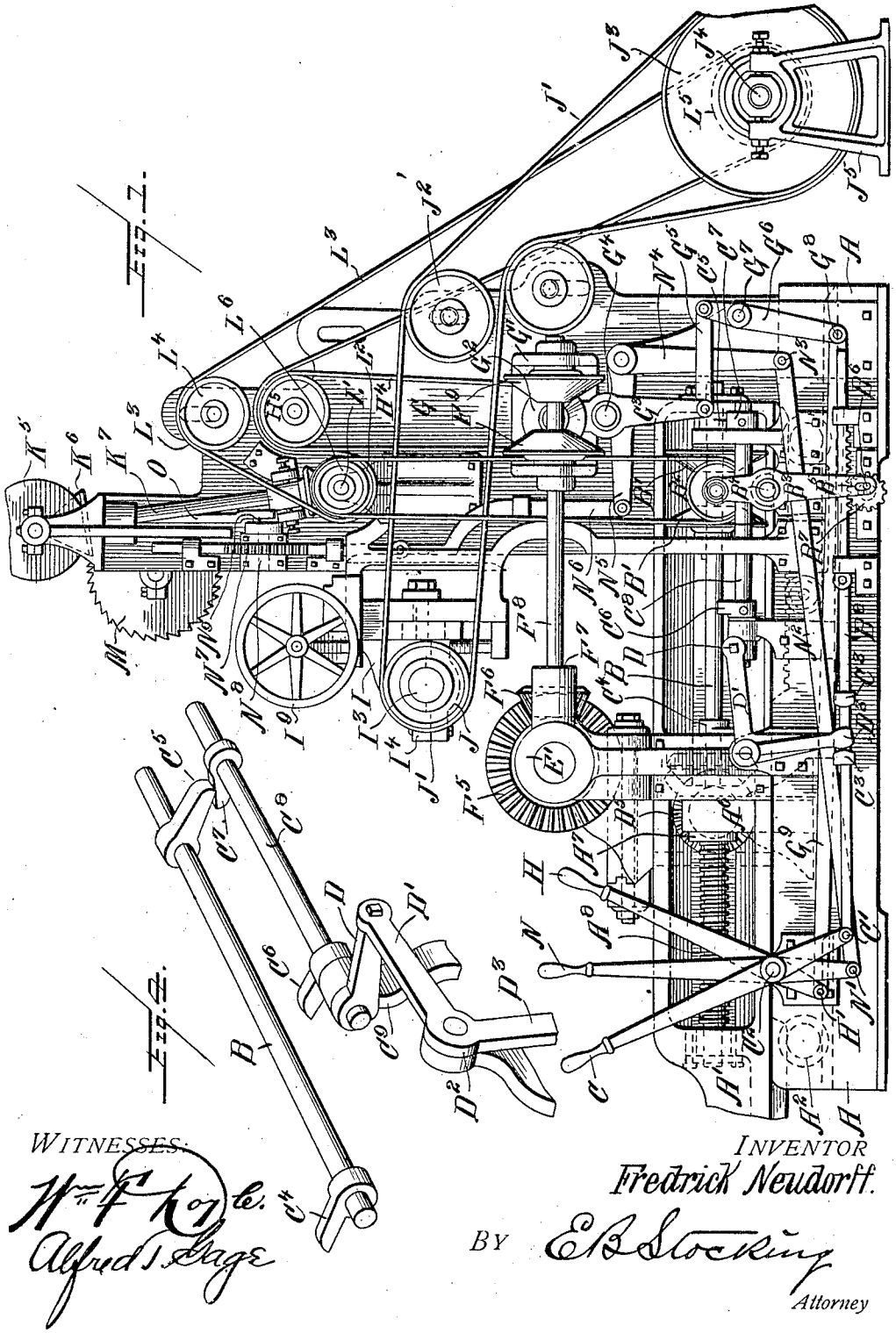
No. 856,656. PATENTED JUNE 11, 1907.

F. NEUDORFF.

CARRIAGE FEED MECHANISM.

APPLICATION FILED JULY 9, 1906.

2 SHEETS—SHEET 1.



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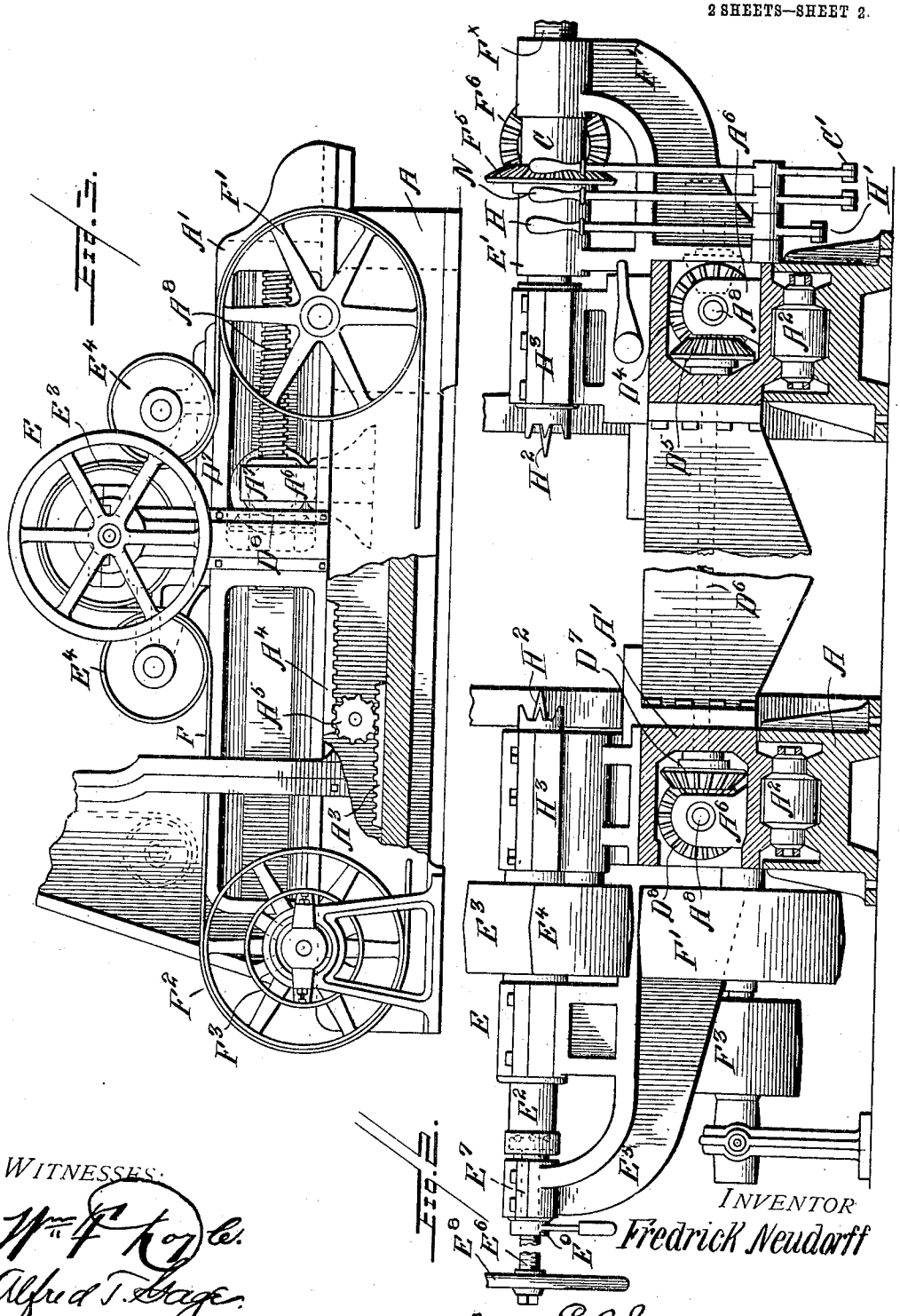


Fig. 2.

Fig. 3.

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CARRIAGE-FEED MECHANISM.

No. 856,656. Specification of Letters Patent. Patented June 11, 1907.

Original application filed August 2, 1905, Serial No. 272,367. Divided and this application filed July 9, 1906. Serial No. 325,360.

To all whom it may concern:

Be it known that I, FREDRICK NEUDORFF, a citizen of the United States, residing at Sheffield, in the county of Colbert, State of Alabama, have invented certain new and useful Improvements in Carriage-Feed Mechanism, comprising a division of my application for turning-lathe, filed August 2, 1905, Serial No. 272,367, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to a carriage feed mechanism, and particularly to means for automatically reversing the direction of such feed in the operation of the carriage.

The invention has for an object to provide a novel and improved construction and arrangement of feeding mechanism for the carriage carrying the work holder whereby the travel thereof is automatically reversed at its opposite extremes by a shifting of the driving means, which reversal and control may also be effected through a hand lever connection.

Other and further objects and advantages of the invention will be hereinafter set forth and the novel features thereof defined by the appended claims.

In the drawing:—Figure 1 is a side elevation of the invention applied to a turning lathe; Fig. 2 is a front view of the carriage and work holder carried thereby; Fig. 3 is a side elevation with parts in section at the opposite side from Fig. 1, and Fig. 4 is a detail perspective of the reversing mechanism.

Like letters of reference indicate like parts in the several figures of the drawings.

The letter A designates the base of the machine which may be of any desired construction or configuration suitable for the purpose, and has mounted thereon a carriage A′ carrying the work holder and the driving mechanism therefor. At suitable points alined bearing rollers A^2 are interposed between the base and carriage, and the motion of these parts equalized and slipping prevented by means of rack bars A^3 and A^4 upon the base and carriage, respectively, adapted to mesh with alined gear wheels A^5 disposed between the same. The base is also provided with a standard A^6 secured thereto at each side and provided with a nut A^7 secured therein to feed the carriage A′ by means of the screw A^8 carried thereby and threaded into the nut. This screw at the right of the machine, as shown in Fig. 1, is provided with a driving shaft B extending rearwardly therefrom and having thereon oppositely disposed friction cones B′ splined thereto and adapted to cooperate with a driving cone B^2 carried by a lever B^3 pivotally mounted upon the base at B^4. This lever may be operated by any desired connection, for instance as herein shown, the lower end of the lever is provided with a slotted way B^5 adapted to receive the eccentrically disposed pin B^6 carried by the pinion B^7 mounted upon the base. This pinion is actuated from the rack bar B^8 extending toward the front of the machine and there connected with the operating lever C at its lower end C′. This lever is pivotally mounted at C^2 upon the base and the bar B^8 is provided with tappets C^3 thereon by which the direction of rotation of the driving shaft B may be automatically reversed. This reversal is accomplished by means of the fingers C^4 and C^5 carried by the driving shaft and rotating therewith, as shown in Fig. 4. These fingers are adapted to coöperate with similar fingers C^6 and C^7 carried upon a countershaft C^8 pivotally supported upon a bracket C^9 extended forward from the base. This countershaft is provided with a lever D secured thereto, which is loosely fitted into an aperture at the free end of arm D′ of the pivotally mounted bell crank lever D^2, the opposite arm D^3 thereof being disposed between the tappets C^3 upon the rack bar B^8.

For the purpose of transferring motion from the driving shaft B to the opposite end of the work holder carriage, a bevel gear D^4 is provided thereon, as shown in Fig. 3, and meshed with a similar gear D^5 carried upon the cross shaft D^6. This shaft carries at its opposite end a bevel gear D^7 meshing with a coöperating gear D^8 disposed upon the driving screw A^8 extending through the nut carried by the bracket A^6 upon that side of the machine.

The work holder is composed of the head stock E′ and tail stock E′, the former being driven by means hereinafter described. The shaft E^2 of the head stock is provided with a main driving pulley E^3 secured thereto, and with oppositely disposed frictional idler pulleys E^4 supported in suitable bearings carried by the carriage or by the bracket E^5 ex-

tending laterally therefrom. This shaft at its end is provided with an adjusting screw E^6 mounted in a threaded bearing E^7 at the upper end of the bracket E^5 and adapted to be operated by a hand wheel E^8 and locked into position by the lock nut E^9 mounted on said screw. Under some conditions it is desirable to drive this head stock, and for that purpose the belt F is provided and extends from the driving pulley E^3 beneath the pulley E^4 and over the pulley F′ and opposite drive pulley F^2 upon the shaft on which a suitable belt pulley F^3 may be provided. (See Fig. 3).

The outer end of the head stock E′ is mounted in the bracket F^4 extended from the carriage and provided with an adjusting pinion F^5 mounted on the screw $F^\times$ and meshing with a similar pinion F^6 mounted in a lateral extension F^7 from the bracket F^4. The driving shaft F^8 for these pinions extends rearwardly and is provided with the friction cones F^9 splined thereon and supported by means of brackets G′ carried by the opposite standards G extended from the base at the rear thereof and behind the path of travel of the carriage. Coöperating with these cones is a coöperating cone G^2 carried by the lever G^3 which is pivotally mounted at G^4 upon the standards and connected at its lower end by a pivoted link G^5 to a rock lever G^6 pivotally mounted at G^7 and connected at its opposite end G^8 with an operating rod G^9 pivotally connected to the lever H at its lower end H′. Both the head and tail stocks are provided with the usual chuck H^2 adjustably mounted in bearings H^3 constructed and supported in the usual manner so as to be moved with the carriage. The cone G^2 is driven by belt H^4 from pulley H^5.

The carriage feed mechanism hereinbefore described is adapted to be used in connection with any class of machine, and particularly in connection with a turning lathe, for instance, as shown in my original application before mentioned, in which the work carried by the work holder is adapted to cooperate with the cutter head I^4 having a shaft I^3 mounted in brackets I and adapted to be driven by a pulley J carried upon said shaft and provided with a belt J′ extending therefrom over the idlers J^2 and the driving wheel J^3 upon the shaft J^4 mounted in suitable standards J^5 at the rear of the machine. The cutter head is adapted to be adjusted in the usual manner by the hand wheel I^9, as shown in Fig. 1. The standards G are also provided with a back bar carrying cut off saws M which are driven from the cone K^5 receiving a friction drive from the cone K^6 carried on the shaft K^7 which is pivotally mounted at its lower end K^8. The movement of this shaft is controlled by the operating lever N at the front of the machine, which is pivotally connected at its lower end N′ with the bar N^2 extending to the rear thereof where it is pivoted at N^3 to the bell crank lever N^4, the arm N^5 of which is pivotally secured to the reciprocating bar N^6 suitably mounted to permit a reciprocatory motion thereof. This bar is formed at its upper end with the rack teeth N^7 meshing with the pinion N^8 and provided with the crank pin N^9 extended into the slotted end of the pivoted lever O which is connected with the driving shaft K^7 to shift it as fully disclosed in my original application. The shaft K^7 is driven from a suitable gear on the shaft L′, motion being communicated thereto by the pulley L^2 from which the belt L^3 extends from the idler L^4 and pulley H^5 to a suitable driving pulley L^5 on the shaft J^4. The driving belt H^4 extends from the pulley H^5 to the driving cone G^2 for the work holder, while the shaft L′ is provided with the driving pulley L^6 from which the belt L^7 extends to drive the cone B^2 for driving the carriage feed.

From the foregoing description the operation of the carriage will be fully understood and it will be seen that the travel of the carriage is automatically reversed at the opposite extremes of its movement, and the tool holder carried thereby continuously driven so as to require the attention of but one operator, as all of the controlling levers are disposed at a single point.

It will be obvious that the construction and arrangement of the parts for driving the carriage feed and adjusting the work chuck produce an efficient and positively operating construction by which a balancing of the carriage drive is secured, and the cone therefor automatically shifted by the means carried on the driving shaft of the carriage.

Having now described my invention and set forth its merits, what I claim and desire to secure by Letters Patent is:—

1. In a carriage feed mechanism, a base, a carriage mounted to travel thereon, a feed nut mounted upon said base, a driving screw carried by said carriage, a driving shaft extended from and movable with said screw, driving devices mounted upon the base through which said shaft travels, and an intermediate driving member disposed between said devices.

2. In a carriage feed mechanism, a base, a carriage mounted to travel thereon, a feed nut mounted upon said base, a driving screw carried by said carriage, a driving shaft extended from and movable with said screw, driving devices mounted upon the base and through which said shaft travels, an intermediate driving member disposed between said devices, means for shifting said driving member, and means carried by the driving shaft for actuating the shifting means.

3. In a carriage feed mechanism, a base, a carriage mounted to travel thereon, a feed

nut mounted upon said base, a driving screw carried by said carriage, a driving shaft extended from and movable with said screw, driving devices mounted upon the base and through which said shaft travels, an intermediate driving member disposed between said devices, means for shifting said driving member, fingers carried by the driving shaft and means extending from the driving member into the path of said fingers to be actuated thereby.

4. In a carriage feed mechanism, a base, a carriage mounted to travel thereon, a feed nut mounted upon said base a driving screw carried by said carriage, a driving shaft extended from and movable with said screw, driving devices mounted upon the base and through which said shaft travels, an intermediate driving member disposed between said devices, a work holder mounted upon said carriage and provided with means for adjusting its chuck, a driving shaft for said work chuck movable with the carriage, and relatively fixed driving devices through which the driving shaft of the work chuck travels in the movement of the carriage.

5. In a carriage feed mechanism, a base, a carriage mounted to travel thereon, a feed nut mounted upon said base, a driving screw carried by said carriage and having an extended shaft, opposite driven cones mounted upon the base and having a sliding connection upon said shaft, an intermediate driving cone, and means for automatically shifting said cone in the travel of said carriage.

6. In a carriage feed mechanism, a base, a carriage mounted to travel thereon, a feed nut mounted upon said base, a driving screw carried by said carriage and having an extended shaft, opposite driven cones mounted upon the base and having a sliding connection upon said shaft, an intermediate driving cone, a pivoted lever upon which said driving cone is mounted, a gear mounted upon the base, a crank pin carried by said gear to engage the slotted end of said pivoted lever, and means for rotating said gear.

7. In a carriage feed mechanism, a base, a carriage mounted to travel thereon, a feed nut mounted upon said base, a driving screw carried by said carriage and having an extended shaft, opposite driven cones mounted upon the base and having a sliding connection with said shaft, an intermediate driving cone, a pivoted lever upon which said driving cone is mounted, a gear mounted upon the base, a crank pin carried by said gear to engage the slotted end of said pivoted lever, a controlling lever mounted upon the base, and a reciprocating rack bar carried by said lever and engaging said gear.

8. In a carriage feed mechanism, a base, a carriage mounted to travel thereon, a feed nut mounted upon said base, a driving screw carried by said carriage and having an extended shaft, opposite driven cones mounted upon the base and having a sliding connection upon said shaft, an intermediate driving cone, a pivoted lever upon which said driving cone is mounted, a gear mounted upon the base, a crank pin carried by said gear to engage the slotted end of said pivoted lever, a controlling lever mounted upon the base, a reciprocating rack bar carried by said lever and engaging said gear, tappets carried by said rack bar, a bell crank lever coöperating with said tappets, and means carried by the shaft of the driving screw for operating said bell crank lever.

9. In a carriage feed mechanism, a base, a carriage mounted to travel thereon, a feed nut mounted upon said base, a driving screw carried by said carriage and having an extended shaft, opposite driven cones mounted upon the base and having a sliding connection upon said shaft, an intermediate driving cone, a pivoted lever upon which said driving cone is mounted, a gear mounted upon the base, a crank pin carried by said gear to engage the slotted end of said pivoted lever, a controlling lever mounted upon the base, a reciprocating rack bar operated by said lever and engaging said gear, tappets carried by said rack bar, a bell crank lever coöperating with said tappets, fingers carried by said driving shaft, coöperating fingers provided upon a counter shaft, and a lever connection from said countershaft to the bell crank lever.

10. In a carriage feed mechanism, a base, provided with a feed nut, a carriage mounted to travel upon said base, a driving screw mounted upon the carriage to coöperate with said nut and provided with an extended shaft therefrom, shifting means mounted upon said shaft, driving devices slidingly mounted upon said shaft, controlling means for said devices, fingers carried by the driving shaft, a countershaft provided with coöperating fingers, a bell crank lever connected to said countershaft, and means carried by said lever to operate said shifting means.

11. In a carriage feed mechanism, a base provided with a feed nut, a carriage mounted to travel on said base, a driving screw movable with said carriage and provided with an extended driving shaft, fingers mounted upon said shaft at the opposite ends thereof, a relatively fixed countershaft provided with means at its opposite ends to engage the fingers of the screw shaft in the travel of the carriage, a driving mechanism for the screw shaft, and means controlled from the countershaft for shifting said driving mechanism.

12. In a carriage feed mechanism, a base provided with a swiveled feed nut thereon, a carriage adapted to travel upon said base, a driving screw pivotally mounted in said carriage, a shaft carried by said screw at the rear of the carriage, driving devices for said shaft mounted upon the base and having a

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sliding connection with said shaft, and means carried by said shaft for automatically shifting the driving devices to reverse the direction of rotation of the shaft.

13. In a carriage feed mechanism, a base provided with parallel ways, a carriage mounted upon said base and provided with ways upon its under face, a feed screw for driving said carriage, bearing rollers disposed between said base and carriage, coöperating rack bars carried by the base and carriage at each side, and an intermediate pinion disposed between said rack bars.

In testimony whereof, I affix my signature in presence of two witnesses.

FREDRICK NEUDORFF.

Witnesses:
W. H. CONNER,
W. E. CONROY.