4 Sheets--Sheet 1.

C. A. BLESSING.

Turning Lathes for Wood.

No. 137,999. Patented April 22, 1873.

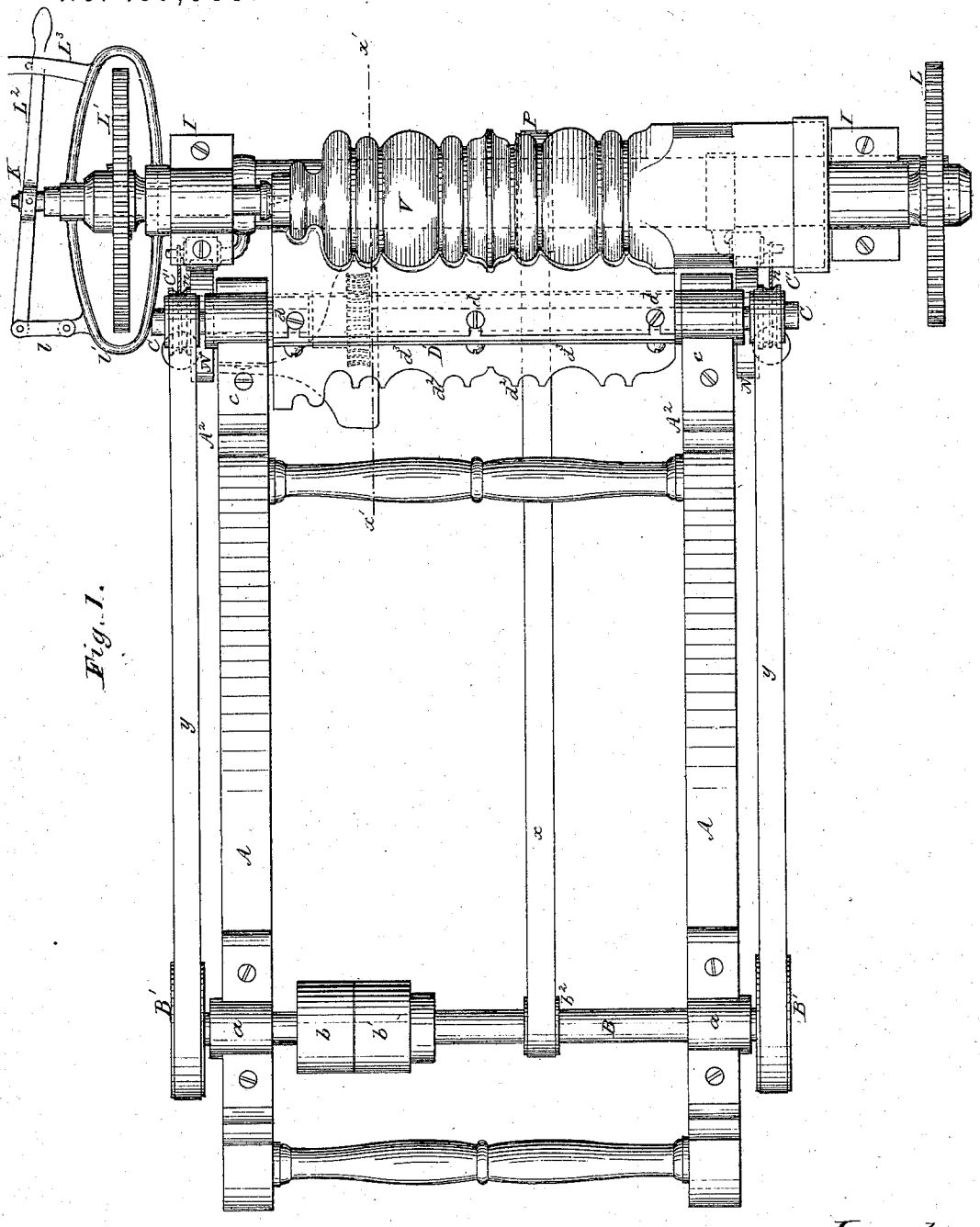


Fig. 1.

Witnesses:

T. C. Brecht.

Edwin James

Inventor:

Charles A. Blessing,

per J. E. B. Holmead,

Attorney.

4 Sheets--Sheet 2.

C. A. BLESSING.

Turning Lathes for Wood.

No. 137,999. Patented April 22, 1873.

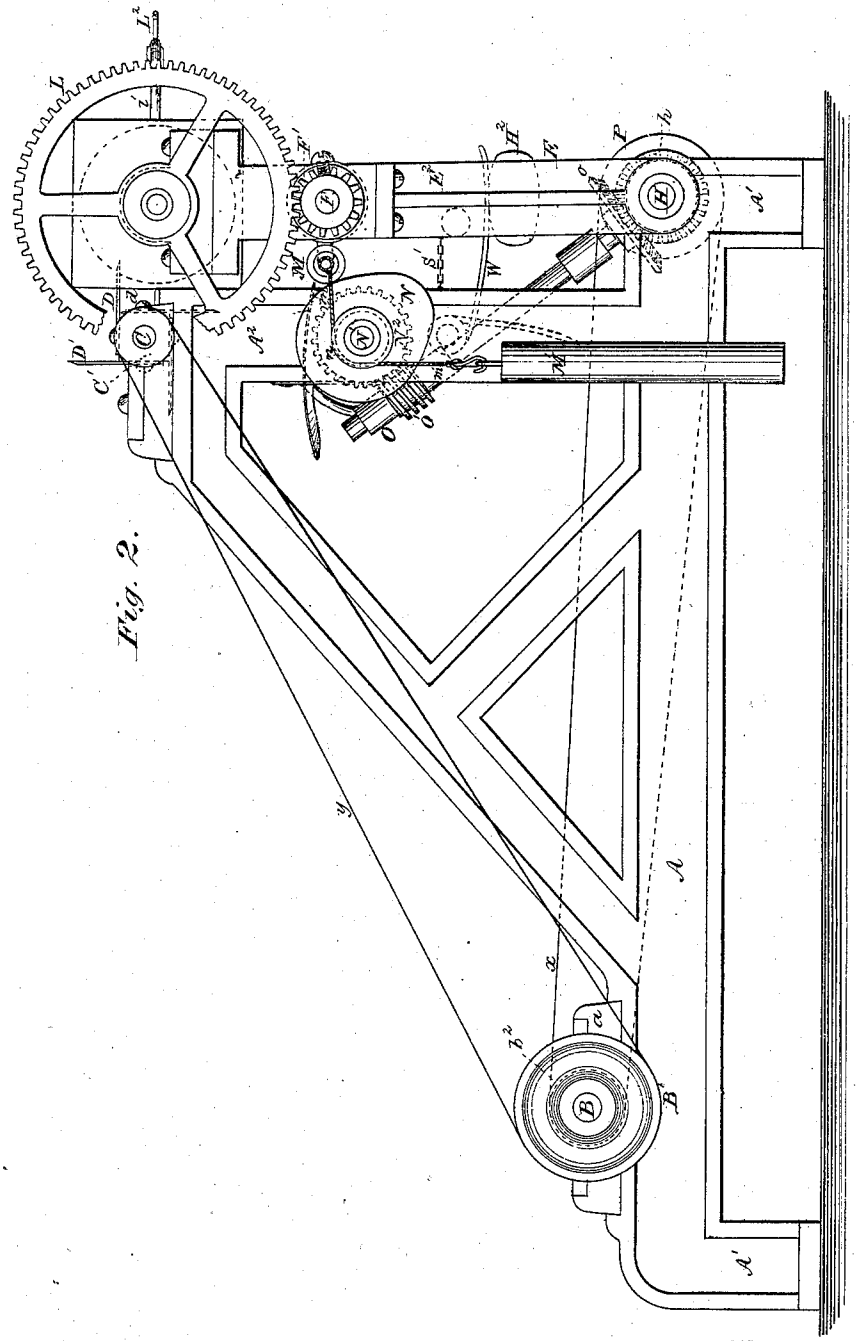


Fig. 2.

Witnesses:

T. C. Brecht.

Edwin James

Inventor:

Charles A. Blessing

per J. E. B. Holmeads

Attorney.

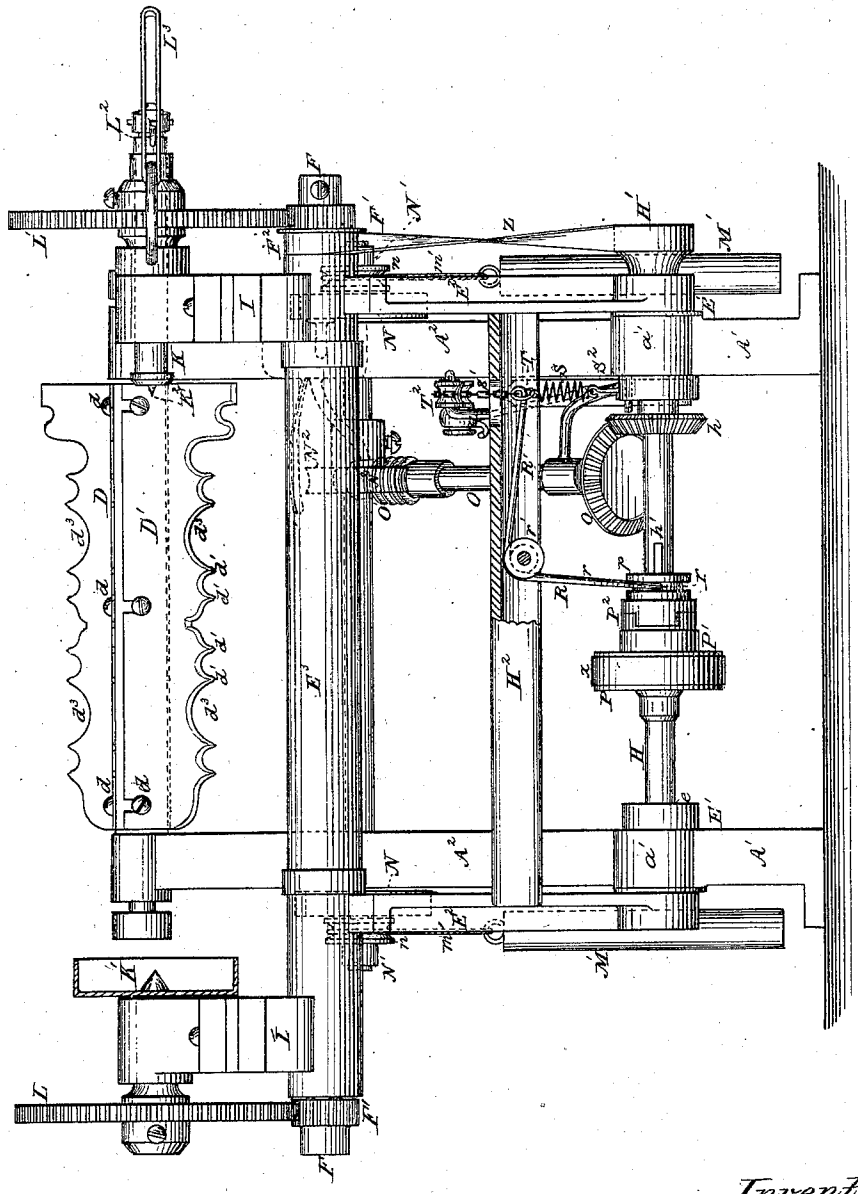
4 Sheets--Sheet 3.

C. A. BLESSING.

Turning Lathes for Wood.

No. 137,999. Patented April 22, 1873.

Fig. 3.



Witnesses:
T. C. Brecht.
Edwin James.

Inventor:
Charles A. Blessing.
per J. E. D. Holmead
Attorney

4 Sheets--Sheet 4.

C. A. BLESSING.

Turning Lathes for Wood.

No. 137,999. Patented April 22, 1873.

Fig. 4.

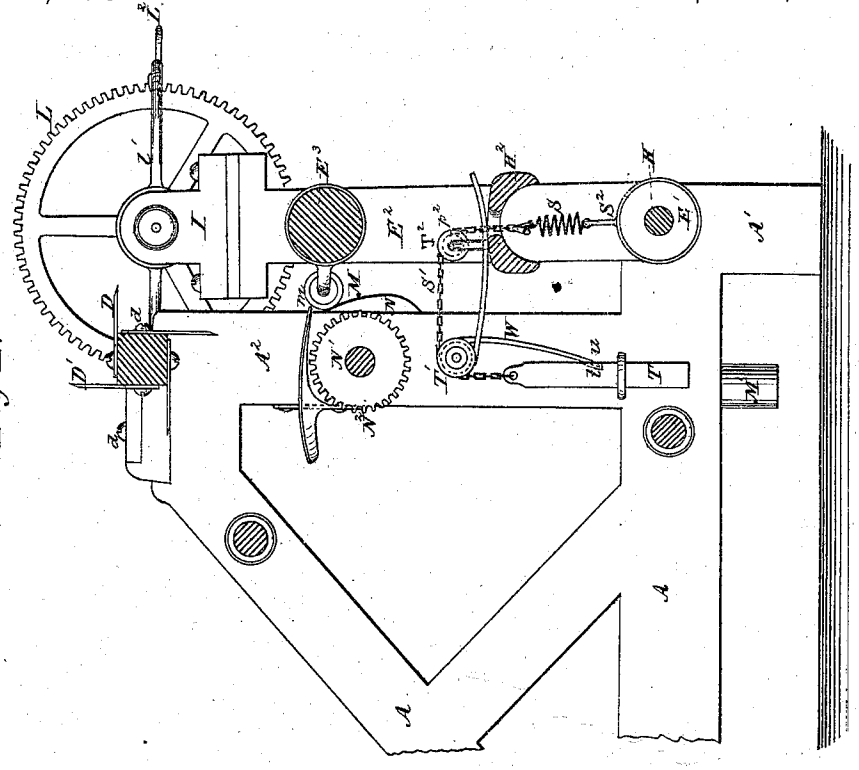
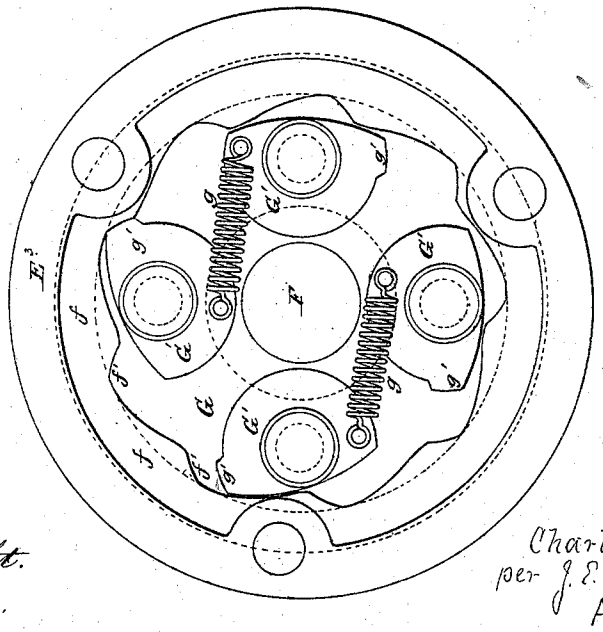


Fig. 5.



Witnesses:
J. C. Brecht.
Edwin James.

Inventor:
Charles A. Blessing
per J. E. D. Holmead & Co
Attorney.

UNITED STATES PATENT OFFICE.

CHARLES A. BLESSING, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN TURNING-LATHES FOR WOOD.

Specification forming part of Letters Patent No. **137,999**, dated April 22, 1873; application filed February 7, 1873.

To all whom it may concern:

Be it known that I, CHARLES A. BLESSING, of the city and county of Philadelphia and State of Pennsylvania, have invented an Improved Machine for Cutting Hydrant and other Posts, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing and the letters of reference marked thereon making part of this specification, in which—

Figure 1 is a top-plan view. Fig. 2 is a side view, parts being removed. Fig. 3 is a front view, parts being broken away. Fig. 4 is a vertical sectional view on the line *x x*, Fig. 1. Fig. 5 is an enlarged view of the mechanism by which the post is prevented from moving contrary to its proper direction in case, for any reason, the cutters should attempt a reverse movement of the post.

The nature of my invention consists in securing to the swinging frame, which carries the revolving bearings of the post, cords or chains, which are passed over pulleys or sheave-wheels, and to which weights are attached, the same being so arranged that the power of the weights shall constantly be employed in drawing the swinging frame toward the knives. Yet while these weights thus operate, still the approach of the swinging frame toward the knives is controlled and regulated, and at a proper time its return or backward movement is impelled through the action of cams attached to a shaft, the faces of which press against the rollers secured on the rear side of the swinging frame. The cam-shaft is operated by power communicated from the motor-shaft, which is connected with the swinging frame, through a shaft whose bevel-gear meshes with the bevel-gear of the motor-shaft, the worm-thread of which drives the ratchet or worm wheel which revolves the cam-shaft. My invention also consists in the combination and arrangement of mechanism by which the clutch-pulley, which is fast on the motor-shaft of the swinging frame, is caused to engage with, and at the proper time automatically to be disengaged from, the loose clutch-pulley to which the belt-pulley is attached, and which communicates motion to the motor-shaft. To the first-mentioned of these clutch-pulleys is attached the forked head of a bent or elbow-shaped lever, which has its bearing at a pivot-center on a cross-bar of the swinging frame. The other end of this lever is connected with a chain and spring, the latter being, on its other end, secured to a stationary bearing on the main frame of the machine. The chain is passed up through the cross-bar of the swinging frame and over pulleys or sheave-wheels, and has attached a ratchet-weight. As the swinging frame is drawn toward the knives this weight gradually descends, and continues to fall until the frame has carried the post to such position as will have enabled the knives to finish their work, when, in an opening in the weight, automatically drops a lever-pawl. Now as the cams, through their action, return the swinging frame, this weight, being held by the pawl-lever, cannot ascend; and consequently the spring, through its elasticity, is called upon to resist the strain. This soon so overcomes its tension that, through the bent lever, the clutch-pulleys are disengaged. Thus when the frame reaches the position when it is desirable to remove the turned and finished post and insert another, its shaft and the entire mechanism which receives power therefrom, are inoperative, and so continue until the pawl is relieved from the weight, when instantly, through the tension of the spring, the clutches again engage, and all works as before. My invention also consists in attaching to the shaft that carries the pinions, and which imparts motion to the revolving bearings of the post, a disk or plate, to which are pivoted cam-shaped pawls, and in inclosing this section of the shaft in a tube or collar, the interior surface of which is irregular, consisting of a series of curves, each terminating in an angular head. These cam-pawls are so connected by springs that while they are kept in contact with the uneven surfaces of the cylinder they shall yet offer no resistance to the revolution of the shaft so long as it moves in the proper direction; but in case the knives should for any reason attempt a reverse movement of the post, and consequently through the gearing of the pinion-shaft, the cam-pawls are instantly brought in such contact with the angular heads of the curves on the interior of the cylinder or collar as instantly to arrest the motion of the shaft, and

which continues until the post is left free to revolve in its proper direction. The nature of my invention also consists in turning the edges of the knives slightly down, and so bending them as to give or impart the desired end slope to the turned sections of the post. I employ two classes of knives, which are secured alternately on the axle. The edges of one set, at certain sections, terminate in sharp teeth-points, which make straight incisions or cuts into the surface of the post, and which permit the cutting-edges of the next knife the more readily to act and operate as a groover at those sections. The concave sections of the knives are all similar, and their cutting-edges all operate in the same manner.

The construction and operation of my invention are as follows: A is the main frame of the machine, to which is connected the entire operating mechanism, and is supported by or rests on standards A^1 A^1. At the rear section of this frame, and in suitable journal-bearings *a a*, is secured the main driving-shaft B. On this driving-shaft B is a fast pulley, *b*, and a loose pulley, b^1, which are designed to connect the machine with an engine or other motor by means of an endless belt, and in such manner as to render the machine operative and also inoperative at pleasure. Near the center of this shaft B is another fast pulley, b^2, which carries the endless belt *x* that works the motor-shaft H connected with the swinging or vibrating frame E. At the ends of the shaft B, and working outside of the frame A, are pulleys B′ B′, which, by means of pulleys C′ C′, and through the endless belts *y y*, operate the shaft C, to which are attached the knives or cutters D D′. The shaft C is journaled in suitable bearings *c c* secured on the upright sections A^2 A^2 of the frame. The edges of these knives or cutters D D′ are formed in the shape, or are of the contour, of the article to be turned, and, by means of screws or bolts *d d*, are secured to the cutter-head that is fast to the cutter-shaft C. The edges of these knives are slightly bent down, and so turned at their ends as to give the desired end slopes to the turned sections of the post. The edges of the knives D D at certain sections terminate in sharp teeth-points d^1 d^1, which are designed to make straight incisions or cuts into the surface of the post, and which permit the groover-edges d^2 d^2 of the next knife D′ the more readily and smoother to act. The concave or curved sections d^3 d^3 of the knives D D′ are all similar, and consequently their operation is the same. Their form and arrangement are clearly shown in Figs. 1 and 3. E is the swinging or vibrating frame of the machine, and is journaled in collar-bearings E^1 E^1, through the openings *e e* of which pass the ends of the shaft H. At the upper sections of the upright arms E^2 E^2 of this swinging or vibrating frame E, and in suitable bearings, rests the tube E^3. In this tube is journaled, so as to revolve freely, the shaft F, on the outer sections of which are pinions F^1 F^1. This shaft F is driven by an endless belt, *z*, passing over its pulley F^2, and also over the pulley H^1 of the shaft H, and by power communicated from the latter. At one section of this pinion-shaft F is secured a plate or disk, G, an enlarged view of which is represented in Fig. 5. The section of the tube E^3 that surrounds this disk, and in connection with which it operates, is on its inner face of an irregular form, consisting of a series of inclined curves, *f f*, which terminate in angular heads or ratchet-bearings *f′ f′*. To the disk G is pivoted a series of cam-pawl plates, G′ G′, which are connected by means of springs *g g*, and which so operate that while they cause the plates G′ G′ to hug the inclines *f f* during the revolution of the shaft, yet they offer no resistance to its movement so long as it travels away from the knives or cutters D D′. But should there be a knot in the wood through which the knives would not readily cut, or for any other reason should they catch so as to attempt to carry the post with them, and, consequently, in an opposite direction from that in which it is designed to travel, the pawl-points *g′ g′* of the cams G′ G′ are instantly brought in such contact with the inclined ratchet-heads *f′ f′* of the inclined curves *f f* as to arrest the motion of the shaft, and to retain it until the knot is cut through or the other obstruction is removed, when the shaft F will operate as before. On the upper section of this tube E^3 are secured the journal-bearings I I of the spindles K K of the head and tail blocks K^1 K^2. On the outer section of these spindles K K are attached ratchet-wheels L L^1, which gear with the pinions F^1 F^1 of the shaft F, and through which the head-block K^1 and the tail-block K^2 which carry the post are revolved. The spindle K of the tail-block K^2 has attached a lever, L^2, which has its bearing on a pivoted arm, *l*, attached to a slotted plate or stirrup-arm, *l′*, that surrounds the ratchet-wheel L^1. By means of this lever L^2 a lateral movement is imparted to the spindle K, and which moves the tail-block K^2 so as to permit of the post being inserted and secured or of its removal at pleasure. This lever L^2 is fastened by means of a ratchet-segment, L^3, as clearly shown in Figs. 1 and 3. On the rear section of the tube E^3, which is secured at the upper section of the vibrating frame E, are secured on suitable bearings, as shown in Figs. 2 and 4, the friction-rollers M M, to the axle-bearings *m m* of which are attached cords *m′ m′*, to which are secured weights M′ M′. These cords or chains pass over pulleys or chain-wheels *n n* attached to the shaft N^1, which is journaled in suitable bearings on the upright arms A^2 A^2 of the frame, and immediately below the cutter-shaft C. The cords *m′ m′*, to which the weights M′ M′ are attached, being thus connected with the vibrating frame E, and passing over rear pulleys *n n* connected with the main frame, the power or gravity of the weights M′ M′ is constantly employed in

drawing the vibrating frame toward the main frame; or, in other words, in drawing the head and tail blocks K^1 K^2, which carry the post, toward the knives D D′. On this shaft N^1, and at the outer section thereof and in close contact with the pulleys *n n*, are secured the cams N N. These cams operate outside of the uprights A^2 A^2 of the frame, and their faces are in immediate contact with the friction-rollers M M of the vibrating frame E, as clearly shown in Figs. 2 and 4. Thus while the weights are constantly acting to draw the vibrating frame forward, its approach is regulated and controlled, and at the proper time its return impelled by the action of the cams N N against the friction-rollers M M. O is an inclined shaft, and is journaled in suitable stationary bearing-rods attached to the frame. This shaft is driven by its bevel-gear *o* meshing with the bevel-gear *h* of the shaft H, and the worm O′ on its upper section drives the worm-wheel N^2 made fast to the cam-shaft N^1, and through which the latter is revolved, which arrangement is clearly shown in Fig. 2. The motor-shaft H, to which is attached the pulley H^1, which revolves through the endless belt *z* the pinion-shaft F, and which has also attached the bevel-gear *h*, which, through the spindle O, revolves the cam-shaft N^1, is journaled in suitable bearings *a′ a′* at the front of the frame A, and immediately above the standards A^1 A^1. As has before been said, the ends of this shaft pass through the openings *e e* of the collar-bearings E^1 E^1 of the vibrating frame E, and thus serve to support said frame. This shaft H is driven by means of an endless belt, *x*, which passes over the pulley b^2 of the main driving-shaft B, and over the pulley P of the shaft H. This pulley P and its clutch P^1 are loose, and are consequently inoperative until they gear with the clutch P^2, which is made fast on the shaft H by means of a stationary key, *h′*, secured to said shaft, and which is so arranged in connection with the clutch P^2 that while it allows of its having a lateral movement, at the same time compels it to revolve with the shaft H. To this clutch P^2 is secured a grooved collar, *p*. In the groove of this collar *p* enter, as clearly shown in Fig. 3, the forked arms *r r* of the bent or elbow-shaped lever R, and which has a pivot-center bearing at *r′* on the under face of the cross-bar H^2 of the vibrating frame E. The lateral arm R′ of this lever R is attached to a spring, S, and a chain, S^1, which spring is secured to a stationary bearing, S^2, at the front of the frame in such manner that its tension is constantly employed in so acting on the bent lever R as through its forked head *r* to cause the clutches P^1 P^2 so to engage as to insure the revolution of the shaft H by the power communicated through the endless belt *x*. To this chain S^1 is secured a ratchet-weight, T, in which is an aperture or opening, *t*. This chain S^1 passes over two pulleys or chain-wheels, one, T^1, attached on the inner face of the upright A^2 of the frame, and the other pulley, T^2, secured in a suitable standard attached to the upper face of the cross-bar H^2 of the swinging frame E. To the shaft of the pulley T^1 is pivoted the bent pawl-lever W, and which lever is so balanced that its point *u* always rests against the center of the weight T. Consequently, as the weight T falls, and which it gradually does as the vibrating frame is drawn in when it reaches such a point as to leave the opening *t* opposite to the point *u* of the pawl-lever W, they will automatically engage, as clearly shown in Fig. 4, and thus the weight T is prevented from being drawn up by the chain S^1 until the pawl-lever W is disengaged, and which causes the strain of the chain S^1 and locked weight T on the outward or return movement of the vibrating frame so to draw on the elasticity of the spring S as to overcome its tension, and which, so soon as this is done, insures the disengaging of the clutches P^1 P^2, and, consequently, the cessation of motion on the part of all the different features of the mechanism, which receive their power from or through the shaft H, and cause them to remain at rest until the pawl W is disengaged, when the weight T is instantly drawn up through the tension of the spring, which tension also so operates on the lever-arm R as to drive the clutches P^1 P^2 again together, when the machine operates as before. The several features herein described, and which are intimately connected with the clutches P^1 P^2 and the weight T, are to be relatively so arranged that the weight T shall engage with the pawl-lever W just as the operation of cutting the post is finished, and to insure that the clutches P^1 P^2 shall be disengaged when the frame E has been returned to the desired position for the removal of the turned and finished work and the securing of a fresh post. V is a metallic or hard-wood cylinder, and is to be covered with emery. The surface of this cylinder has to be so shaped as to conform exactly to the contour of the edges of the knives or cutters D D′. When the knives require sharpening the cylinder V is placed in the head and tail blocks K^1 K^2, as shown in Fig. 1, and the main driving-shaft is stopped running, as well as the cutter and motor shaft H. The endless belt *z* is taken from the machine, and the pinion-shaft and its pulley are driven by a pulley and belt not connected with the machine when it is in operation, and running the emery-cylinder at a faster speed than the machine itself would run it. The inside mechanism in the tube E^3 is set out of working order so that the emery-cylinder V is allowed to be turned or moved in a direction contrary to its usual way, thus enabling the knives to be sharpened, one after the other, by holding them in proper contact with the emery-cylinder. During the process of sharpening the knives remain fastened to the cutter-head, being turned after one knife is sharpened so as to bring the next one in contact with the emery-cylinder, and the swinging frame remaining stationary.

From the foregoing description the opera-

tion of the machine will readily be understood. We will suppose that the swinging or vibrating frame E has been pushed out, and that the lever-pawl W is in the opening *t* of the ratchet-weight T, and that, consequently, the tension of the spring S has been so far overcome that it no longer, through the lever R, causes the clutches P^1 P^2 to engage; the result is, the pulley P being now entirely loose on the shaft H, that, though the belt *x* may still continue to revolve said pulley, the latter imparts no motion to the shaft, and, being motionless, the pulley H^1 and bevel-gear *h*, each of which the shaft H works, are also still, and, consequently, the pinion-shaft F no longer revolves the spindles K K of the head and tail blocks K^1 K^2, and the shaft N^1 is also at rest. The friction-rollers M M rest against the sections of the faces of the cams N N which are most distant from their axles, and which causes them to hold in a stationary manner the swinging frame E, and at a position the most distant from the knives which the frame in its movement ever reaches. The lever L^2, Fig. 1, is now pulled back, and carries with it the spindle K of the tail-block K^2. The post is then inserted and secured between the head and tail blocks K^1 K^2, and securely fastened by the lever L^2 being caught and held in the ratchet-segment L^3. The post is now ready to be carried forward for the action of the knives. The pawl-lever W, Fig. 4, is now withdrawn from the ratchet-opening *t* of the weight T, and the strain on the spring S being now removed through its elasticity, it so draws on the chain S^1 as to cause it to elevate the weight T. The pawl-lever W still rests against the face of the weight, but does so at a point now far below its opening *t*. The tension of this spring S, which has thus elevated the weight T and carried it to such point as to render it impossible for the pawl-lever W to engage therewith, has also so acted on the lateral arm R′ of the bent lever R, Fig. 3, as to cause the clutch-pulleys P^1 P^2 to engage. This causes the endless belt X, through the now fast pulley P, to revolve the shaft H, which, of course, carries with it the bevel-gear *h* which works the spindle O, causing it, through its worm O′, to revolve the ratchet N^2, and, through its movement, the shaft to which it is fast, and to which shaft are attached the cams N N. This movement of the cams permits of the gradual approach of the vibrating frame E, the same being drawn in by the cords *m′ m′* and weights M′ M′, Fig. 2. The same movement of the shaft H which has, through its bevel-gear *h*, thus set in motion the shaft N^1 which carries the cams N N, also revolves the pulley H^1, Fig. 3, which, through the endless belt *z*, revolves the shaft F. This movement of the shaft F, through its fast pinions F^1 F^1, revolves the gear-wheels L L^1, and, through them, the spindles K K of the head and tail blocks K^1 K^2, and which imparts a regular and uniform motion to the post, causing it to revolve in such direction as to travel from or in an opposite direction to that of the knives, and which continues until the cams N N have been so turned that the rollers M M rest against the sections of their faces which are nearest their common axle N^1. When the vibrating frame E reaches this point, the knives D D′, through their rapid revolution on the shaft C, which is driven by the endless belts *y y*, Fig. 1, secured to the main driving-shaft B, have finished their work on the post, it being cut to the desired form. The cams N N, through their slow, continued, and uninterrupted action, now begin to return the swinging or vibrating frame E, pushing the same out until it again rests against the extreme points of the cams N N, or the points thereof which are most distant from their axle N^1, and at which point all the operating mechanism, except the cutter-shaft C, is inoperative, and so because as the frame E approached the cutters the weight T gradually was allowed to fall until it reached the position shown in Fig. 4, and at such point as caused the pawl-lever W to engage with it. This occurs exactly at the period of time that the cutters D D′ have finished their work and the cams N N begin to return the vibrating frame E. Now, this outward movement of the frame E, which of course carries out with it the cross-bar H^2, to which the chain-pulley T^2 is attached, gradually increases the distance between the pulley-bearings T^1 T^2 of the chain S^1, and which causes a strain on the chain, the natural tendency of which is to elevate the weight T; but the weight is locked in position by the pawl-lever W, and cannot rise; consequently, the strain falls directly on the tension of the spring S, which gradually yields until, through the action of the chain S^1, as clearly shown in Fig. 3, the arm R′ is drawn up, which movement causes the bent lever R, through its forked head *r*, to disengage the clutches P^1 P^2, and which instantly renders the entire mechanism connected with the vibrating frame E inoperative, as the pulley P, being loose and now no longer engaged, does not, through its revolution, impart motion to the shaft H. This interruption of the operation of the mechanism connected with the vibrating frame occurs exactly as said frame reaches the position which renders it convenient for the finished post to be removed and a fresh one supplied. So soon as this change is made the pawl-lever W is withdrawn from the opening *t* of the weight T, when the tension of the spring S, acting through the chain S^1, instantly elevates said weight. But the tension of the spring S, being now free to act, draws down the arm R′ of the lever-arm R, and which drives out the arm of the bent lever to which the forked head *r* is attached in such manner as to cause the clutches P^1 P^2 to engage, and thus cause the machine instantly to operate as before.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. The vibrating frame E, cords or chains

and weights m' m' and M′ M′, and cams N N, when the same are connected, combined, and arranged, as herein described, so that the weights constantly act to draw the frame forward, yet its approach shall be regulated, and at the proper time its return impelled, through the action of the cam, substantially as described.

2. The cams N N, shaft N^1, worm-wheel N^2, shaft O having worm O′ and bevel-gear o, and the bevel-gear h attached to the shaft H, when the same are combined and arranged to operate substantially as described.

3. The shaft H, loose pulley and clutch P P^1, clutch P^2, lever R, spring S, chain S^1, weight T, and pawl-lever W, the whole being combined and arranged to operate substantially as described.

4. The pinion-shaft F, disk G, pawl-plates G′ G′, springs g g, and the tube E^3, having irregular surfaces f f', when the whole is combined and arranged to operate substantially as described.

5. The knives or cutters D D′, having their edges formed as shown in Figs. 1 and 3, and secured to the shaft C, to operate substantially as and for the purpose specified.

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

CHAS. A. BLESSING.

Witnesses:
EDWIN JAMES,
JOS. T. K. PLANT.