(No Model.) 2 Sheets—Sheet 1.

E. RING.

WHIP ROLLING MACHINE.

No. 407,690. Patented July 23, 1889.

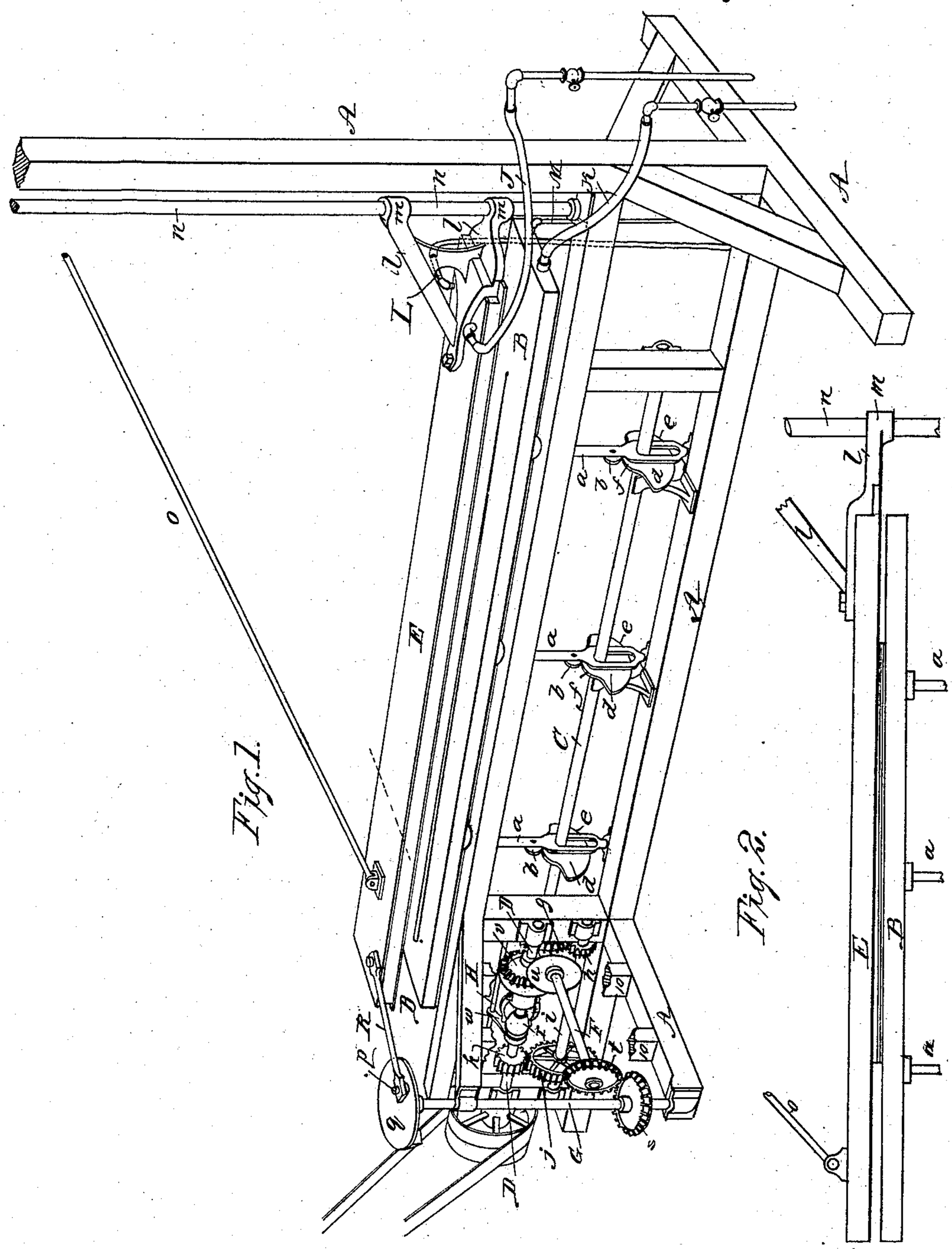

Fig. 1.

Fig. 2.

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 6.

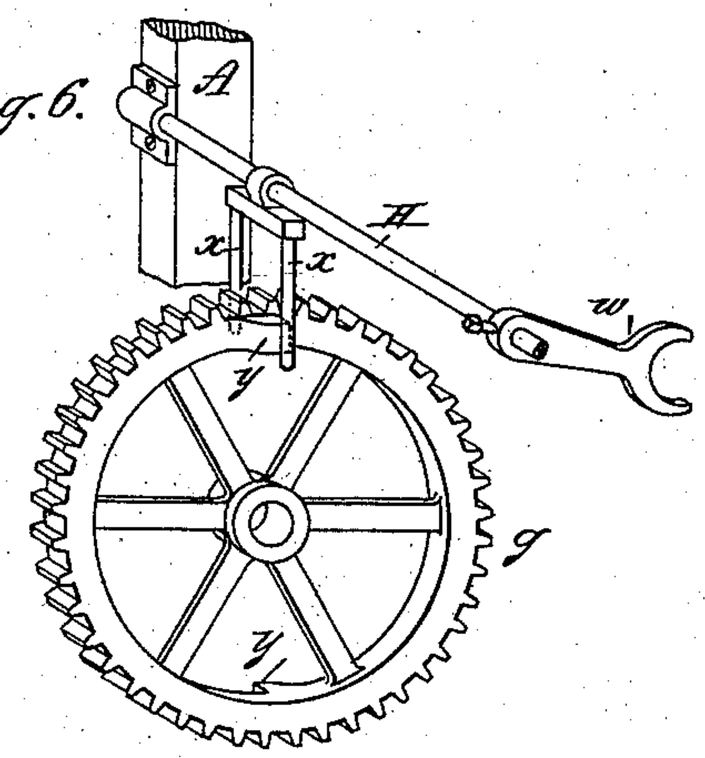


Fig. 3.

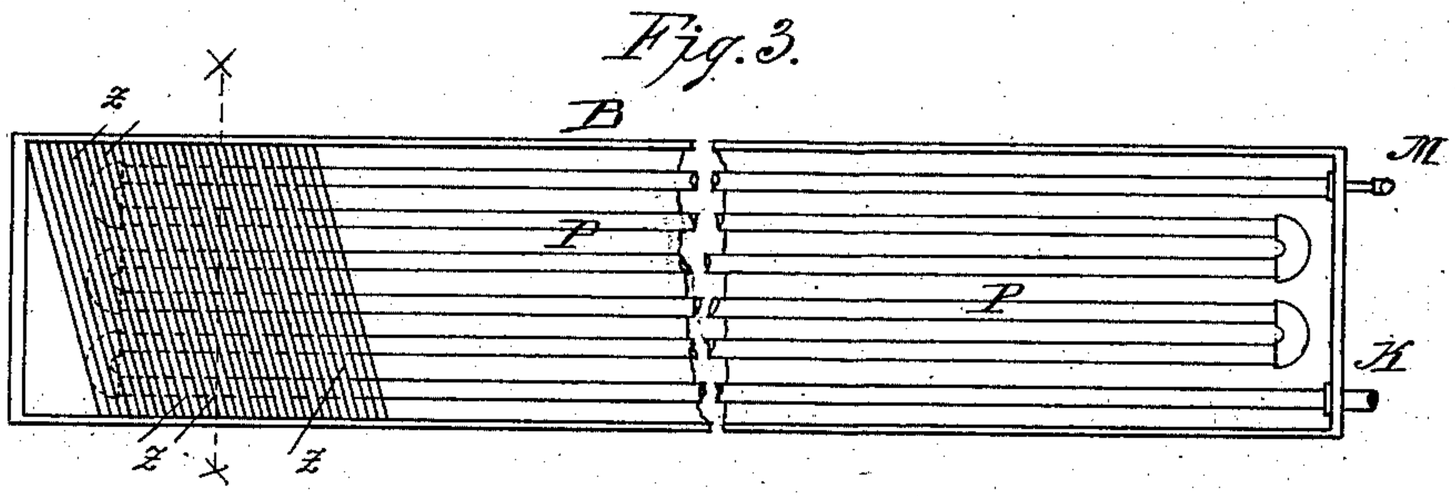


Fig. 4.

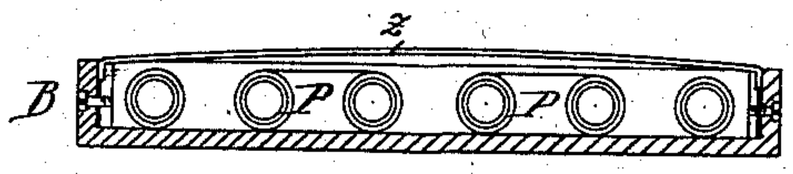
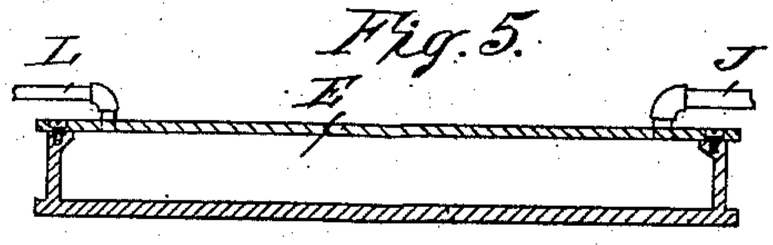


Fig. 5.



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per

his Attorneys.

UNITED STATES PATENT OFFICE.

ELKANAH RING, OF WESTFIELD, MASSACHUSETTS, ASSIGNOR TO JAMES NOBLE, JR., OF SAME PLACE.

WHIP-ROLLING MACHINE.

SPECIFICATION forming part of Letters Patent No. 407,690, dated July 23, 1889.

Application filed December 17, 1888. Serial No. 293,837. (No model.)

To all whom it may concern:

Be it known that I, ELKANAH RING, a citizen of the United States, residing at Westfield, in the county of Hampden and State of Massachusetts, have invented new and useful Improvements in Whip-Rolling Machines, of which the following is a specification.

This invention relates to a whip-rolling machine in which the parts for the direct-rolling action on the whip consist of a horizontal table or support for the whip and another and superposed table having a vibratory motion in about a horizontal plane; and the invention consists in the construction and combination of parts whereby mechanism is provided for supporting and rolling the whip in a most effective and practical manner, and for securing or permitting an automatic separation of one of the whip-rolling contact parts from the other, and for securing a cessation and continuation of the vibratory motion of one of said parts before and after such time of separation, and to other improved constructions, all substantially as will hereinafter fully appear, and be set forth in the claims.

Reference is to be had to the accompanying drawings, by the aid of which, in connection with the detailed description hereinafter given, the invention will be clearly understood, similar letters and figures of reference therein indicating corresponding parts in all the views.

Figure 1 is a perspective view of the whip-rolling machine, certain supporting parts of an obvious construction being broken away. Fig. 2 is a detail front elevation of the whip-rolling tables as in their adjacent operative positions relative to each other. Fig. 3 is a plan view of the lower table with a portion of its spring-formed upper surface removed. Fig. 4 is an enlarged cross-section thereof. Fig. 5 is an enlarged cross-section of the upper table; and Fig. 6 is a perspective view in detail of a portion of the mechanism for automatically throwing in and out the driving-connections between the driving-shaft and the vibratory table, said view being taken from the opposite side of the machine to that seen in Fig. 1.

The operative parts of the machine are supported from and movable on a rigid frame-work A of any suitable construction, and the lower table B is held in a horizontal position at the upper end of one or more vertical posts *a*, in the present instance three thereof being shown, each of said posts being guided for a vertical play in ways or sockets of the said frame A. A horizontal shaft C, ranging longitudinally under said table, carries cams *d*, preferably one for each of said posts, each of which cams has its working-face *e* in the arc of a circle, and has its "dead" space *f* also comprised in the arc of a smaller circle, the cams working in unison against or with relation to the lateral supporting-abutments, that are provided at given and uniform heights on the said posts, the most desirable form of said abutments being friction-rollers *b*. The said shaft C receives its rotation through the engagement with the spur-gear *g* thereon of the spur-gear *h*, carried by a horizontal counter-shaft *i*, said counter-shaft receiving its rotation through the engagement with the spur-gear *j* thereon of the spur-gear *k* on the driving-shaft D, horizontally journaled on the frame A, a belt and pulley, as shown, or other means being provided on said main shaft for securing its rotation.

The upper table E, to which a lateral vibratory motion is imparted, as will shortly appear, is horizontally supported above the lower table by the bracket-frame *l*, which has one or more bored bosses *m*, embracing a vertical rod *n*, fixed to or forming part of the said frame A, said engagement of the bracket-boss being a pivotal or swiveling one, whereby the table may be moved, its outer end swinging from the vertical rod *n* as its fulcrum. A stay-rod *o*, connected to and extending obliquely from an upper portion of said rod *n* to an engagement with the outer end of the table, forms a sufficient support for that portion thereof.

A crank-pin *p*, with which the pitman-rod R is connected, is carried for revolution in a horizontal plane by a face-plate *q*, fastened on the upper end of a vertical shaft G, which has a bevel-gear *s*, which is engaged by a bevel-gear *t* on a horizontal counter-shaft F, which is supported in journals on the posts 10 10 of the frame, the journal-carrying portions of said posts being broken away in Fig. 1 for the

purpose of clearer illustration, and a bevel-gear *u* is secured on the rear end of said counter-shaft F, that engages with a bevel-gear *v* on the driving-shaft. The bevel-gear *v* is loosely mounted on the driving-shaft, and in its hub is a clutch mechanism operated by the conical collar *r*, supported for a slide on the said driving-shaft, said clutch being of any particular and desired form of a class of friction-clutches too common and well known to require further mention.

H represents a rod supported in guides of the frame parallel with said driving-shaft and capable of an endwise slide, said rod carrying a rigid yoke-shaped arm *w*, that engages with the peripheral groove of said conical slide-collar *r*. A pair of legs *x x* is also rigidly held pending from said slide-rod H, being located thereon at a portion to straddle and lie near either side of the gear-wheel *g*, near its rim and on the opposite sides of the said gear. Said side faces are formed with inclined cam-surfaces *y y* at different parts of the circumference, as desired, for their relative intervals of operation on the said legs, which they pass and move once at each rotation of the said gear, and, as will be apparent from the foregoing and on reference to Fig. 6, said slide-rod H will be alternately moved endwise in opposite directions to operate the clutch on the gear *v*, whereby said gear will be interlocked with the driving-shaft at one period and will be disengaged therefrom at another period, and therefore when the lower table, by the cams *d*, is supported through the vertical posts *a* in its position in proximity to the upper table, the upper table will be vibrated, and at another time—that is, when the table is depressed and supported from the dead portions of the cams—the vibrating mechanism will be at rest and the table stationary and in no way interfering with or making difficult the withdrawal of a rolled whip and the insertion of another whip to be rolled.

Of course the mechanism for securing the intermittent stoppage of the vibratory table may be dispensed with and yet permit of the machine being effectively used, and the cams *y* for working on the slide-rod legs may be carried on some other part of the machine than said gear *g*.

As will be noted in Fig. 2, the adjacent surfaces of the tables E when in their operative relations are separated slightly more at their ends farthest from the pivotal point of the vibrating table than at their inner ends to conform to the taper of the whip.

By the employment of extended tables the working-surface of one of which is slightly inclined with relation to the adjacent surface of the other and hung by its end portion, which is the least separated for a horizontal vibration, the whip will be rolled uniformly throughout and no torsional action will be imparted thereto.

The upper surface of the lower table may be formed by a plurality of strips *z* of spring-metal, arranged transversely or obliquely of the length of said table, which is made hollow, preferably obliquely, as particularly shown in Fig. 3, such a formation affording a yielding contact to accommodate any inequalities of the surface of the whip, and, as shown in Fig. 4, this surface is more effective for best results when a slight crown is imparted to said strips, this slight arching of the strips being secured by making them slightly longer than the width or oblique contour of said table and securing the strip ends at the edge walls of the said hollow table.

Appliances for the employment of steam heat in connection with one or both of the whip-rolling tables are provided.

The lower box-shaped table, when formed with the spring-strip top, may be provided with a system of coils of steam-pipe P, and the upper table, the walls of which are imperforate, may receive steam for circulation directly within its chamber. The steam through suitable flexible conduits J K is entered to said chambered tables, and flexible exhaust-chambers L M are also provided.

Inasmuch as I believe myself to be the first to devise means for rolling whips consisting of tables horizontally supported, with the adjacent working-surfaces slightly inclined with relation to each other, and one of which tables is hung for a swing from a pivotal point at or near the end thereof which lies nearest to the other table, I do not wish to be confined to any particular means for securing the lateral swinging of the said pivotally-hung table, as in its most primitive use when the vibration is imparted by hand practical results may be insured, with, of course, much less capacity for speedy work.

What I claim as my invention is—

1. In a whip-rolling machine, a suitable supporting-frame and two whip-rolling tables sustained thereon, one thereof being by its inner end pivotally supported on a part of said frame, whereby it is adapted to be reciprocatingly swung across the working-face of the other table, and a stay-rod connected to said frame and to the outer end of said table, holding said outer end more separated from the opposing table than is its inner end, whereby a slight angle between the working-faces of said table is secured, substantially as described.

2. In a whip-rolling machine, a suitable supporting-frame and two whip-rolling tables, movable supports mounted on said frame, on and by which one of said tables is carried and presented toward and away from the opposing table, and the other of said tables pivotally supported by its inner end on a part of said frame, whereby it is adapted to be reciprocatingly swung across the working-face of the adjacent table, and a stay-rod connected to said frame and to the outer end of said table, holding the said outer end more separated from the opposing table than is the inner end,

whereby a slight angle between the working-faces of said tables is secured, substantially as described.

3. In a whip-rolling machine, a suitable supporting-frame and two whip-rolling tables, movable supports mounted on said frame, on and by which one thereof is carried and presented toward and away from the opposing table, and the other of said tables pivotally supported by its inner end on a part of said frame, whereby it is adapted to be reciprocatingly swung across the working-face of the adjacent table, and a stay-rod connected to said frame and to the outer end of said table, holding the said outer end more separated from the opposing table than is the inner end, whereby a slight angle between the working-faces of said tables is secured, combined with a crank-pin and means for securing its revolution, and a pitman-rod secured to said crank-pin and to said pivotally-mounted table, substantially as described.

4. In a whip-rolling machine, the lower table B, the vertically-movable supporting-posts *a* therefor, lateral abutments *b* on one or more of said posts, and a horizontal shaft C, having one or more cams *d*, on which the said post-abutments bear, combined with the upper table E, supported for a lateral vibration, and means for so vibrating said table, substantially as and for the purpose described.

5. In a whip-rolling machine, in combination, two whip-rolling tables, one of which is adapted to have a reciprocatory movement relative to the other, and one of said tables having its working-surface constituted by a series of laterally-extending strips of spring metal, substantially as and for the purpose described.

6. In a whip-rolling machine, in combination, two whip-rolling tables, one of which is adapted to have a vibratory motion relative to the other, and one of said tables having its working-surface constituted by a series of laterally-extending strips of spring metal of arch form secured by their ends to the edge portions of the table, substantially as and for the purpose described.

7. In a whip-rolling machine, in combination, two whip-rolling tables, one of which is adapted to have a vibratory motion relative to the other, and one of said tables being of box form, having its working-surface constituted by a series of laterally-extending strips of spring metal secured by their ends to the side walls of the table, and steam-pipe coils disposed within the chamber of said table, substantially as described.

8. A whip-rolling machine comprising upper and lower whip-rolling tables, the former supported with its face at a slight angle to the other and pivotally hung at its least separated end for a horizontal lateral swing therefrom, and the latter having an intermittent vertical vibratory movement, an intermittently-rotating shaft having a crank-pin, and a pitman-rod connected thereto and to said upper table, for the purpose described.

9. In a whip-rolling machine, the combination, with the lower table B, vertically-movable supporting-posts therefor, and the upper vibratory table E, of a shaft C, having the cams thereon for engagement with the said posts and having a gear *g* thereon, a driving-shaft D, having a gear *v* thereon and a clutch therefor, a counter-shaft *i*, geared to receive rotation from the said driving-shaft and to impart rotation to said cam-shaft C, a counter-shaft F, having a gear engaging with said clutching-gear *v*, a shaft G, geared to said counter-shaft F, having a crank-pin, the pitman-rod R, connected to said crank-pin and said upper table, a slide-rod H, having an engagement with said gear-clutch, and cam-inclines carried by a rotary part of the machine for moving said slide-rod, substantially as and for the purpose described.

10. In a whip-rolling machine, the combination, with the driving-shaft D and the gear *v* and clutch therefor, of the cam-shaft C, having thereon the gear *g*, provided with the cam-inclines on its opposite sides, and the slide-rod H, provided with the legs *x x*, located in the path of said cam-inclines to be actuated thereby to move said rod H, and also having an arm *w*, for operating the gear-clutch, substantially as described.

11. In a whip-rolling machine, a suitable supporting-frame and two whip-rolling tables interiorly provided with steam-chambers, movable supports mounted on said frame, on and by which one of said tables is carried and presented near and away from the opposing table, and the other of said tables pivotally supported by its inner end on a part of said frame, whereby it is adapted to be reciprocatingly swung across the working-face of the adjacent table, and a stay-rod connected to said frame and to the outer end of said table, holding the said outer end more separated from the opposing table than is said inner end, whereby a slight angle between the working-faces of said table is secured, combined with flexible steam supply and exhaust conduits leading to and from said chambered tables, substantially as described.

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A. F. LILLEY.