(No Model.)

E. GOULD & U. & H. EBERHARDT.

Adjustable Crank Pin.

No. 241,488. Patented May 17, 1881

Fig. 2.

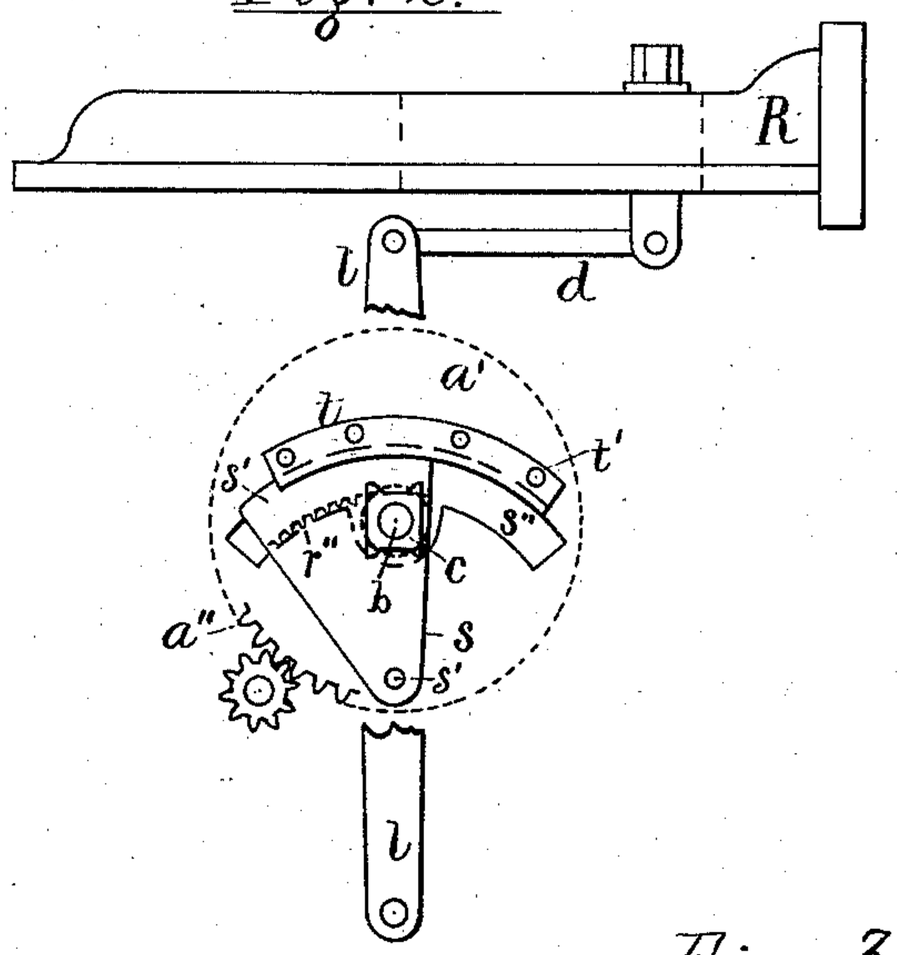


Fig. 1

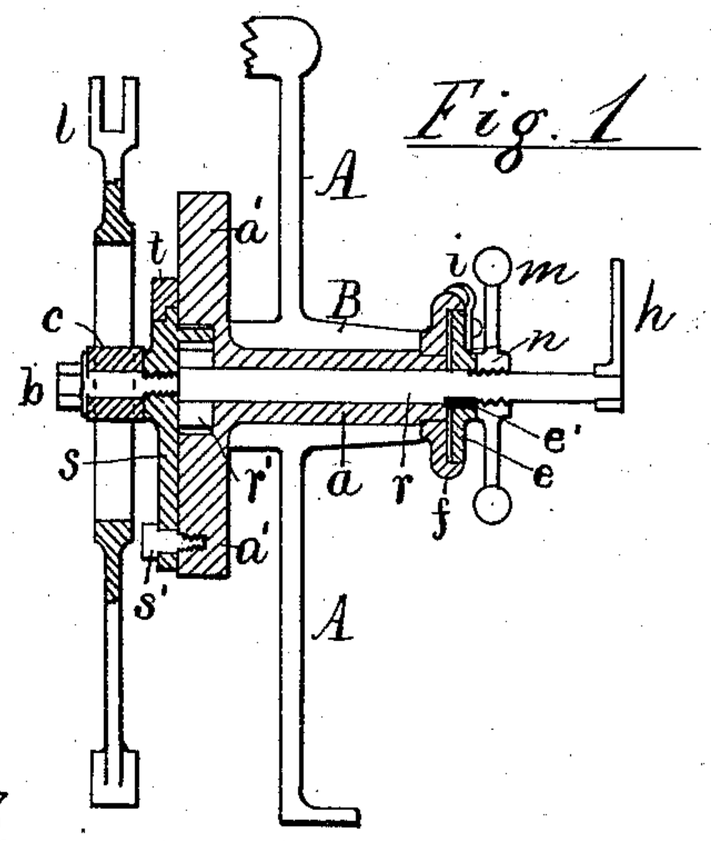


Fig. 3.

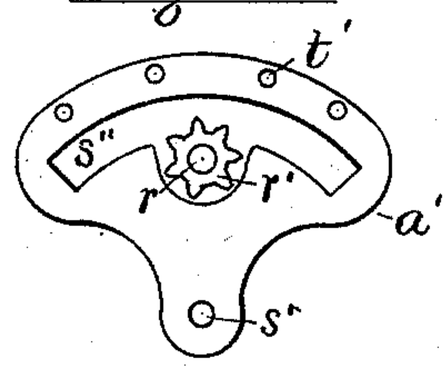


Fig. 5.

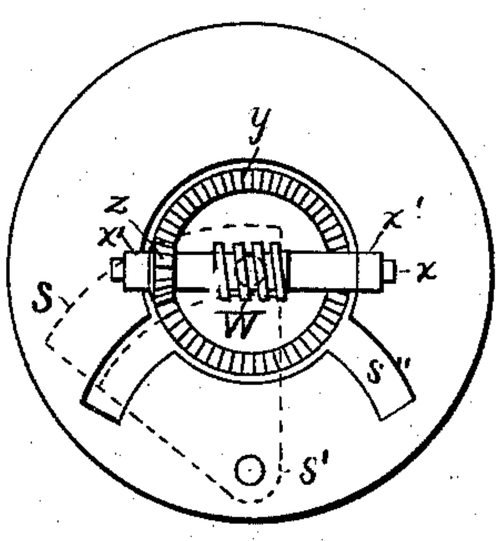
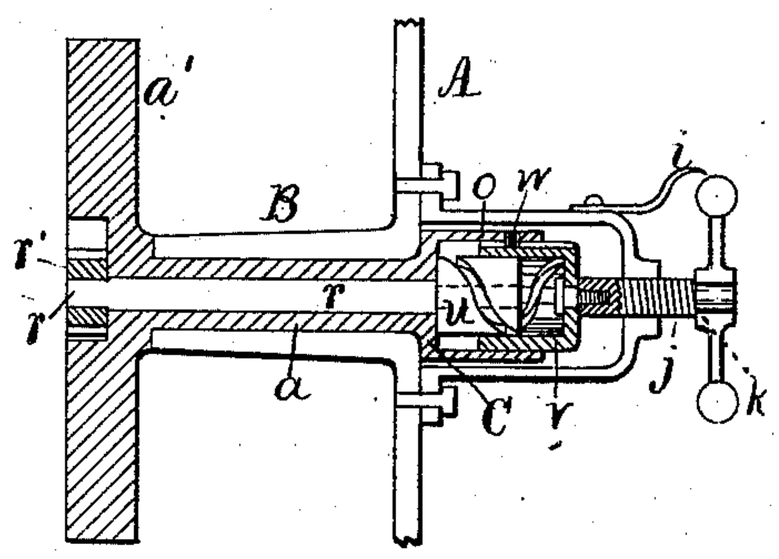


Fig. 4.



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UNITED STATES PATENT OFFICE.

EZRA GOULD, ULRICH EBERHARDT, AND HENRY EBERHARDT, OF NEWARK, NEW JERSEY.

ADJUSTABLE CRANK-PIN.

SPECIFICATION forming part of Letters Patent No. 241,488, dated May 17, 1881.

Application filed March 2, 1881. (No model.)

To all whom it may concern:

Be it known that we, E. GOULD, U. EBERHARDT, and H. EBERHARDT, residing in the city of Newark, county of Essex, and State of New Jersey, have invented certain new and useful Improvements in Adjustable Crank-Pins, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to an improvement in adjustable crank-pins; and it consists in the combination, with a hollow driving-spindle, of an adjustable pinion-shaft operating a toothed slide carrying the crank-pin to or from the center when the pinion is turned by the said shaft.

It also consists in means for turning and clamping the shaft in any desired position, in the use of a frictional device for the latter purpose, and in the combination, with the pinion-shaft, of a spiral pinion, *u*, for effecting the rotary movement of the pinion-shaft by the turning of a stationary hand-wheel when the crank and its driving-spindle are in motion. The form of these devices may be modified considerably, and they are shown in the drawings constructed in the most preferable manner for operating the ram of a shaping or metal-slotting machine.

Figure 1 is a sectional view through the center of the crank driving-spindle *a;* Fig. 2, a side view of the driving-plate *a'*, attached to such spindle, and the ram R of a shaping-machine, connected to the crank-pin *b* by a box, *c*, link *d*, and lever *l*, the latter being partly broken away to show the crank-slide *s* more plainly. Fig. 3 is a detached view of the driving-plate *a';* and Fig. 4, a sectional view similar to Fig. 1, showing the spiral pinion *u* and the means for operating it applied to the spindle and driving-plate *a'*, the other parts being omitted from the figure.

A represents a portion of the frame of a shaping-machine, and B a suitable bearing for the crank driving-spindle, which is made hollow for the introduction of a pinion-shaft, *r*. The spindle is provided at one end with a disk or plate, *a'*, having a straight or pivoted slide, *s*, mounted upon its surface, to carry the crank-pin *b*, which is thus adapted to be traversed to and from the center of the spindle as the slide is moved.

In Fig. 2 the driving-plate is shown circular, and provided with teeth *a''* at its periphery, by which the plate and spindle may be revolved, if desired. In Fig. 3 the plate *a'* is shown of oval shape, and when thus constructed the driving-spindle would be operated by a pulley or gearing, in the usual way. In either case the slide is indicated in the drawings as of segmental shape, pivoted to the surface of the plate at one side of the center by a bolt, *s'*. A gib, *t*, is applied to the arched end of the segment upon the opposite side of the center, and the slide is thus held snugly to the plate *a'* by the gib and its bolts *t'*, while it is free to move to and fro with the crank-pin *b*, which is shown in Fig. 2 secured rigidly upon one edge of the sliding segment, exactly over or coincident with the center of the spindle *a*.

To move the slide at pleasure a rack, *r''*, is formed upon the arched end of the segment, forming a portion of an internal gear, meshing into a pinion attached to the end of pinion-shaft *r*. This pinion is sunk into a recess formed in the center of the plate *a'*, and a segmental recess, *s''*, is also provided for the rack *r'''* to move in contact with the pinion. By this arrangement it is obvious that the slide and crank-pin can be moved by merely rotating the pinion-shaft; and for that purpose I extend the shaft entirely through the spindle *a* and apply the moving device to its extremity.

The device shown in Fig. 1 consists merely of a hand-crank, *h*, which, when applied to the shaft, necessarily revolves with the latter, and the clamp employed to retain the shaft in any position is a friction clamp or disk, *e*, fitted to a feather, *e'*, upon the shaft *r*, and pressed against a disk, *f*, formed upon the end of the hollow spindle *a* by a nut, *n*, applied to a screw-thread formed upon the shaft outside the feather *e'*.

The nut may be formed with handles *m*, and by means of a pointer, *i*, applied to the disk *e*, and graduations formed upon the disk *f*, the

relative position of the crank-pin may be known at any time and its stroke varied at pleasure when the driving-shaft is at rest.

In practice it is found that a degree of friction which will permit the shaft *r* to be turned is still sufficient to hold the crank-pin securely when at work, and by thus dispensing with any fresh adjustment of the nut the shaft may be turned and the indicator set in the desired position with considerable facility, even when the machine is in motion.

To effect the rotation of the shaft by a fixed hand wheel, crank, or lever, we have devised the mechanism shown in Fig. 4 for converting a longitudinal motion of such fixture into a rotation of the shaft.

In Fig. 4 the plate *a'* is shown in section, with the pinion and its shaft *r* in position, and the spindle *a* terminated just outside the bearing B and kept in its place by a collar, C. The outer end of the shaft is provided with an enlargement, having a coarse spiral groove formed upon its exterior, and a nut, *v*, with similar spiral thread is applied to the enlargement and arranged to move lengthwise while turning, so that it may revolve freely with the spindle *a* and twist the shaft definitely inside the spindle when moved longitudinally.

That the nut *v* may be carried around with the spindle the collar C upon the latter is formed with a socket, *o*, projecting around the spiral pinion *u*, and provided with a key or pin, *w*, fitted to a groove in the nut *v*.

To move the nut endwise, a screw, *j*, is swiveled into the latter, and the screw is mounted in a bracket, D, projected from the frame A, and provided with a hand-wheel, *k*, for turning it. A pointer, *i*, affixed to the disk and graduations formed upon the rim of the wheel *k*, afford the means of setting the crank-pin accurately while in motion; for it is obvious that the shaft *r* is rotated solely by the nut *v*, which turns in unison with the spindle and crank-plate *a'*, and that the shaft and its pinion cannot therefore change their position inside the hollow spindle, except the nut *v* be moved endwise, which at once turns the pinion an amount proportioned to the longitudinal movement of the nut upon the hub attached to the spindle.

Having thus described two modifications of our invention, it will be seen that the use of a friction-clamp to retain the shaft in a fixed position affords a chance to change the setting of the crank-pin even when the latter is in motion, and that the use of a spiral hub and nut to turn the pinion-shaft permits the latter to be set in any desired position by a stationary fixture, like a hand wheel or crank.

Instead of the screw *j*, a lever could be used to move the nut *v* endwise, and could be clamped in any position by a set-screw or friction applied to the lever.

A straight slide and rack could also be used, instead of the segmental one, to support and move the crank-pin *b*; but we have found that no device sustains the thrust upon the crank-pin so well as the segmental-shaped piece *s*, pivoted at one end and clamped to the plate *a'* by a long gib like *t*. Such a segment can be moved by a worm geared to the shaft *r*, as shown in the construction illustrated in Fig. 5, which is a view of the worm and gearing similar to the view in Fig. 2. A worm, W, is mounted upon a worm-shaft, *x*, in bearings *x'*, fixed to the face of the plate *a'*. A recess is formed in the center of the plate *a'*, to insert a large bevel-wheel, *y*, which is secured to the end of the shaft *r* in a manner similar to the pinion *r'*, and a bevel-gear, *z*, is affixed to the shaft *x* and operates to revolve the worm-shaft several times whenever the shaft *r* is rotated once. The segment (not shown in the figure) is pivoted at *s'*, as in Fig. 2, and is provided with a section of a worm-wheel adapted to fit the worm W and to move to or fro in the recess *s''* when the worm is revolved by the shaft *r* in any of the modes herein described.

The adjustable crank-pin mounted upon the toothed slide is adapted for use in any machine where the stroke needs to be varied frequently, especially where it is desirable to move the pin a definite amount while the crank shaft and pin are in motion.

The pinion *r'* first described can be proportioned to make less than a single revolution when moving the toothed slide its entire range of stroke, and is therefore preferable to the worm for moving the crank-pin, as the worm necessarily requires numerous revolutions to effect the whole movement of the slide, and cannot be provided with a simple index fitted to the shaft *r*, for indicating the position and stroke of the crank-pin.

We have shown several modes of carrying out our invention to exhibit its scope more clearly; and,

Having thus described its mode of operation, we claim the same, as follows:

1. The combination of the hollow spindle *a*, carrying the plate *a'*, having the crank-pin slide mounted upon it, with the shaft *r* and pinion *r'*, for operating the toothed slide, and the index *i*, for showing the position and stroke of the crank-pin, substantially as herein described.

2. In combination with the toothed slide mounted upon the plate *a'*, and operated by a pinion upon the shaft *r*, in the manner described, the friction-clamp secured to and revolving with the hollow spindle, and operating to hold the shaft *r* in any desired position, as herein shown and described.

3. In combination with the plate *a'*, having a pivot at one side of the center of revolution, the toothed slide *s*, of segmental shape, secured to the plate by the pivot, and a curved gib, *t*, the crank-pin mounted upon the slide, and a worm or pinion for moving and holding the slide in position, substantially as set forth.

4. The device for moving a crank-pin while

revolving with its spindle, consisting of an operating-shaft arranged in the center of the crank-spindle, and provided with a spirally-grooved nut and hub arranged to revolve in unison with the hollow spindle, in combination with a stationary device, as the screw *k*, for moving the hub or nut longitudinally, in the manner herein described.

In testimony whereof we have hereunto set our hands in the presence of two subscribing witnesses.

EZRA GOULD.
ULRICH EBERHARDT.
HENRY EBERHARDT.

Witnesses:
H. F. EMME,
E. MERZ.