(No Model.) 3 Sheets—Sheet 1.

E. A. ALPRESS.

TAPER ATTACHMENT FOR LATHES.

No. 376,843. Patented Jan. 24, 1888.

Fig. 1.

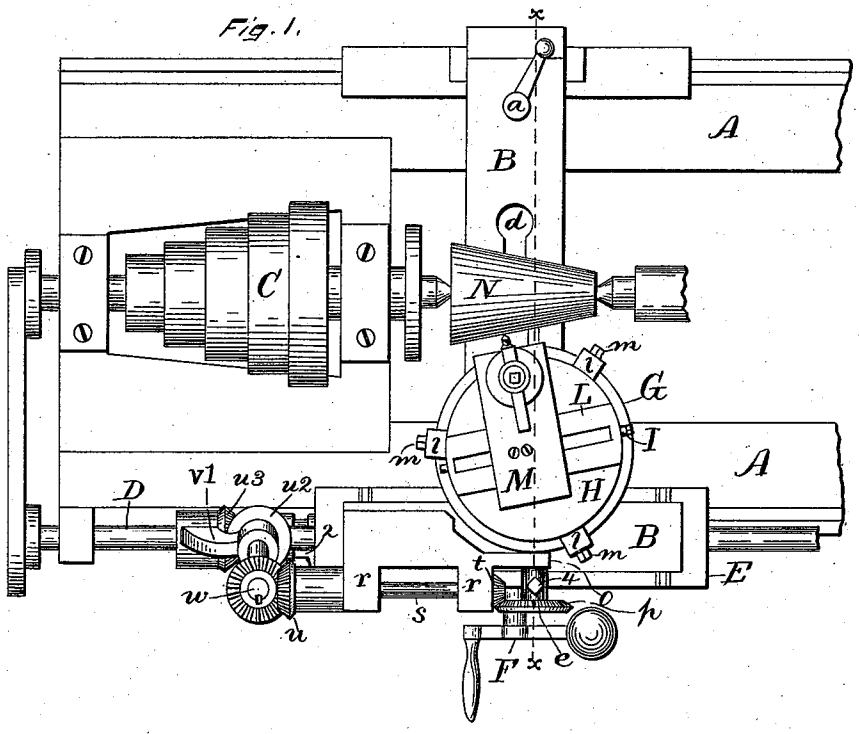
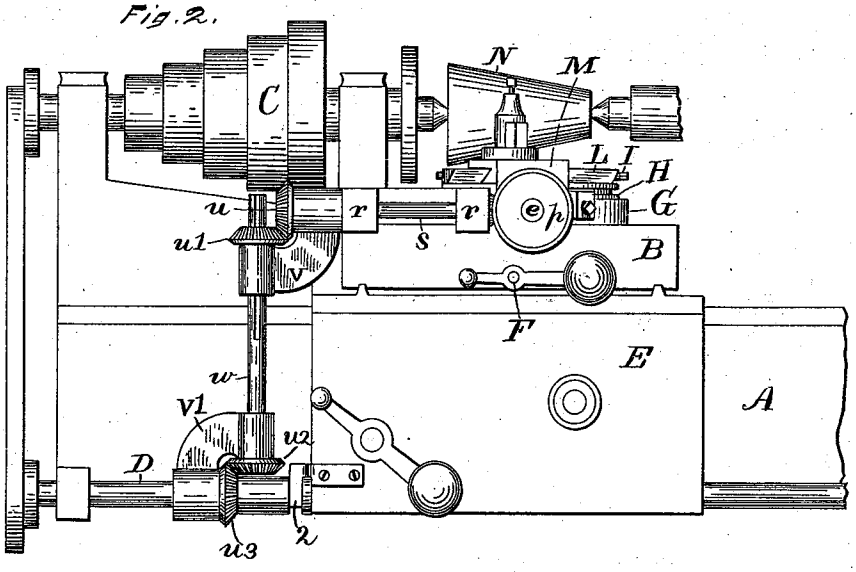


Fig. 2.



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Fig. 3.

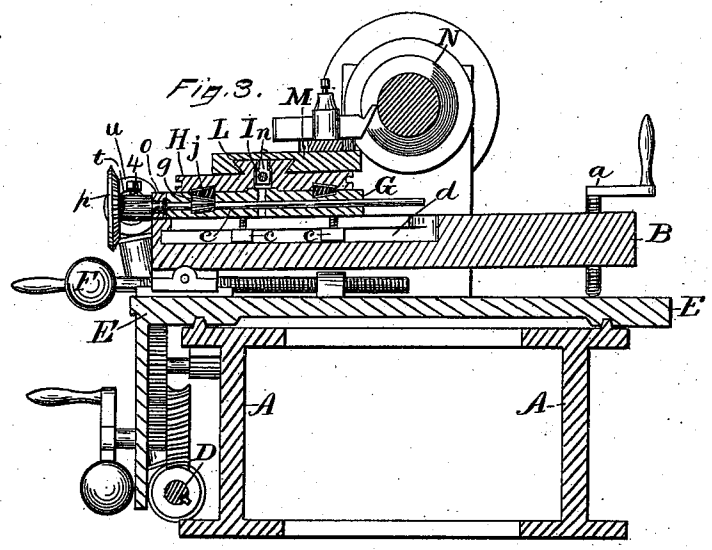
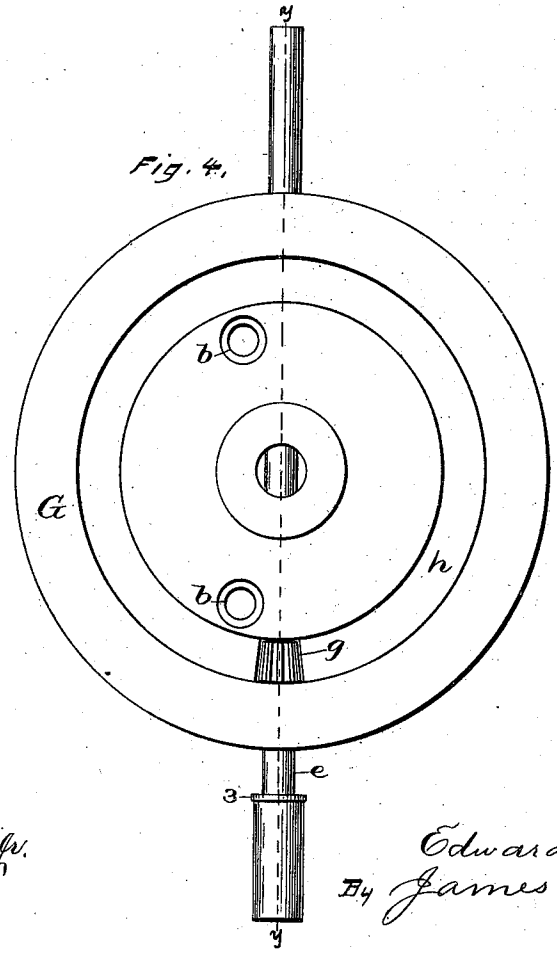


Fig. 4.



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Fig. 5.

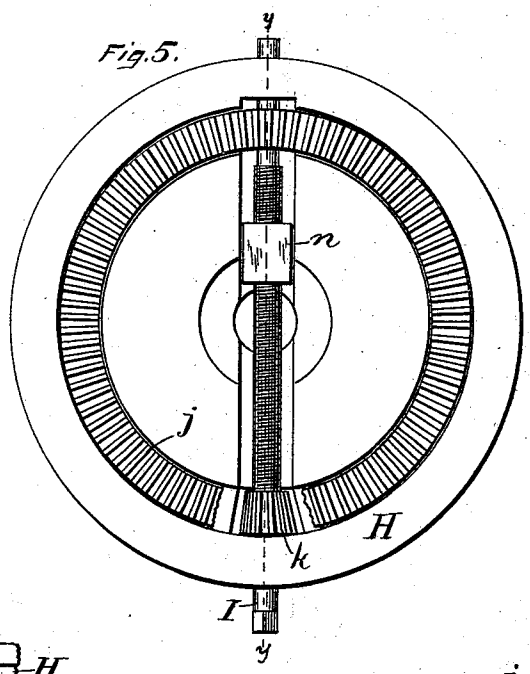


Fig. 7.

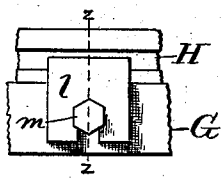


Fig. 8.

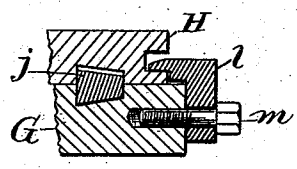


Fig. 6.

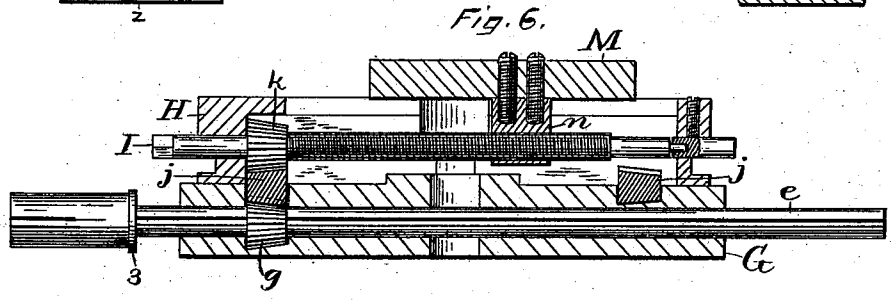
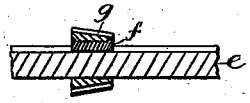


Fig. 9.



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UNITED STATES PATENT OFFICE.

EDWARD A. ALPRESS, OF NEW BRITAIN, CONNECTICUT.

TAPER ATTACHMENT FOR LATHES.

SPECIFICATION forming part of Letters Patent No. 376,843, dated January 24, 1888.

Application filed March 31, 1887. Serial No. 233,102. (No model.)

To all whom it may concern:

Be it known that I, EDWARD A. ALPRESS, a citizen of the United States, residing at New Britain, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Taper Attachments for Engine-Lathes, of which the following is a specification.

My invention relates to improvements in taper attachments for engine-lathes; and the object of my invention is to automatically feed the turning-tool at any desired angle to the axis of the lathe.

In the accompanying drawings, Figure 1 is a plan view of my attachment together with so much of an engine-lathe as is necessary to show the connection of said attachment therewith. Fig. 2 is a front elevation of the same. Fig. 3 is a transverse vertical section thereof on line *x x* of Fig. 1, partly in elevation. Fig. 4 is a plan view of the lower bed of my attachment, together with its driving-shaft and pinion. Fig. 5 is a reverse plan view of the upper bed which is fitted upon said lower bed. Fig. 6 is a vertical section of the main parts of my attachment on the line *y y* of Figs. 4 and 5, partly in elevation. Fig. 7 is a partial side elevation of the same; and Fig. 8 is a partial section thereof on line *z z* of Fig. 7, said two figures illustrating the manner of securing the beds, Figs. 4 and 5, together; and Fig. 9 is a sectional view of a portion of the driving-shaft of my attachment together with its pinion and spline. Figs. 1, 2, and 3 are on a smaller scale than the other figures.

A designates the frame or bed of an ordinary engine-lathe, B the ordinary tool-carriage, C the main driving-shaft or head, and D the shaft which drives the feed for the carriage. The carriage B is mounted upon the ordinary carriage-bed E, so as to move at right angles to the axis of the lathe-bed C by means of the screw F, while said carriage and its bed may move bodily together lengthwise of the lathe. The carriage B is also provided with a crank-screw, *a*, for the purpose of raising and lowering said carriage, all the parts thus specifically described being of an ordinary construction in engine-lathes.

Fig. 4 shows in plan view the lower bed, G, of my attachment, having two bolt-holes, *b b*, through which holes bolts are passed into nuts *c c* in the ordinary T-shaped groove *d* of the feed-carriage B, as shown in Fig. 3, whereby the bed of my attachment may be adjusted toward the front or rear and fastened in any desired position on the carriage B. The driving-shaft *e* extends loosely through bearings in the bed G in a direction which is parallel to the length of the T-shaped slot *d* in the carriage B. This shaft is grooved longitudinally to receive a spline, *f*, Fig. 9, by which to connect the pinion *g* to said shaft in such manner as to necessitate the simultaneous revolution of said shaft and pinion, while at the same time the carriage-bed and pinion may be moved longitudinally along the shaft to set the attachment at any desired point on the carriage B. This shaft *e* is secured against longitudinal movement, and also revolved by mechanism to be hereinafter described.

The pinion *g* projects into an annular groove, *h*, Fig. 4, within which is fitted a double-faced annular rack or driving-gear, *j*. Above this rack and concentric with the lower bed, G, is the upper bed, H, which is provided with a feed-screw, I, having a pinion, *k*, which also engages the double-faced gear *j* and is driven thereby. The upper bed, H, is adjustably secured to the lower bed, G, so that by loosening the fastening mechanism it may be turned around to bring the feed-screw I at right angles to the axis of the lathe-head C or parallel thereto, or at any desired intermediate angle, and then fastened in place.

The fastening mechanism is more particularly illustrated in Figs. 7 and 8, and consists of clamps *l* and set-screws *m*, the clamps taking into a peripheral groove in the upper bed, as shown.

The upper bed, H, is provided with suitable ways, L, parallel to its feed-screw, upon which ways a supplementary tool-carriage M is mounted. This tool-carriage is connected with the feed-screw I by means of the nut *n*, whereby the revolution of the driving-shaft *e* will cause the supplementary tool-carriage M to travel along in the direction of the length of the feed-screw I when the upper bed is so set as to bring said feed-screw into any desired angle or position with reference to the axis of the lathe-head. It is evident, however, that

the connections for driving the shaft *e* of this attachment must be such as will permit of all the ordinary movements of the ordinary tool-carriage and its bed. I accomplish this object by fixing or attaching upon the ordinary tool-carriage B a suitable bearing, *o*, for one end of the driving-shaft *e*, and providing said shaft with a gear-wheel, *p*. The feed-carriage is also provided with bearings *r* for the shaft *s*, having at one end a beveled gear, *t*, which meshes into and drives the gear *p*, and at its other end a pinion, *u*, rigidly mounted on said shaft. The shaft *s* also passes through one end of an angle-arm, *v*, for connecting said shaft *s*, by means of the swinging shaft *w*, to the feeding-shaft D of the lathe. The shaft *w* passes loosely through the other end of the angle-arm *v*, while a like angle-arm *v'* is at the other end of said shaft with one end surrounding said shaft *w*, and its opposite end surrounding the feed-shaft D. A beveled pinion, *u'*, is fitted to the upper end of the shaft *w* by means of a groove and spline in the same manner that pinion *g* is connected to shaft *e*, as shown in Fig. 9, so that said pinion may slip lengthwise upon the shaft when the tool-carriage is moved. The lower end of the shaft *w* is provided with a gear-wheel, w^2, rigidly secured to said shaft and engaging the wheel w^3 on the shaft D. This wheel w^3 has a peripheral groove in its hub into which an arm, 2, enters, the other end of said arm being secured to the carriage-bed E, so as to connect said wheel to the carriage-bed, but leaving it free to rotate. The grooved hub is a rigid part of the wheel w^3, and said wheel is secured to the feed shaft D by means of a groove and spline in the manner hereinbefore described, and illustrated in Fig. 9, for securing the pinion *g* to the shaft *e*. Thus it will be seen that the revolution of the shaft D will impart a revolution to the shaft *e* through the shafts *w s* and the respective gears, while at the same time the tool-carriage is free to make all of its ordinary movements without interfering with such connection, the swinging shaft *w* and the spline-connection permitting the same.

The shaft *e* is held against longitudinal movement by a shoulder, 3, Figs. 4 and 6, which bears against one side of the bearing *o* to prevent said shaft from moving forward, while the hub of the gear-wheel *p* may bear against the other side of said bearing to hold said shaft from moving in the opposite direction.

It is evident that some provision should be made to return the supplementary carriage to its starting-point after it has been once fed in a given direction the desired distance. This may be accomplished by securing the gear *p* on its shaft by means of a set-screw, 4. By loosening said screw, the wheel may be slipped out of gear with the pinion *t*. A crank-wrench may then be applied to the squared end of the feed-screw I, for drawing the supplementary carriage back to the desired point for restarting.

I do not wish to confine myself in all cases to the specific mechanism which I have described for accomplishing certain results, as, in many instances, other known equivalent mechanism for analogous purposes may be employed without changing the main features of my invention, and this is particularly the case with reference to the means for returning the supplementary carriage to the desired starting-point, and with reference to the means for fastening the upper and lower beds together.

In Figs. 1, 2, and 3, N designates a piece of work set upon the ordinary lathe centers with its sides of a taper, such as would be turned by this attachment when the upper bed is set with the feed-screw I in the position shown in Fig. 1. It will be seen that such a piece may be turned with the lathe centers in perfect alignment with the axis of the head C. It is also evident that the tool may be fed across the face of a piece when secured to the face-plate of the lathe or in a chuck, or across the end of a shaft, and that it is also applicable for turning tapering holes.

I claim as my invention—

1. The combination of the carriage and head of an engine-lathe with the herein-described taper attachment, consisting of the upper and lower beds concentrically mounted one upon the other, and adjustably secured to the lathe-carriage, the driving-shaft *e*, pinion *g*, double-faced gear *j*, the feed-screw I, having a pinion connected with said double-faced gear, the supplementary tool-carriage M, and mechanism for driving the shaft *e*, substantially as described, and for the purpose specified.

2. The combination of the lathe-head C, carriage B, the upper and lower beds concentrically mounted one upon the other and adjustably secured upon the lathe-carriage, the driving-shaft *e*, pinion *g*, double-faced gear *j*, feed-screw I, having the pinion connected with said double-faced gear, the supplementary tool-carriage, the gear *p*, for driving the shaft *e*, the shafts *s w* D, with their connecting-gearing and angle-arms, substantially as described, and for the purpose specified.

3. The combination of a lathe-head and carriage with the supplementary tool-carriage M, adjustably mounted upon the main carriage, and provided with a feed-screw, driving-shaft, and mechanism connecting said shaft and feed-screw, the gear-wheel *p*, secured to said driving-shaft, the shaft *s* and its gears, mounted on the lathe-carriage B, the feed-shaft D of the lathe, and the swinging shaft *w*, with its connecting angle-arms and gears, substantially as described, and for the purpose specified.

4. The combination of a lathe-head and carriage with the lower bed, G, adjustably secured to said lathe-carriage, the driving-shaft *e*, se-

cured against longitudinal movement upon the lathe-carriage, and provided with driving mechanism, the pinion *g*, secured on shaft *e*, so as to rotate therewith, the double-faced gear *j*, the upper bed, H, concentrically mounted upon the bed G, and provided with mechanism for fastening it in any desired position thereon, the feed-screw I, mounted within said upper bed and provided with driving-pinion *k*, and the supplemental carriage M, connected to said feed-screw, substantially as described, and for the purpose specified.

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