(No Model.) 4 Sheets—Sheet 1.

A. JOHNSTON.

MACHINE FOR GRINDING AND POLISHING KNIFE OR FORK HANDLES.

No. 534,395. Patented Feb. 19, 1895.

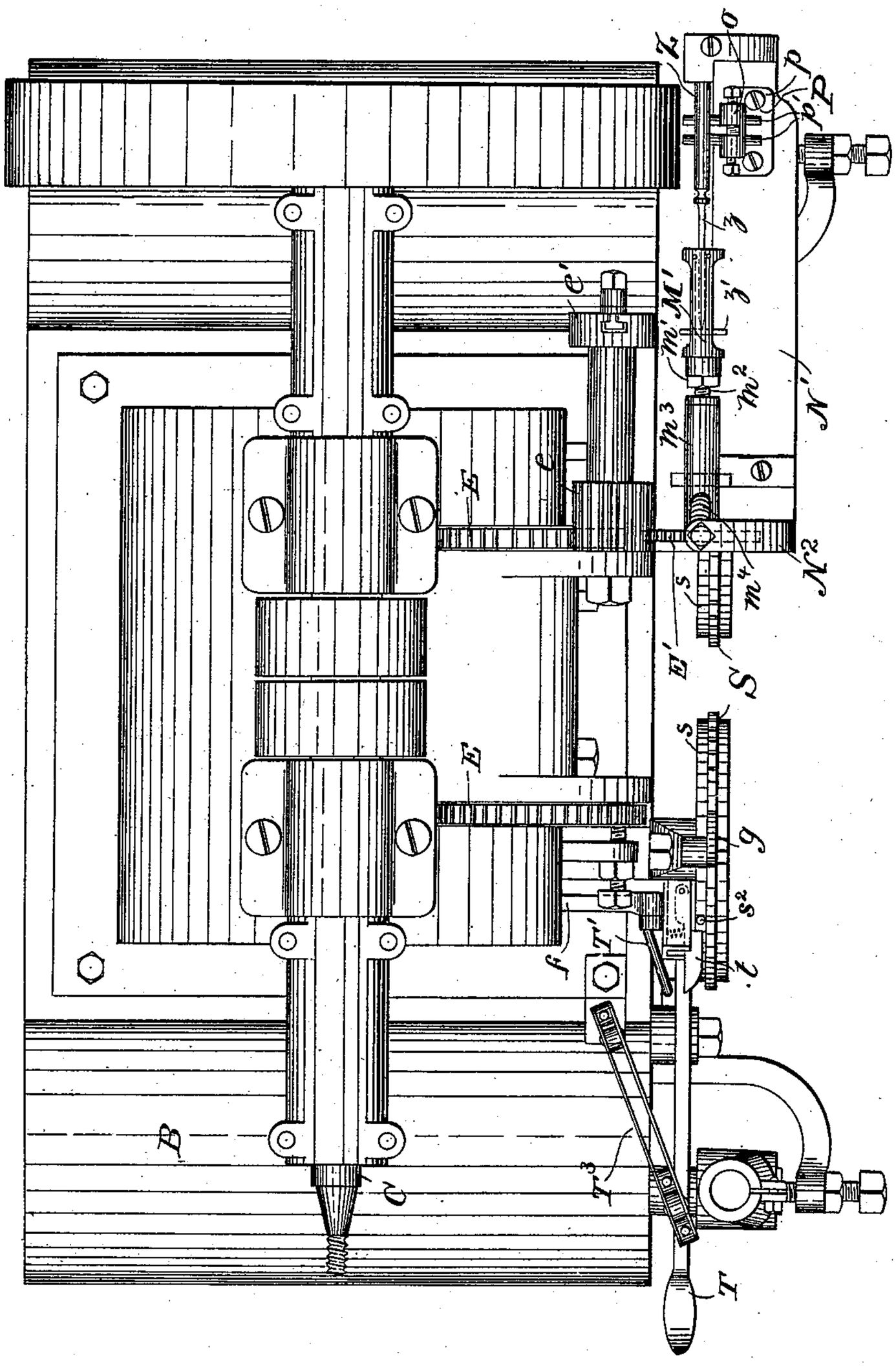

Fig. 1.

Witnesses.
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Peter Lewis.

Inventor.
Allen Johnston
by Pollock & Mauro,
his attorneys

(No Model.) 4 Sheets—Sheet 2.

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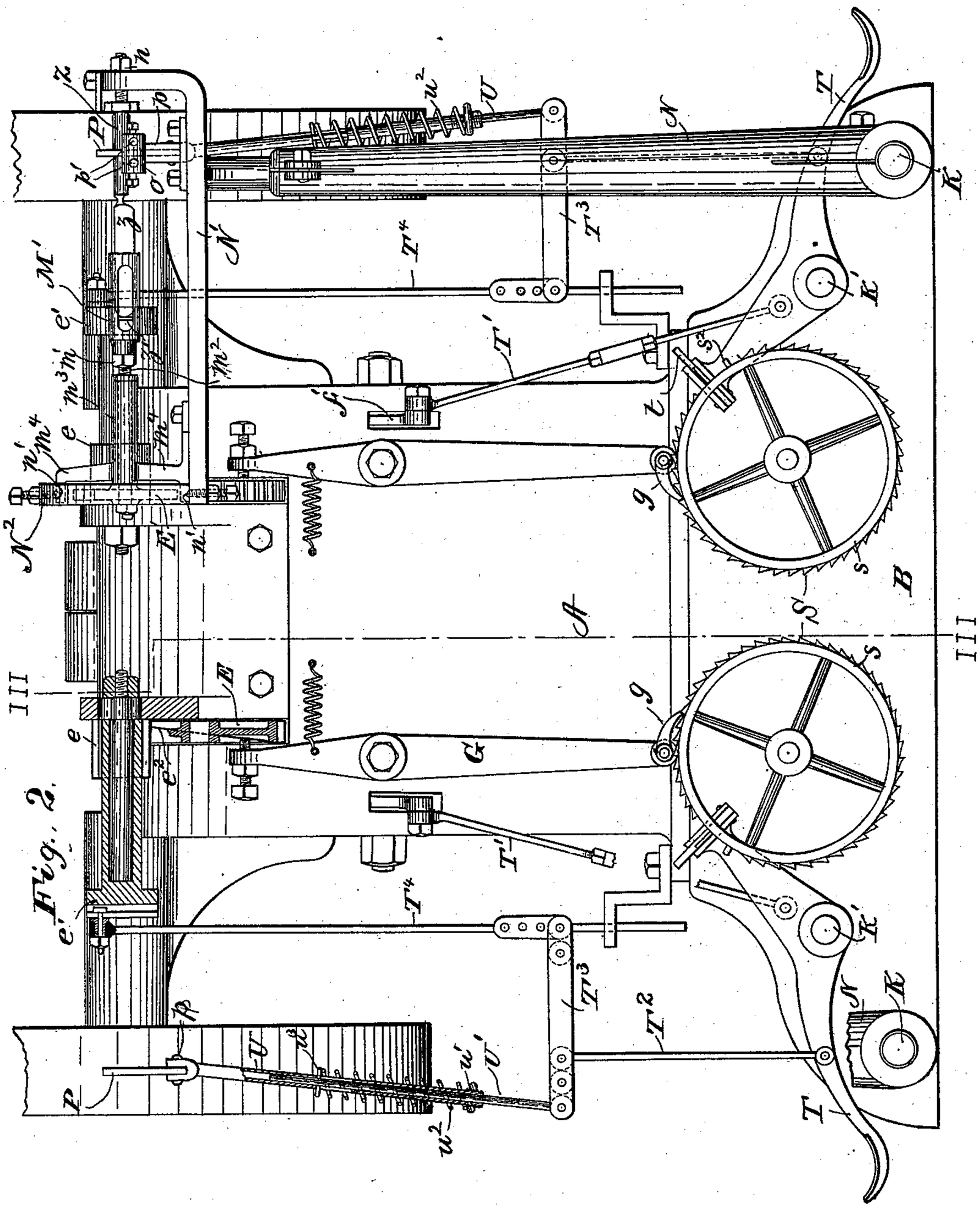

Fig. 2.

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(No Model.) 4 Sheets—Sheet 3.

A. JOHNSTON.

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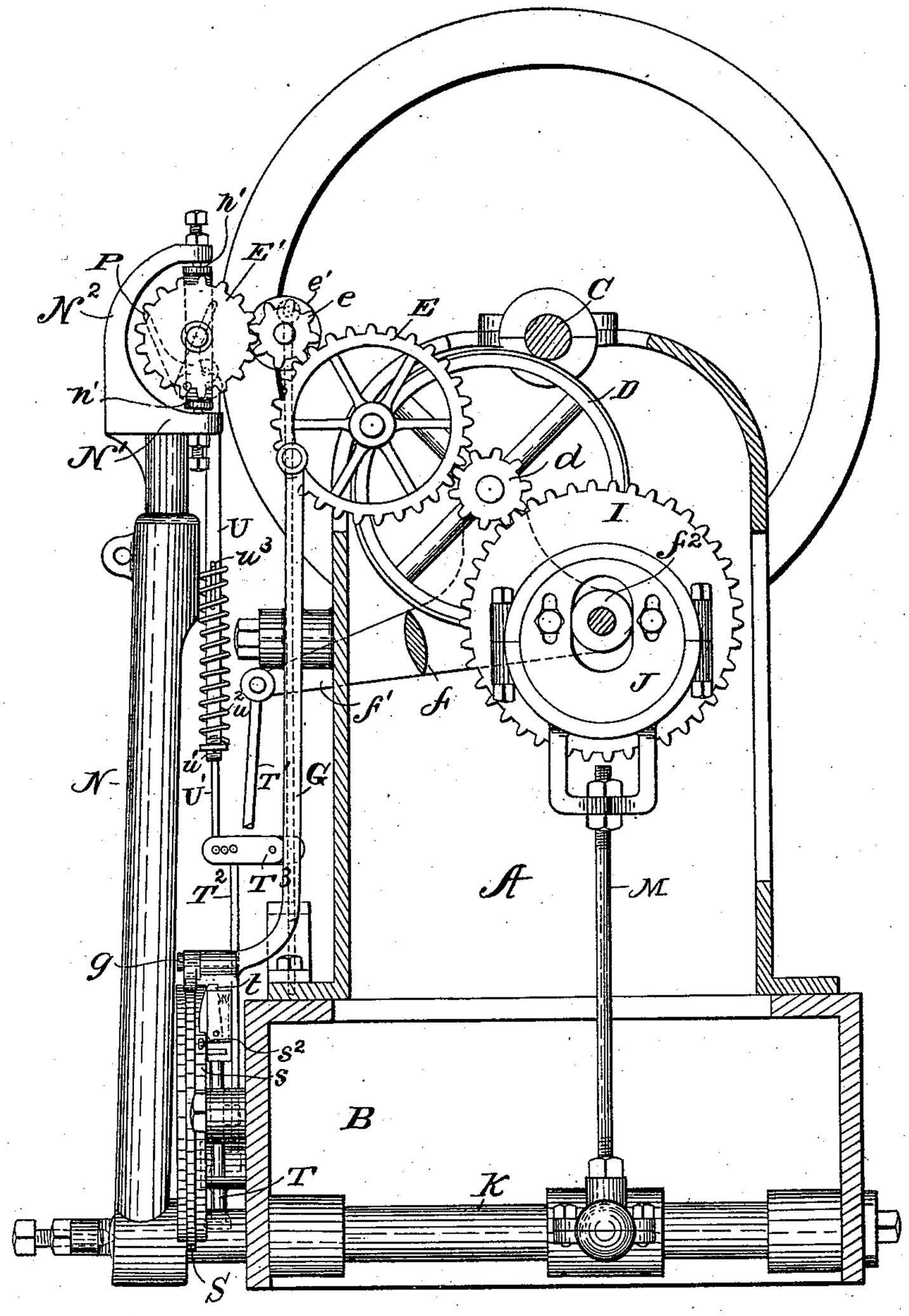
Fig. 3.



Witnesses
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Peter Lauri.

Inventor.
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(No Model.) 4 Sheets—Sheet 4.

A. JOHNSTON.

MACHINE FOR GRINDING AND POLISHING KNIFE OR FORK HANDLES.

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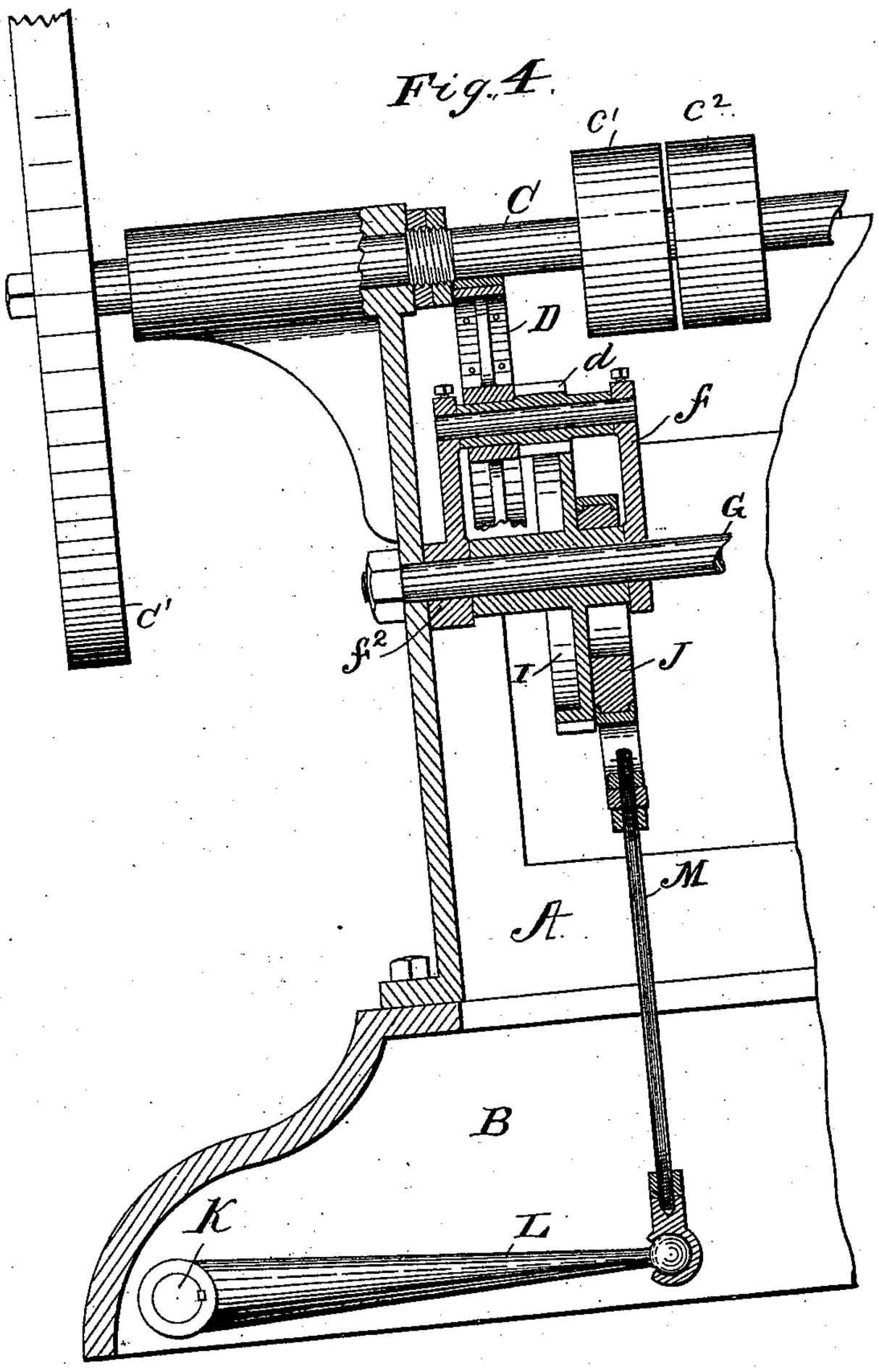
Fig. 4.



Witnesses.
H. R. Edelin
Geo. Lewis.

Inventor.
Allen Johnston
by Pollock & Mann
his attorneys

UNITED STATES PATENT OFFICE.

ALLEN JOHNSTON, OF OTTUMWA, IOWA.

MACHINE FOR GRINDING AND POLISHING KNIFE OR FORK HANDLES.

SPECIFICATION forming part of Letters Patent No. 534,395, dated February 19, 1895.

Application filed October 16, 1894. Serial No. 256,067. (No model.)

To all whom it may concern:

Be it known that I, ALLEN JOHNSTON, of Ottumwa, Iowa, have invented a new and useful Improvement in Machines for Grinding and Polishing Knife or Fork Handles, which is fully set forth in the following specification.

This invention relates to the grinding and polishing of knife and fork handles, and the object of the invention is to effect the grinding and polishing of every part of the irregularly shaped handle uniformly and expeditiously by means of automatic machinery.

As the machine herein described is equally adapted for grinding as for polishing knife and fork handles, involving merely a change in the abrading wheel employed and in some other minor details, the following description in connection with the grinding operation will be understood to apply also to polishing.

As the proper form is imparted to the handle during the forging of the knife or fork, consequently in the subsequent operations of grinding and polishing (particularly the former) there should be a uniform and evenly distributed reduction in the dimensions of the handle; that is to say, the same thickness of material should be removed from the entire surface thereof, and the handle should not be ground more or less on one side than on the edges of the other side; otherwise its form will be destroyed. This is the more difficult to attain, solely through mechanical means, on account of the irregular form of handle (which is universally employed in certain grades of knives and forks) tapering on the sides toward the butt end of the handle and on the edges toward the blade. In this connection it will be observed that if the handle which is rotated at a uniform speed is, while being ground or polished on its edge, held against the grinding or polishing wheel with the same pressure as when the side is being operated upon, more material will be taken off at the edge than on the side on account of the difference in the area of surface in contact with the grinding wheel.

According to my invention the difficulties above referred to are effectively overcome mainly by allowing one end of the knife or fork to rest loosely in a revolving holder which is also allowed a slight swinging movement in a horizontal plane, and at the same time holding the handle of the knife or fork against the grinding wheel with the yielding pressure of a spring, thereby holding the whole length of the handle at all times in contact with the grinding wheel, whatever the angle of the surface may be relatively to the axis of the handle, the pressure of said spring being increased when the flat side of the handle is in contact with the wheel and decreased when the edge of the handle makes contact therewith. Another feature of my invention is the longitudinal reciprocation of the handle across the grinding wheel (which latter may be any of the kinds well known to the market) which is accomplished by reciprocating the work holder. The wheel as illustrated in the drawings is of a width substantially the same as the length of the handle. It may be wider or narrower depending upon the amount of reciprocation given to the handle. For the best results the reciprocation should be small and the wheel as much wider as the amount of reciprocation.

Other important features of the invention will be set forth in the following description, wherein reference is made to the accompanyings, in which—

Figure 1 represents a top plan view of a machine constructed according to my present invention. Fig. 2 is a front elevation partly in section. Fig. 3 is a vertical section on the line III—III of Fig. 2, and Fig. 4 is a vertical section through one side of the machine, at right angles to Fig. 3.

The drawings illustrate a double machine having two grinding wheels each adapted to perform the same work, or one may be a grinding and one a polishing machine.

The general structure of the machine herein described resembles that described in my application filed of even date herewith, (Case C,) Serial No. 526,068, but differs therefrom in important features.

A represents the main frame, B the base or pedestal on which it is mounted, and C the main shaft suitably mounted in bearings in frame A. The means for communicating motion to the several moving parts, which means constitute no part of the present invention, will be briefly described. Shaft C communicates motion to a friction wheel D, whose shaft is journaled in a swinging frame

f pivoted to the main frame at f^2 (Fig. 4). Wheel D is thrown into and out of gear with the main-shaft as hereinafter described.

On the shaft of wheel D is a pinion d, which drives a gear E. The latter through pin i o e and gear E′ drives the revolving work-holder M′.

Frame f has an arm f' extending forwardly through a slot in frame A, and to the end of the arm is pivoted a connecting rod T′ pivoted at its lower end to a treadle T. The latter is pivoted to the base B at K and at its inner end carries a latch t which when the machine is in operation rests on the rim s of a ratchet wheel S, as shown in Figs. 2 and 3. In that position rod T′ holds up frame f, keeping wheel D in engagement with the main shaft. This engagement continues until a pin s^2 on rim s dislodges latch t from its seat on the latter, permitting treadle T and frame f to drop, and arresting the movements of the parts driven from wheel D.

Wheel E, above referred to, has on one face a cam surface e^2 (Fig. 2) which oscillates a lever G which carries at its lower end a pawl g in engagement with the ratchet wheel S. The latter thus moves step-by-step at a slow speed compared with that of the holder, until one revolution is completed, when the action of pin s^2 on latch t takes place as above described. Treadle T is also connected with a lever T^3 by a rod T^2 which rod also consitutes a fulcrum for said lever. At one end the lever is connected with a rod T^4, which is oscillated through an adjustable eccentric connection with a disk e' on the end of the shaft carrying pinion e, and at its other extremity said lever is connected with a pitman U. Said pitman U is pivoted at its upper end to a finger P, which latter is pivoted also to its support at p (Figs. 2 and 3) and by which the work is yieldingly pressed against the grinding wheel. Consequently, when the inner end of treadle T descends, as above described, pitman U is raised throwing holding finger P away from the work, as indicated in dotted lines Fig. 3. When the outer end of treadle T is depressed raising the inner end, and engaging latch t with the rim of wheel S, the holding finger P is by the same movement brought into operation against the handle of the knife or fork.

A gear wheel I driven by pinion d carries an eccentric J which oscillates a shaft K through a pitman M and rocking arm L. Said shaft carries at one end a vibrating standard N supporting at its upper extremity a frame N′ for the work-holder and accessory parts. The revolving work-holder M′ has a hollow socket to receive and hold the blade z the end of which abuts against plate z', and is adjustable to varying lengths of work by means of a nut m' engaging on the shaft m^2 of the work-holder which passes through a sleeve m^3 and carries the gear wheel E′ before referred to. The handle Z of the article to be ground rests at its end against an adjustable stop n carried by the frame N′. Said frame has an upright plate o in which are adjustably secured the outer ends of pins p' constituting a rest for the handle Z. Finger P which is pivoted in said block at p (before referred to) lies between the two pins p' p' and presses the handle against the wheel.

A yielding pressure is imparted to the finger P through the action of a spring u^2 which surrounds the upper part of pitman U. This part is tubular and in it slides the end of the lower part U′ which carries a pin u^3 projecting through a slot in tubular part U. Spring u^2 is compressed between pin u^3 at its upper end and thumb-nut u' at its lower end, and its pressure may be regulated. The variation in the pressure of the finger P during each revolution of the holder for the purpose of increasing the pressure as the flat side of the knife or fork handle comes in contact with the wheel and decreasing it as the edge of the handle makes such contact (referred to in the introductory part of this specification), is effected through the reciprocation of the rod T^4 by the eccentric on disk e'. Referring to Fig. 2 it will be seen that the flat side of the handle is in contact with the grinding wheel and that the eccentric pin on disk e' is at its highest point, rocking lever T^3, compressing spring u^2 to the full extent and consequently increasing the pressure of the finger P to the maximum degree. As the knife or fork handle continues to rotate bringing the narrower part thereof against the wheel the continued rotation of the disk e' (through its connections with the lower part U′ of pitman U) thereby effects a decrease in the pressure exerted by finger P, which reaches its minimum as the blade of the knife reaches a horizontal position. After handle Z has been in contact with the wheel for a predetermined period (during one revolution of the wheel S) the pressure on the handle is released the pin s^2 shoving latch t off of the rim of said wheel allowing the lever T to swing on its pivot throwing the finger P back to the position indicated in dotted lines Fig. 2 and dropping the wheel D away from contact with shaft C thereby stopping the operation of the machine, which may be commenced by depressing the outer end of lever T until the catch again engages over the rim of wheel S.

In order to allow the knife or fork sufficient freedom of movement in the work-holder so that it can so adjust itself through the pressure exerted by finger P that the handle thereof is at all times in contact with the grinding wheel from end to end, it is necessary to mount the holder so that it can swing slightly in a horizontal plane. On the sleeve m^3 is a forked extension m^4 which forms a bearing for the pivot points n' n' projecting upwardly through an overhanging arm N^2 thereon. A wide pinion e is provided so that the engagement of the gear-wheel E′ therewith will not be interrupted by the swinging of the holder on its pivot points.

From the foregoing description it will be observed that in addition to its rotary and swinging movement in a horizontal plane the work-holder is also reciprocated longitudinally, through the standard N and its connections with eccentric J. It will also be apparent that parts of the invention may be separately employed and that modifications may be made without departing from the principle of the invention.

What I claim is—

1. In a machine for grinding or polishing the handles of knives or forks, the combination with the grinder or polisher of a revolving work-holder for the article loosely mounted so as to allow the handle to align itself with the surface of the grinding wheel and means for pressing the handle thereof against the grinder or polisher substantially as described.

2. In a machine for grinding or polishing the handles of knives and forks the combination with a grinder or polisher, of a revolving work-holder for the article, loosely mounted so as to allow the handle to align itself with the surface of the grinder or polisher means for pressing the handle thereof against the grinder or polisher, and means for reciprocating the handle longitudinally across the surface of the grinder or polisher, substantially as described.

3. In a machine for grinding or polishing the handles of knives and forks, the combination with a grinder or polisher, of a revolving work-holder for the article, means for pressing the handle thereof against the grinder or polisher, and means for varying the pressure against the handle during each revolution thereof, substantially as described.

4. In a grinding or polishing machine for knife and fork handles, the combination with the grinder or polisher, of a revolving work holder for the article, means for holding the handle thereof in contact with the grinder or polisher by a maximum pressure when the sides thereof are in contact with the wheel and with a minimum pressure when the edges make such contact, substantially as described.

5. In a grinding or polishing machine for knife and fork handles, the combination with a grinder or polisher, of a revolving work-holder mounted to swing in a horizontal plane, and in which the article is loosely held, and means for pressing the handle against the grinder or polisher, substantially as described.

6. In a machine for grinding or polishing the handles of knives and forks, the combination with the grinder or polisher of a revolving work-holder mounted to swing in a horizontal plane and in which the article is loosely held, a spring-actuated finger for holding the handle against the grinder or polisher, and means for reciprocating the handle longitudinally across the grinder or polisher, substantially as described.

7. In a machine for grinding or polishing the handles of knives and forks, the combination with the grinder or polisher of a revolving work-holder for the article, a spring-actuated finger for pressing the handle against the grinder or polisher and means for releasing the pressure from said finger and stopping the working parts of the machine after the handle has been operated upon for a predetermined period of time, substantially as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

ALLEN JOHNSTON.

Witnesses:

A. G. HARROW,

ALFRED BRIGGS.