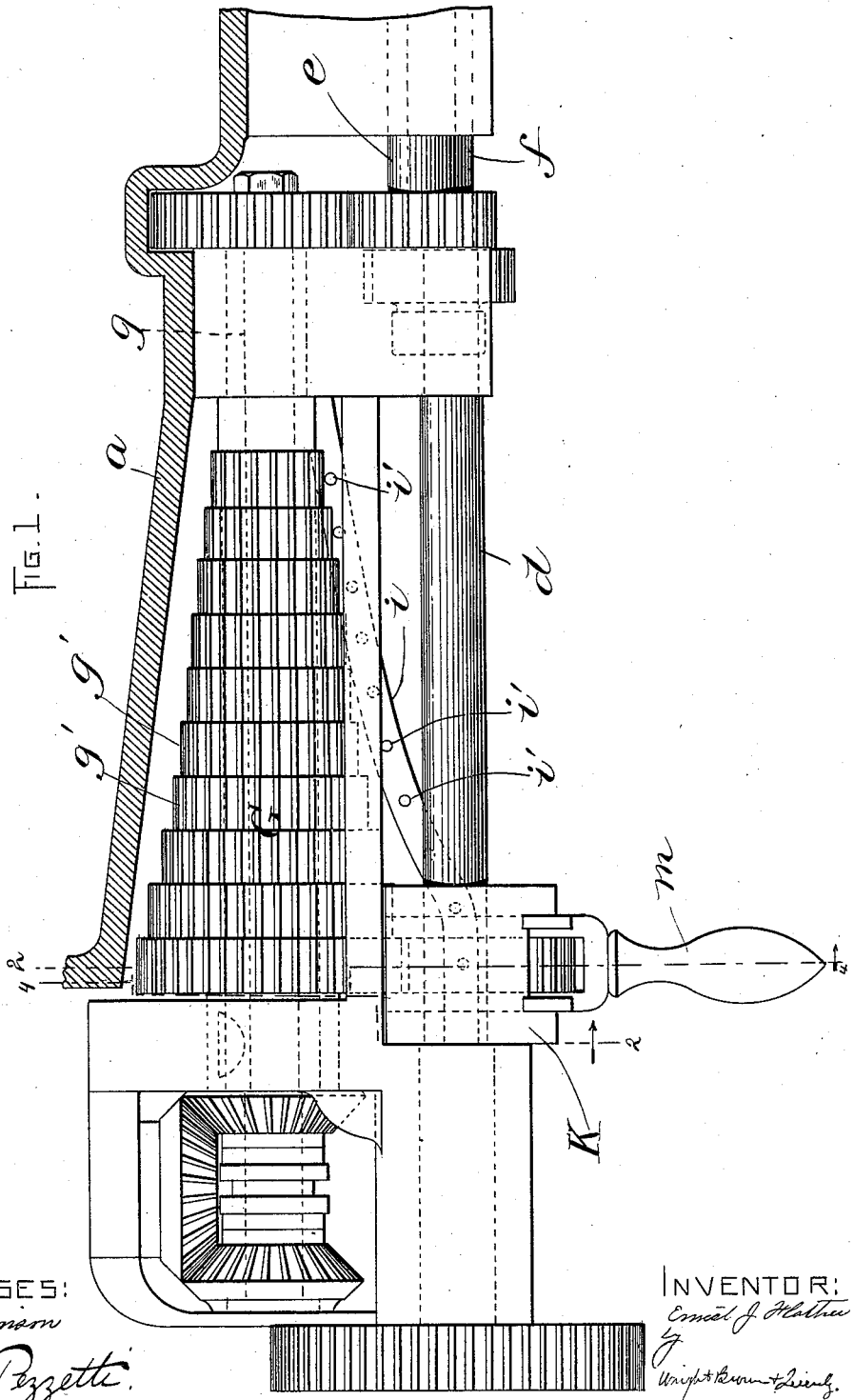

FIG. 1.

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(No Model.) 4 Sheets—Sheet 2.

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CHANGE GEAR LATHE.

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FIG. 2.

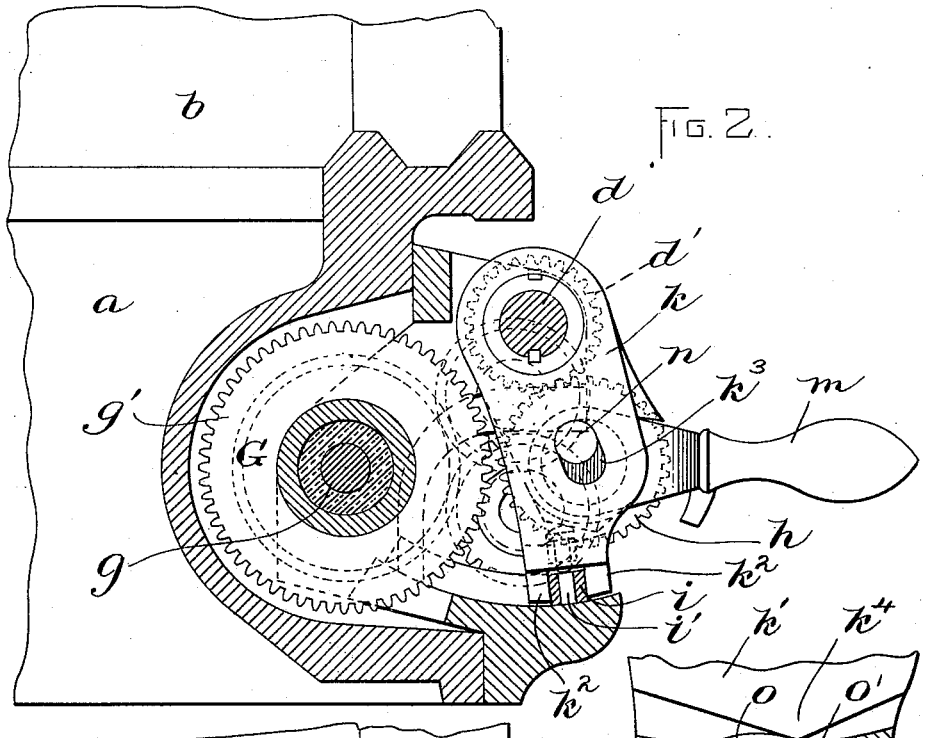


FIG. 3.

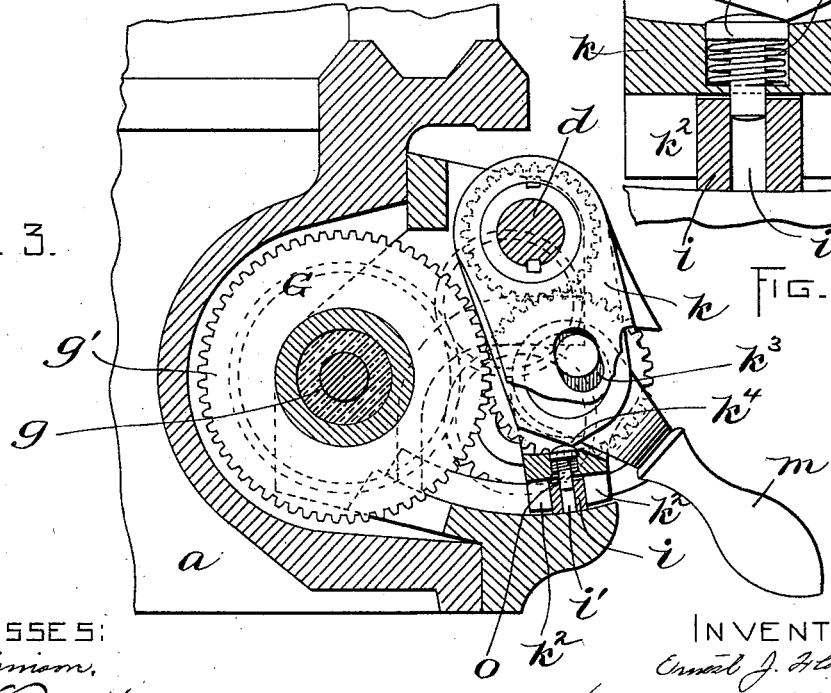
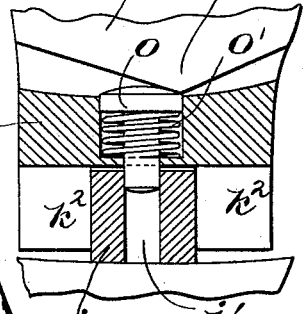


FIG. 9.



WITNESSES:
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4 Sheets—Sheet 3.

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CHANGE GEAR LATHE.

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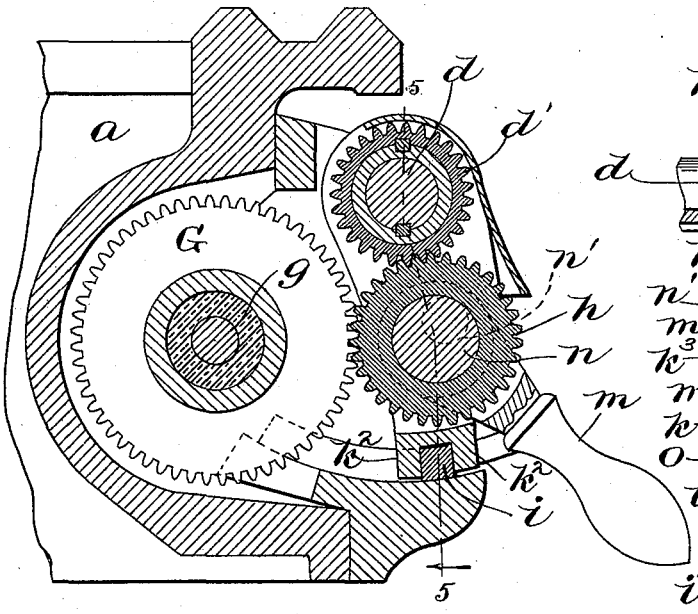

FIG. 4.

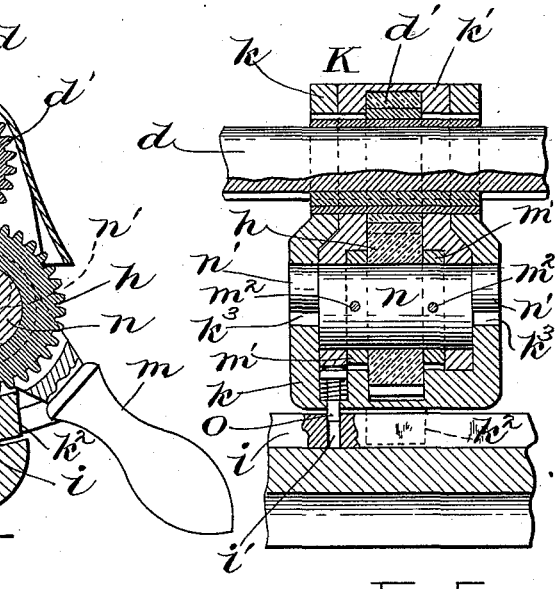

FIG. 5.

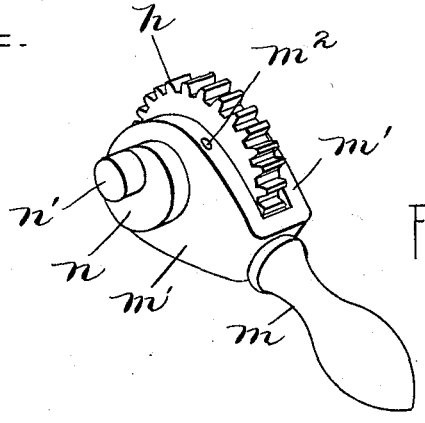

FIG. 6.

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CHANGE GEAR LATHE.

No. 595,562. Patented Dec. 14, 1897.

FIG. 7

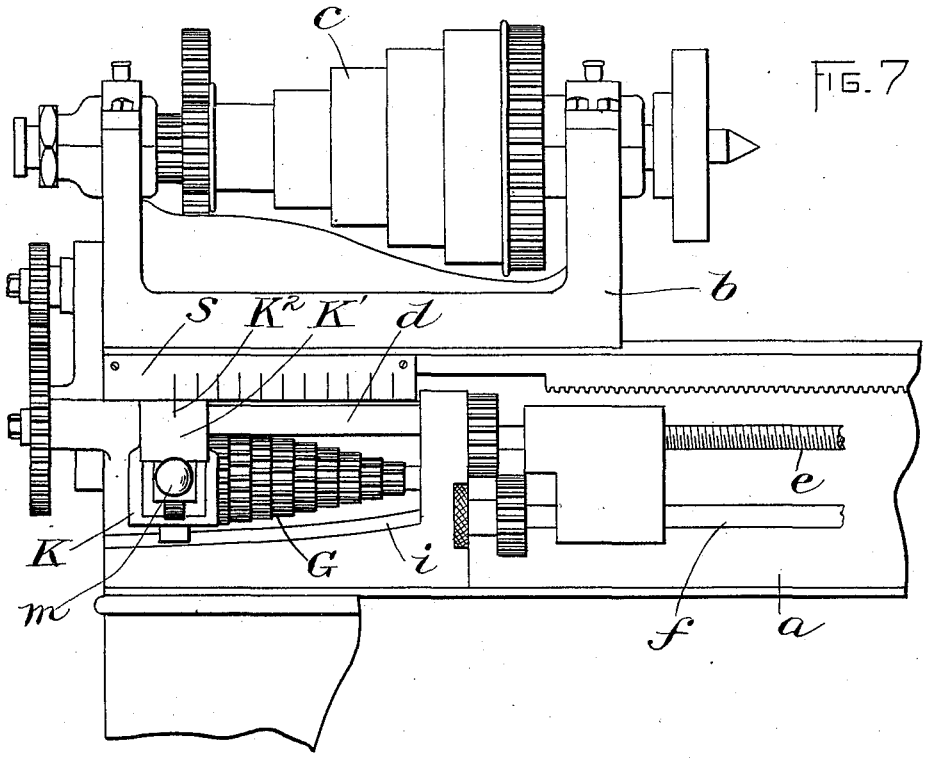
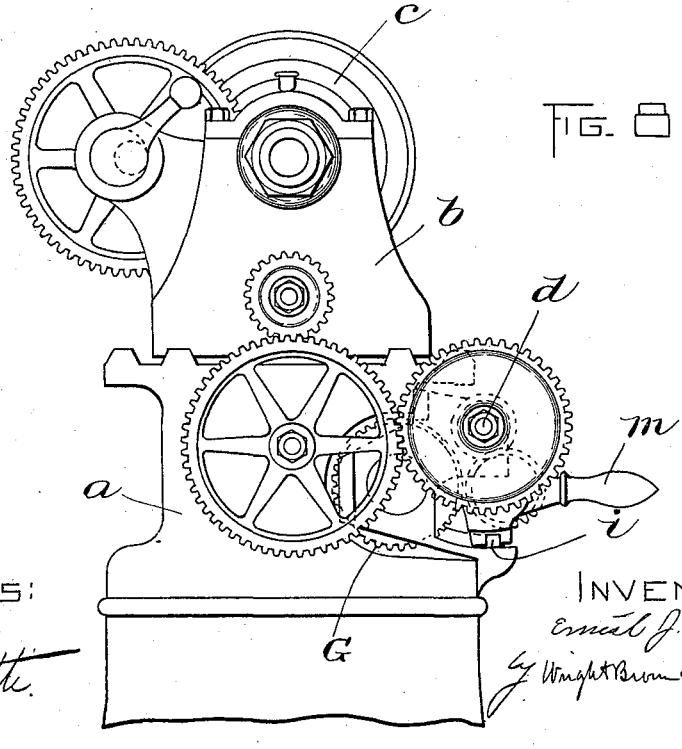


FIG. 8



WITNESSES:
A. D. Harrison.
P. W. Pezzetti.

INVENTOR:
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Attys.

UNITED STATES PATENT OFFICE.

ERNEST J. FLATHER, OF NASHUA, NEW HAMPSHIRE.

CHANGE-GEAR LATHE.

SPECIFICATION forming part of Letters Patent No. 595,562, dated December 14, 1897.

Application filed June 11, 1897. Serial No. 640,317. (No model.)

To all whom it may concern:

Be it known that I, ERNEST J. FLATHER, of Nashua, in the county of Hillsborough and State of New Hampshire, have invented certain new and useful Improvements in Change-Gear Lathes, of which the following is a specification.

This invention relates to the production of a novel change-gear mechanism for lathes and other machines of the same general class; and it consists in the novel features of construction and relative arrangement of parts hereinafter fully described in the specification, clearly illustrated in the drawings, and particularly pointed out in the claims.

Reference is to be had to the accompanying four sheets of drawings, forming a part of this application, in which like characters are used to indicate like parts wherever they occur.

Figure 1 represents a top plan view of the change-gear mechanism in a lathe constructed according to my invention, parts being shown in section. Figs. 2 and 3 represent sections on the line 2 2 of Fig. 1, showing off and on positions of the mechanism. Fig. 4 represents a section on the line 4 4 of Fig. 1. Fig. 5 represents a section on the line 5 5 of Fig. 4. Fig. 6 represents a detail perspective view of the operating-handle and intermediate or idler gear employed. Fig. 7 represents a side elevation of the head of the lathe. Fig. 8 represents an end elevation thereof. Fig. 9 represents a detail sectional view which will be referred to hereinafter.

Referring to the drawings, in the embodiment of my invention therein shown and selected by me for the purpose of illustrating my invention *a* represents the lathe-bed, *b* the head-stock, and *c* the cone-pulley in a screw-cutting lathe, all of which parts are of the ordinary construction.

Power is transmitted from the head-stock shaft by suitable gearing to a shaft *d*, which I will call the "power-shaft," and from said power-shaft, through the intermediate gearing, which I shall describe, to the lead-screw *e* or to the feed-rod *f*. Upon a shaft *g* is mounted a stepped or cone gear G, such as is commonly employed in machines of this class for effecting a change of speed in the lead-screw. A gear-pinion *d'*, splined to the power-shaft *d* and adapted to travel longitudinally along the same, is permanently engaged with an intermediate gear or idler *h*, which may be thrown into or out of engagement with any one of the gears *g' g'* which compose the cone G. The pinion *d'* and the idler *h* are held in a traveler K, which comprises an outer frame *k* and an inner frame *k'*, both of which are loosely mounted on the power-shaft *d* or on an elongated bushing surrounding the same and bearing the pinion *d'*. The lower end of said traveler is confined to a fixed path by means of a diagonal gib or guide *i*, engaged by ears k^2 k^2 on the outer frame *k* and provided with a series of sockets *i' i'*, corresponding to the several gears *g'*. Between the arms of the inner frame *k'* of the traveler is a lever *m*, provided with a suitable handle and formed with forks *m' m'*. The said forks are secured by pins m^2 to a cylindrical shaft *n*, which is provided with bearings in the said frame *k'* and upon which is loosely mounted the idler-gear *h*. At both ends of the shaft *n* and at one side of its central axis are formed cylindrical studs *n' n'*, which project into slots k^3 in the sides of the outer frame *k*. The said frame being confined by the gib *i* and the inner frame being free to oscillate about the shaft *d*, it will be seen than when the shaft *n* is turned in its bearings by raising or depressing the lever *m* it acts as an eccentric upon the studs *n'* and throws the idler-gear out of or into engagement with the cone-gear G. The lower end of one arm of the inner frame *k'* is formed, as shown in Figs. 3 and 9, with a cam projection k^4, which actuates a spring-detent *o*. The said detent consists of a headed pin carried by the frame *k* and provided with a spring *o'*, by which it is kept in contact with the projection k^4. The shank of said pin projects through the bottom of the frame *k* and is adapted to engage any one of the sockets *i'* in the guide *i*.

When the idler *h* is thrown out of engagement with the cone-gear G, as represented in Fig. 2, the pin *o* is projected upwardly by its spring out of engagement with the sockets *i'* and the traveler K may be moved to any desired position along the shaft *d*.

The change of gear and consequent change of speed in the feed-carriage of the lathe are very quickly and easily effected by raising

the lever *m*, shifting the traveler K to the desired position, and then depressing the handle until the idler-gear engages one of the gears *g'*. The traveler becomes locked in position by the engagement of the pin *o* with one of the sockets *i'* when the lever is depressed.

As a means for determining the various positions of the traveler K, I provide a graduated scale S on the lathe-bed and an index-mark K^2 at a suitable place, such as the cap K', on the top of the traveler.

It will be observed that the mechanism is compact and well set into the head of the lathe-bed. This does away with a housing for the parts and removes what is ordinarily an obstruction to the movements of the workmen in lathes with outside change-gear devices.

It is obvious that by slight changes in construction I could dispense with the independent shaft *g*, upon which the cone-gear G is mounted, and mount said gear directly upon a continuation of the lead-screw.

Having thus explained the nature of my invention and described a way of constructing and using the same, though without attempting to set forth all the forms in which it may be made or all the modes of its use, what I claim, and desire to secure by Letters Patent, is—

1. In combination, a cone-gear, a driving-shaft, a driving-pinion on said shaft, an idler-gear in constant mesh with said pinion, and an eccentric lever for throwing the idler into and out of mesh with the cone-gear, the said lever having a pivot which moves concentrically with the driving-shaft, and a fulcrum which moves concentrically with the idler-gear.

2. In combination, a cone-gear, a fixed diagonal rib or guide, a driving-shaft, a frame arranged to slide on said shaft and permanently engaged with said rib, a sliding gear splined to said shaft and embraced by the frame, an idler-gear embraced by said frame, and an eccentric or cam having a shifting bearing in said frame, and arranged to throw said idler-gear into and out of mesh with the cone-gear.

3. In combination, a cone-gear, a driving-shaft, a sliding frame, a gear splined to said shaft and embraced by said frame, an idler-gear, a handle provided with an eccentric, or cam, for throwing said idler-gear into and out of mesh with the cone-gear, and means for locking the sliding frame in successive positions, said means comprising a series of sockets, a pin carried by the frame and adapted to enter any of said sockets, and a cam actuated by the handle and adapted to force said pin into the sockets.

4. In combination, a cone-gear, a driving-shaft and a sliding traveler comprising a frame provided with fixed guides, a gear splined to the driving-shaft and embraced by said frame, an idler-gear, a forked handle-lever embracing said idler-gear, eccentrics affixed to the forks of said handle-lever, and studs or trunnions projecting laterally from the said forks and having a bearing in slots formed in the sliding frame, whereby the oscillation of the handle-lever throws the idler-gear into and out of mesh with the cone-gear.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 24th day of May, A. D. 1897.

ERNEST J. FLATHER.

Witnesses:
F. E. PECKHAM,
J. B. TILLOTSON.