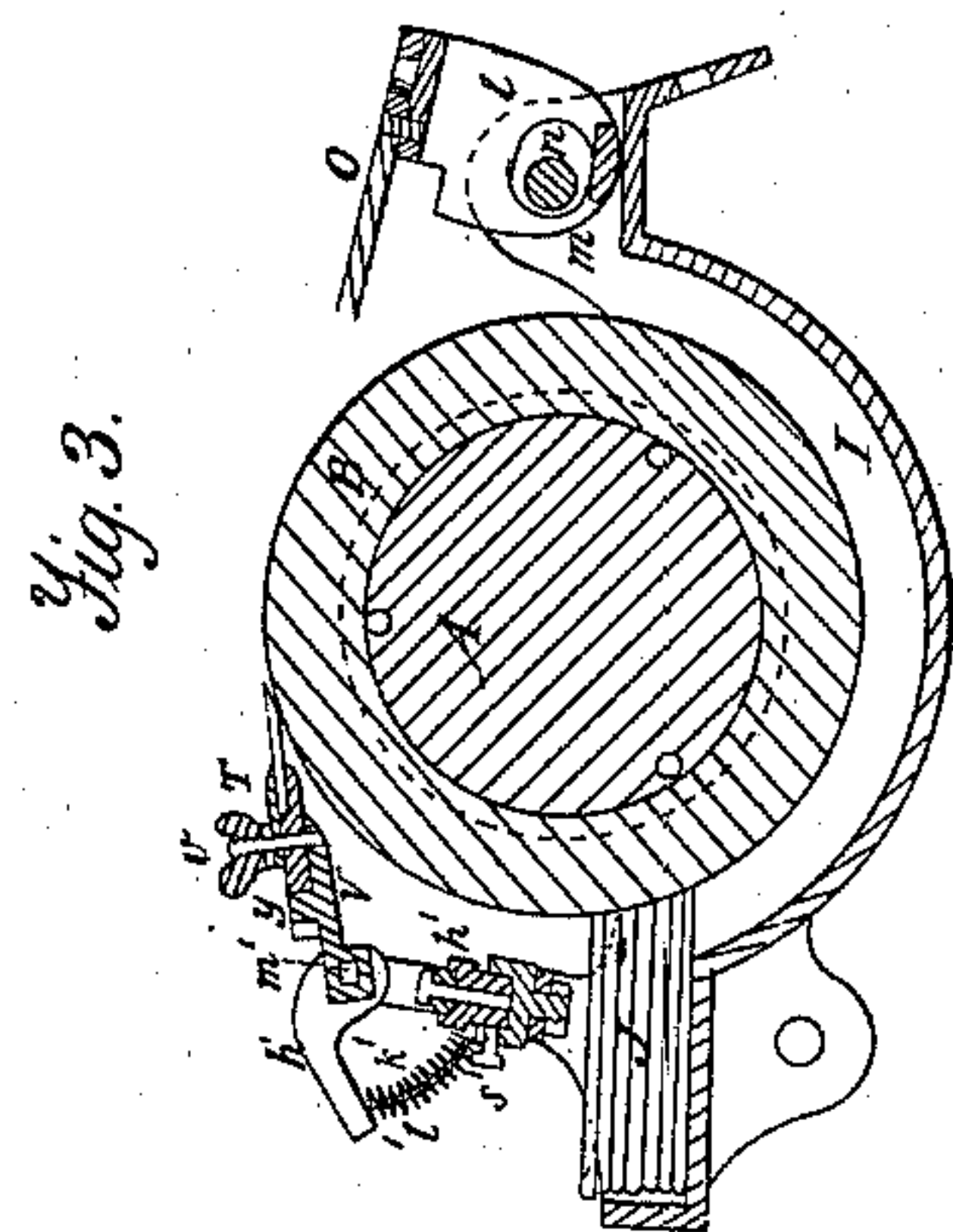
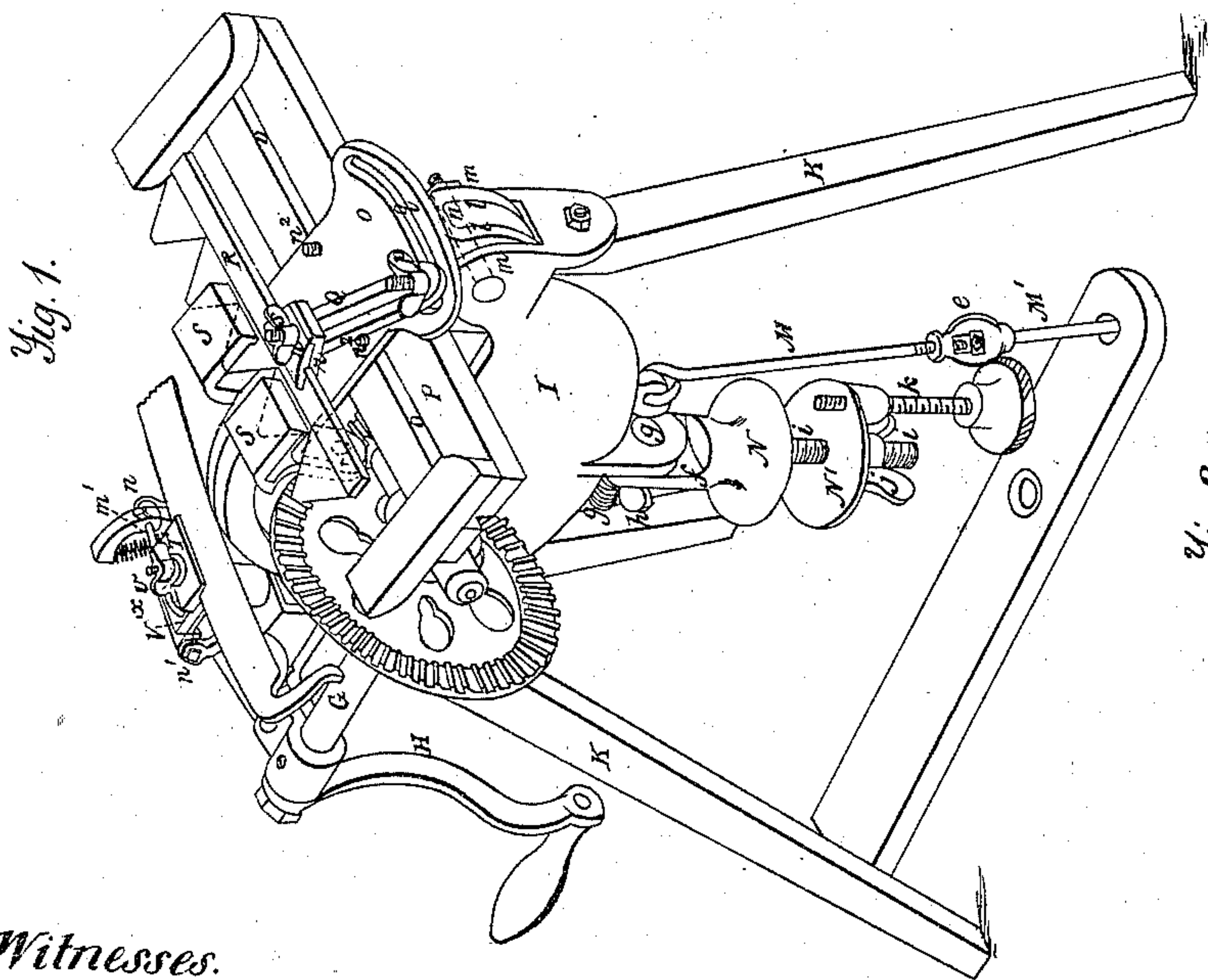
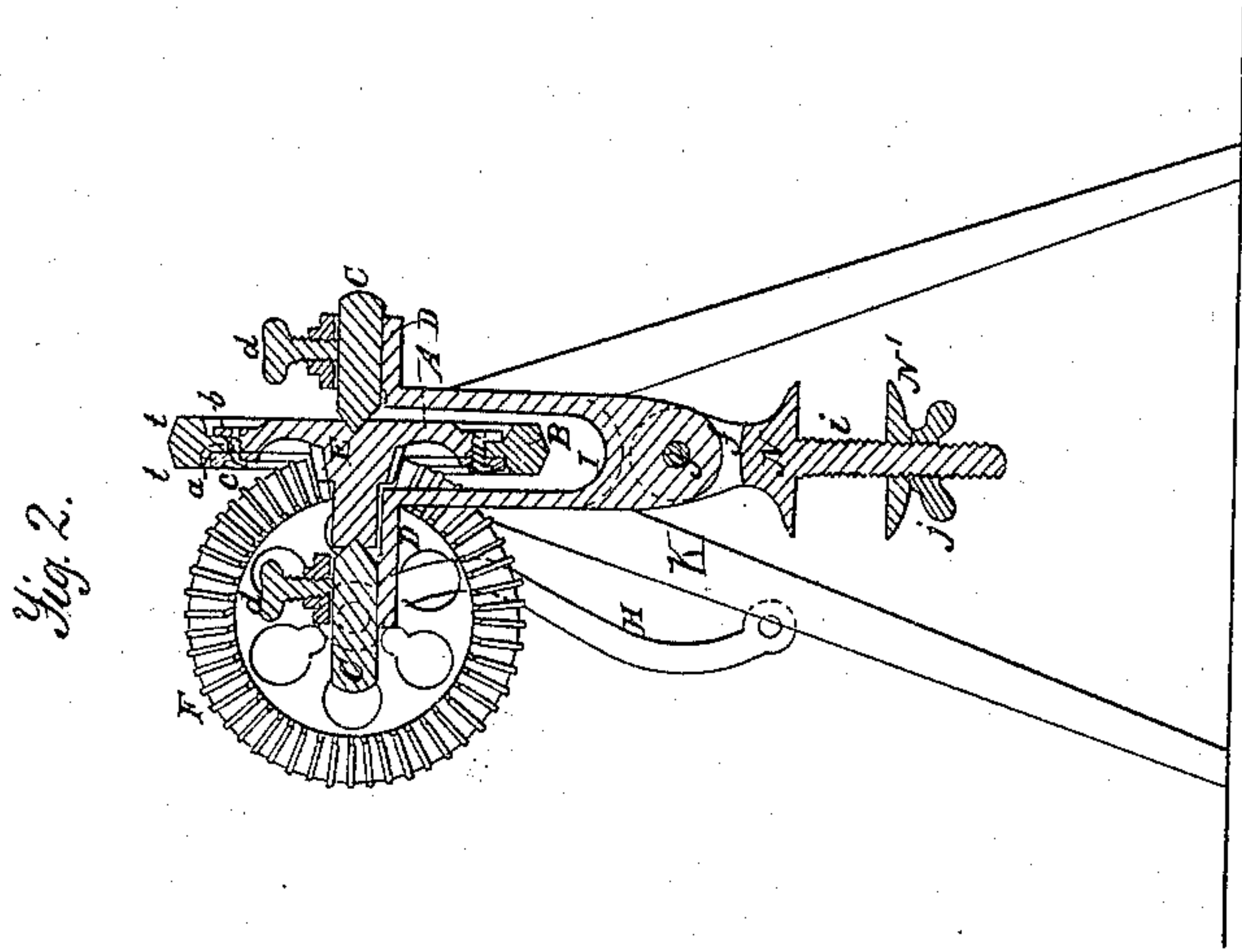


S. W. & J. F. PALMER.
 MACHINE FOR GRINDING CUTTERS OF MOWING MACHINES.
 No. 80,761. Patented Aug. 4, 1868.



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S. U. PALMER, AND CLARA M. PALMER, OF SAME PLACE.

Letters Patent No. 80,761, dated August 4, 1868.

IMPROVEMENT IN MACHINE FOR GRINDING CUTTERS OF MOWING-MACHINES.

The Schedule referred to in these Letters Patent and making part of the same.

TO WHOM IT MAY CONCERN:

Be it known that we, S. W. PALMER and J. F. PALMER, of Auburn, in the county of Cayuga, and State of New York, have invented certain new and useful Improvements in Machines for Grinding the Sections of Mower and Reaper-Knives and other articles; and we hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings.

Our invention refers mainly to the construction of hand-grinding machines for mower and reaper-knives and other articles; and one of its objects is to produce a better and cheaper grinding-wheel than has heretofore been done.

To this end we combine with the body of the wheel a rim, of emery or other like material, which is secured to the periphery of the wheel in the manner hereinafter described; and we further combine with the wheel a water-trough, for preventing the heating of the grinding-surface, and a stuffing-box for taking up the excess of water from the wheel.

In order to impart motion to the wheel, we employ bevelled gearing, arranged as hereinafter described, so as to throw the crank out of the way of the work, and to give greatly-increased speed to the grinding-surface; and in order to insure at all times the proper meshing of the gears, we support the grinding-wheel in conical bearings, which can be moved towards or away from the centre, so as to readily adjust the depth of the mesh of the gearing, such bearings being also adapted to be kept at the exact degree of tightness required without producing unnecessary friction.

A further object of our invention is to construct the table upon which the article to be ground is held, and to combine it with the wheel, in such manner as to admit of the grinding of each face of any section of a reaper-knife with ease, and to regulate with certainty the bevel to be given to the blade.

To this end the table is adapted, first, to move laterally, or from right to left, and *vice versa*, across the wheel, the object of this movement being to prevent the edge of the reaper or mower cutter-bar from interfering with the grinding of the section next to it; secondly, it is capable of being tilted or raised and lowered upon the hinge-joint upon which it is hung, so as to vary its angle of inclination with respect to the wheel, and thus determine the bevel of the cutting-edge which is being ground; and this hinge-joint is also so constructed as to allow the table to be moved up towards the wheel, in proportion as the grinding-surface wears away.

A further feature of our invention consists in the means hereinafter described, or their equivalent, for giving the blade or cutting-edge a movement diagonally across the grinding-surface.

One of the gravest objections to other grinding-machines of this class is, that the knives are held rigidly in one position against the stone, thus forcing each edge in succession to conform to any unevenness in the grinding-surface; and as the latter unavoidably wears away, the blade must be imperfectly ground. We remove this defect by causing the section to move diagonally over the grinding-wheel; and in order to admit of the two edges of the section being ground with ease, we bevel the surface of the grinding-wheel from the centre towards each side, and mount the clamp which holds the section in a slotted bar, which is pivoted to the table and set at the proper angle to either of the bevelled faces of the wheel, in order to effect the grinding of the corresponding edge of the section, as will be fully explained hereafter.

Our invention further relates to the construction of the frame in which the grinding-wheel is supported, and of the clamp and treadle by means of which the machine is held and steadied in position.

These and other features of our invention will, however, best be understood by reference to the accompanying drawings, in which—

Figure 1 is a perspective view of a machine made in accordance with our invention.

Figure 2 is a transverse vertical section of the machine through the axis of the grinding-wheel; and

Figure 3 is a longitudinal section of a detached portion of the machine in the plane of the grinding-wheel.

The central or main part, A, of the grinding-wheel is made of metal or other suitable material, upon which

is cast or pressed, or otherwise attached, a rim, B, of emery or other grinding-substance or composition. We prefer, however, to attach the rim to the wheel by means of a tongue, *a*, projecting centrally from the inner surface of the wheel, which is held between the flange *b*, on the periphery of the wheel, and the metal ring *c*, by means of bolts or pins passing through both tongue and ring and flange. The tongue *a* is not, however, absolutely essential, as the flange *b* and the ring *c* may embrace the body of the rim itself.

The wheel has formed in its hub or axis conical recesses, in which fit the conical ends of pins or bearing C, which are supported in boxes in the frame D, and are held in place by means of set-screws *d*. Upon the hub of the wheel is keyed a bevelled gear, E, which meshes with a bevelled gear, F, mounted upon a shaft, G, supported in suitable bearings on the sides of the frame, and extending out to the rear of the machine, where it is provided with a crank or handle, H, by which motion is imparted to the grinding-wheel.

The conical bearings in which the wheel is hung cause but little friction, and it will be seen that by loosening the set-screws *d*, the said bearings, together with the wheel, may be moved to one side or the other of the machine, so as to adjust the depth of mesh of the gears E F.

Beneath the grinding-wheel is placed the water-trough I, through which the rim B passes as the wheel revolves; and at one end is formed the stuffing-box J, which is filled with straw or other suitable material, for taking up the excess of moisture on the surface of the grinding-wheel.

The trough, stuffing-box, and all other parts of the frame, in which the grinding-mechanism is supported, may be cast in one piece if desired, and they are supported upon legs, K, attached, by means of bolts and nuts, to ears formed at the ends of the frame.

In order to steady and hold the machine in position while it is in use, either of the devices about to be described may be employed.

The rod M M', consisting of two parts united by the swivel-screw nut *e*, is secured at its upper end to the under side of the water-trough, and its lower end is provided with a treadle, upon which the operator can press with his foot, so as to steady the machine.

A rope or chain or cord may be substituted for the rod if desired, or the treadle may be dispensed with, and the lower end of the lower rod, M', may be attached to the floor, and the machine can then be secured by tightening the swivel-nut *e*.

The combination swivel-clamp N N' is intended for holding the machine in place without the use of the legs K, which may be detached by removing the screw-bolts by which they are held to the frame. The upper washer, N, is hung, by a central arm, *f*, upon a set-screw, *g*, fixed in a bearing formed on the under side of the water-trough, and can be set at various angles with respect to the frame, and then held in such position by means of the tightening-nut *h*. The lower washer, N', fits loosely upon a screw, *i*, projecting downwards from the washer N', and is held in position by the thumb-nut *j*.

In order to secure the machine in position, the lower washer can be removed, and the screw *i* of the upper washer can be passed through a hole in the platform or table upon which the machine is placed, and then tightened in place by screwing up the lower washer, by means of its thumb-nut *j*. Or the machine may be firmly secured by fastening the edge of the table or other support between the two washers, by means of the clamping-screw *k* attached to and passing up through the lower washer.

In the drawing we have shown two different devices for holding in place the mower or reaper-knives, scythes, or other articles to be ground.

The one consists of plate O, provided on its under side with ears *l*, which interlock or are held between corresponding ears *m*, on the main frame, and are hung upon a bolt, *n*, passing through both ears *l* and *m*, and fastened in place by means of a tightening-nut, as shown in fig. 1. To the under side of the plate O is attached a table, P, by means of set-screws *n*², which pass up into the plate, through a longitudinal slot or opening, *o*, formed in the table. The latter can, by this means, be adjusted or moved to the right or left, as circumstances may require, so that in grinding reaper or mower-knives, the eye on the end of the cutter-bar need not interfere with the grinding of the section next to it.

Upon the plate O is placed an adjustable bar, Q, pivoted at its front end to that part of the plate just opposite the face of the grinding-wheel. The other end of the bar is provided with a set-screw, *p*, the lower headed end of which is held in a segmental slot or groove, *q*, formed in the rear portion of the plate O. The bar Q can thus be swung from one side to the other of the plate, and fastened firmly in any position by means of the set-screw *p*, its movement being limited by the length of the slot *q*.

This bar is slotted throughout its length to receive a pin on the under side of the cutter-bar clamp or holder, consisting of the two plates or jaws *r*, held together by a clamping-screw, *s*.

In order to use the mechanism just described, to advantage, we bevel the face of the grinding-wheel from the centre towards each side, as shown plainly at *t t'*, fig. 2.

The operation of this portion of the mechanism is substantially as follows:

The cutter-bar R is clamped between the jaws *r*, and held down in place under angle-plates S on the front of the plate O, and the adjustable bar Q is then set or moved so that the slot in it shall be parallel or thereabouts with the prolongation of the edge of the section to be ground, the cutter-bar itself being held at about right angles to the grinding-wheel. This edge of the section is then pushed up towards the grinding-wheel, and by means of the pin on the under side of the clamp, which moves in the slotted bar Q, is caused to travel diagonally across the bevelled surface *t'* of the wheel. As soon as this edge of the section is ground, the set-screw *p* is loosened, the bar Q is swung through the segmental groove *q* to the opposite side of the plate O, and the position of the parts being thus reversed, the opposite edges of the cutter-section is caused to travel diagonally over the surface *t* of the grinding-wheel.

The table P may be adjusted to the right or left, for the purpose hereinbefore stated. The hole in the

ears *l* of the cutter-bar, through which the pin *n* passes, are, as shown in fig. 3, made of considerably greater size than the pin which passes through them. The object of this is twofold, for thereby the table can be moved up nearer the wheel, as the latter wears away, and it can be tilted, or raised and lowered, at its rear end, so as to increase or decrease to any degree desired the bevel given the cutter-edge in grinding. In order to adjust the table, the nut on the end of the pin is first loosened, and then, after the table is in proper position, the nut is tightened so as to bind all parts firmly together and in place.

The device at the opposite end of the machine is intended to effect the same results as those just specified. It consists of a cutter-bar clamp, *T*, which is held or pivoted to a plate, *V*, by a holding-screw, *v*, which also serves to tighten or press together the jaws of the clamp. The clamp *T* is capable of being swung from one side to the other of plate *V*, a segmental slot, *x*, being formed for this purpose in its outer end, in which fits a pin, *y*, from the plate *V*.

The plate *V* is held and slides on a square rod, *m'*, mounted in cylindrical bearings, formed in arms *n'*, which are united to a central pin or cylindrical rod, *p'*, which is held in a socket or hollow post in the frame of the machine, by means of a set-screw, *s'*. From the square rod *m'* projects a radial arm, *h'*, carrying at its end a curved rod, *k'*, the free end of which passes loosely through an opening formed for it in one of the supporting-arms *n'*. That portion of the curved rod between the end of the radial arms *h'* and the arm *n'* is surrounded by a spiral spring, *l'*, or its equivalent, which serves to hold the table or the cutter-bar, which it supports, against the surface of the grinding-wheel, with a yielding pressure.

The operation of this mechanism is substantially the same as before described.

If the article to be ground be a reaper-knife, the cutter-bar is held in the clamp at about right angles to the grinding-wheel, the plate *V* and supporting-arms being set at an angle to the face of the wheel corresponding with the angle of the knife to be ground, by means of the set-screw *s'*. A diagonal movement across the face of the wheel may now be imparted to the cutter-bar by sliding the clamp upon the square rod *m'*, while the blade is held in contact with the wheel by means of the spring *l'*, as before explained.

The method of grinding ordinary scythes and like articles, is essentially the same as with cutter-bars of reapers, &c., it being, of course, understood that the adjustment of the tables varies, and is governed by the size and shape of the articles to be ground.

If desired, the adjustable table *O P* may be employed with other mechanism than herein described for clamping and adjusting the cutter-bar or other article to be ground.

Having now described our invention, and the manner in which the same is or may be carried into effect, what we claim as new, and desire to secure by Letters Patent, is—

1. The combination, with the grinding-wheel, and the conical adjustable bearings in which it is hung, of the bevelled gearing and crank for driving said wheel, under the arrangement and for the operation as set forth.
2. The construction of the water-trough, stuffing-box, and frame or bearings, in which the grinding mechanism is supported, in one piece, substantially as herein and for the purposes set forth.
3. The combination, with the frame of the machine, of the adjustable rod and treadle, for holding and steadying the same while in use, as herein shown and specified.
4. The adjustable swivel-clamp, for holding the machine in position without the use of legs or other like supports, constructed and operated substantially as herein described.
5. The cutter-bar, supporting table *O P*, when constructed and hinged to frame of the machine, in the manner described, so that it may be adjusted both laterally and towards and away from the grinding-wheel, as and for the purposes set forth.
6. In combination with the parts claimed in the preceding clause, we claim the pivoted slotted bar, having its swinging end held in a segmental slot formed in said table, and the cutter-bar clamp, with or without the angle-plate *S*, the said parts being arranged and operated substantially as shown and specified.
7. The employment, in connection with the mechanism herein described, or its equivalent, for holding and adjusting the position of reaper-sections and like articles to be ground, of a grinding-wheel, the surface or rim of which has a double bevelled form, so that both edges of the section may be ground without materially changing the position of the cutter-bar, as herein shown and set forth.
8. The combination, with the arms *n'*, their central supporting-pin, the hollow post or socket for receiving said pin, and the adjusting-screw, for holding the same, of the knife or cutter-bar clamp, its supporting-plate, and the horizontal rod upon which the same are mounted and slide, the said rod being provided with a radial arm, curved rod and spring, as described, and the whole being arranged to operate in connection with the grinding-wheel, as and for the purposes set forth.

In testimony whereof, we have signed our names to this specification before two subscribing witnesses

S. W. PALMER.
J. F. PALMER.

Witnesses:

WM. E. PEASE,
HENRY H. SEGOINE.