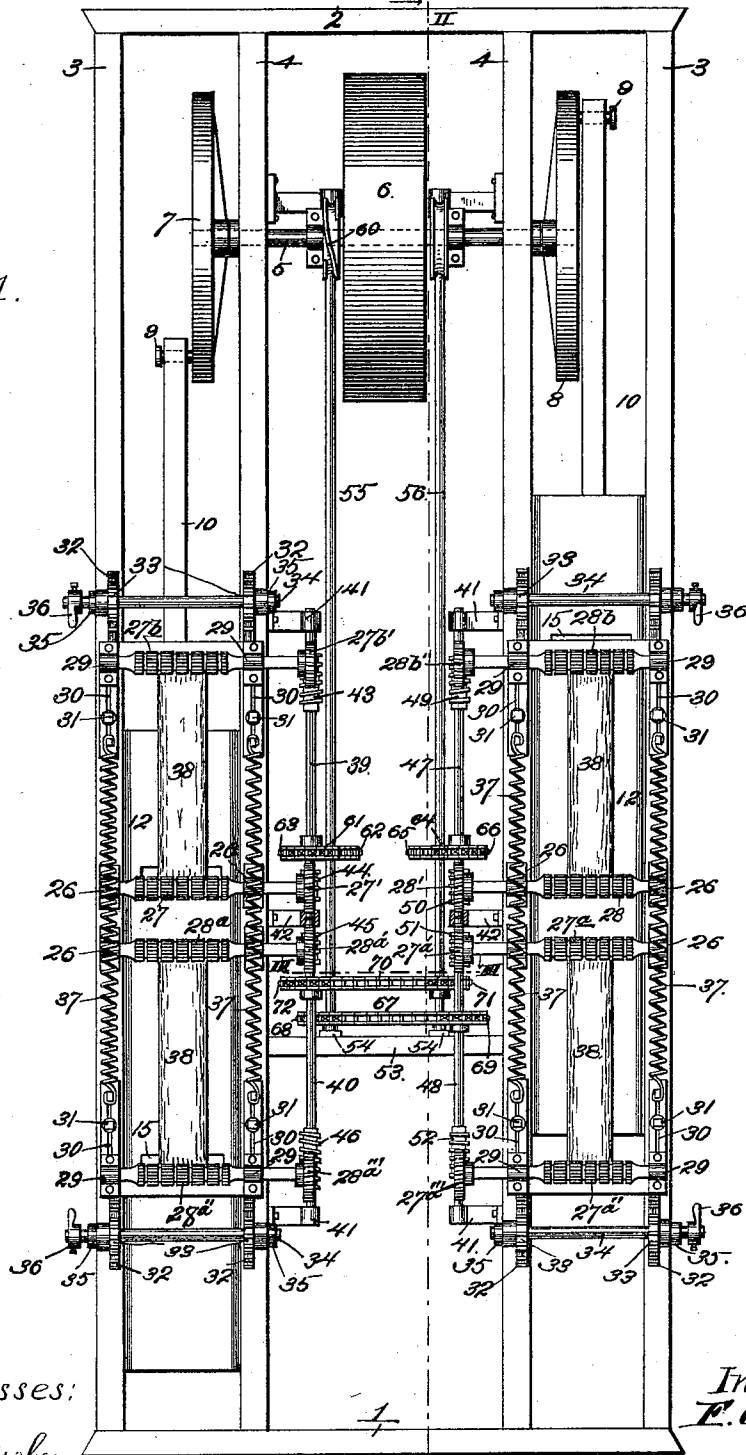


F. ABEL.
EXCELSIOR CUTTING MACHINE.

No. 583,882.

Patented June 8, 1897.

Fig. 1.



Witnesses:

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L. J. Thorpe

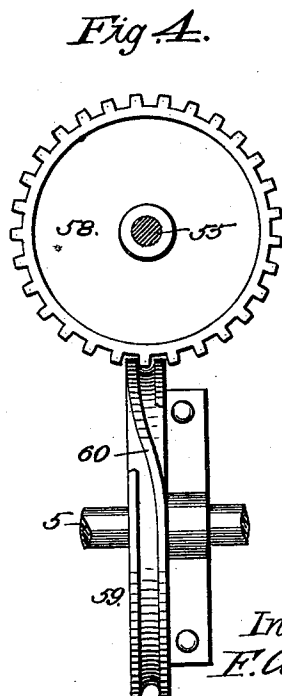
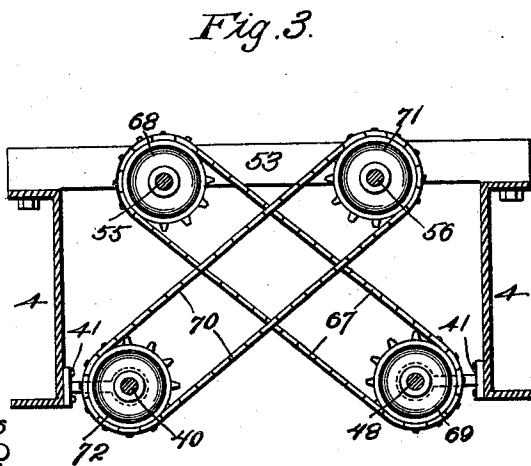
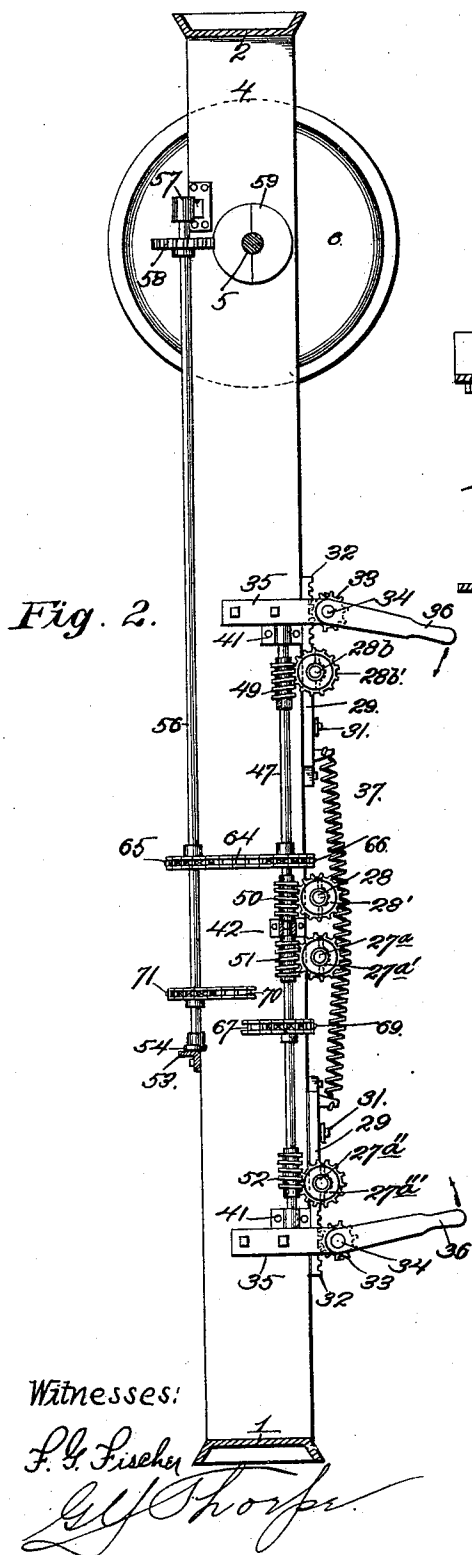
Inventor
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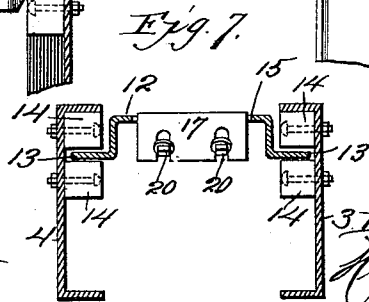
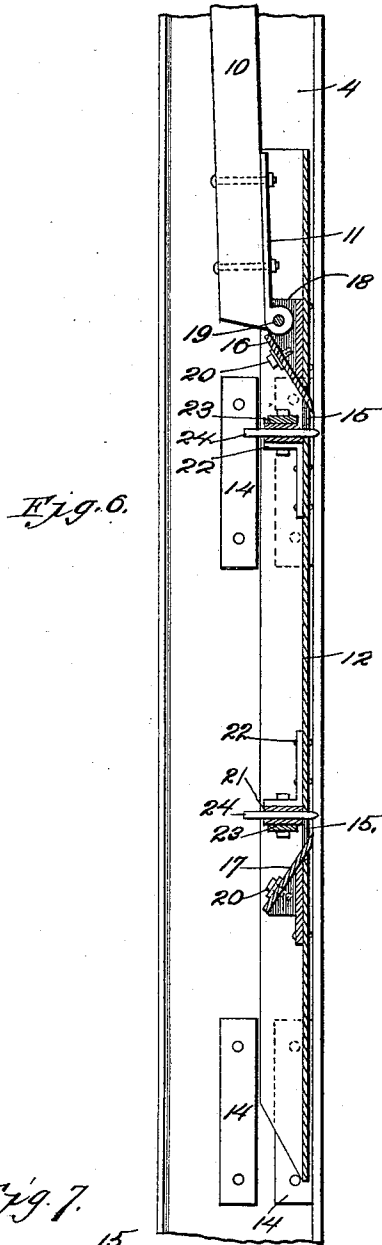
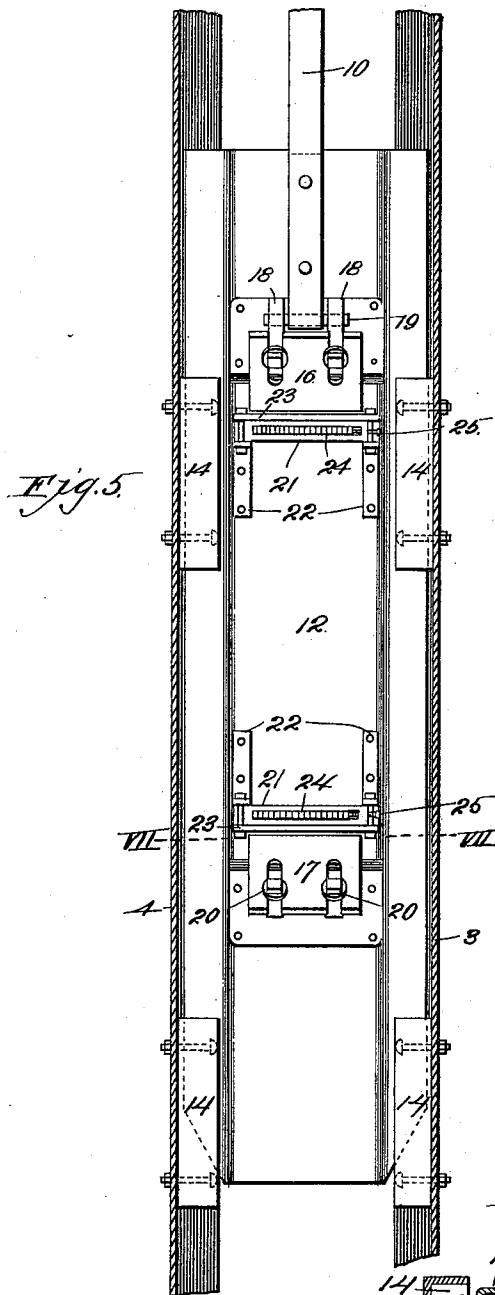
(No Model.)

3 Sheets—Sheet 3.

F. ABEL.
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Witnesses:

F. G. Fischer

E. J. Thorpe

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3 By

Higdon Higdon
attys.

UNITED STATES PATENT OFFICE.

FRANCIS ABEL, OF ROSEDALE, KANSAS, ASSIGNOR TO THE KANSAS CITY
EXCELSIOR MANUFACTURING COMPANY, OF KANSAS CITY, MISSOURI.

EXCELSIOR-CUTTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 583,882, dated June 8, 1897.

Application filed September 22, 1896. Serial No. 606,634. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS ABEL, of Rose-
dale, Wyandotte county, Kansas, have in-
vented certain new and useful Improvements
in Excelsior-Cutting Machines, of which the
following is a full, clear, and exact descrip-
tion, reference being had to the accompany-
ing drawings, forming a part hereof.

My invention relates to excelsior-machines;
and it consists in certain novel and peculiar
features of construction and combinations of
parts hereinafter described, and pointed out
in appended claim.

The object of the invention is to produce a
machine of this character which is positive
and reliable in operation and comparatively
simple and inexpensive of construction.

In order that the invention may be fully
understood, reference is to be had to the said
accompanying drawings, in which—

Figure 1 represents a front view of an excel-
sior-machine embodying my invention. Fig.
2 represents a section taken on the line II II
of Fig. 1. Fig. 3 represents, on an enlarged
scale, a cross-section on the line III III of
Fig. 1. Fig. 4 represents, on an enlarged scale
and in plan view, one of the switch-wheels
and its engaging worm-wheel. Fig. 5 repre-
sents a rear view of the planing or cutting
mechanism at one side of the machine, the
guide-standards being shown in section. Fig.
6 represents a vertical central section of the
same. Fig. 7 represents a horizontal section
taken on the line VII VII of Fig. 5.

Referring to said drawings in detail, 1 des-
ignates the bottom, 2 the top, 3 the outer, and
4 the inner, standards of a strong and dura-
ble vertically-arranged framework, said parts
being constructed, preferably, of channel-
iron. Journaled horizontally in the stand-
ards 4, near their upper ends, is a shaft 5,
and mounted rigidly upon said shaft at its
middle is a belt-wheel 6 and at its ends disks
or wheels 7 and 8, provided at their outer
sides and at diametrically opposite points
with wrist-pins 9, to which are pivotally con-
nected at their upper ends in the customary
manner the pitmen 10. Said pitmen are bolted
at their lower ends to the metallic straps 11.

12 designates vertical plates, of sheet metal,
having their faces adjacent to and parallel

with the front sides of the channel-bars 3 and
4 and bent so as to provide the vertical flanges
13, which fit slidingly and snugly between
the guide-blocks 14, bolted to said channel-
bars, as shown clearly on Sheet 3.

At a suitable distance apart each plate 12
is provided with openings 15, and projecting
downwardly and forwardly through the upper
opening is a plane or cutting-plate 16 and
upwardly and forwardly through the lower
opening a plane or cutting-plate 17. The sta-
tionary frame of the upper plane is provided
with extended ears 18, which carry the pin
19, upon which the lower end of the corre-
sponding strap 11 is pivotally mounted. Said
planes are set to cut at the required depth in
the customary manner by the clamping-bolts
20, extending through notches or slots of the
plane or cutting-blade.

Arranged below the plane 16 is a transverse
slotted frame 21, and a similar frame is ar-
ranged just above the plane 17. Each of said
planes is clamped reliably and immovably be-
tween the angle-plates 22, bolted to the plate
12, and the transverse plates 23. A set of scor-
ing-knives 24 of the customary form project
outwardly from each frame 21 and through
the opening 15 of its corresponding plate, and
they are held reliably in the position required
by means of the clamping-bolts 25. By this
arrangement and disposition of the parts it
is obvious that as the plate 12 is moved down-
ward the plane 16 operates, and that as it is
moved upward the plane 17 operates, this al-
ternate operation of said planes continuing
as long as the machine is in operation.

26 designates stationary bearings which are
bolted or otherwise suitably secured to the
front flanges of the channel-bars or stand-
ards 3 and 4, one set of said bearings being
located at a point opposite the lowest limit of
travel of the planes 16 and the other oppo-
site the upper limit of travel of the planes 17,
and journaled in said bearings are corrugated
or toothed rollers. The roller at the lower
limit of movement of the plane 16 at one side
of the machine is numbered 27, and diag-
nally opposite is the roller 27^a, located at the
upper end of the limit of movement of the
plane 17 at the opposite side of the machine.
Above said roller is the roller 28, located at

the lower end or limit of movement of the plane 16 at the corresponding side of the machine, and diagonally opposite and below the roller 27 is the roller 28^a, located at the upper limit of movement of the plane 17 at the corresponding side of the machine.

As will hereinafter appear, the rollers 27 and 27^a work together and alternately with respect to the rollers 28 and 28^a. Mounted rigidly upon the extensions of the rollers 27, 27^a, 28, and 28^a are worm-wheels 27', 27^a', 28', and 28^a', respectively. Arranged vertically above the rollers 27 and 28, respectively, are similar rollers 27^b and 28^b, and said rollers are journaled in bearings 29, fitting snugly against the face of the framework and provided with longitudinal slots 30, which engage guide and retaining bolts 31, projecting from said framework. Said bearings are also provided with upwardly-extending rack-bars 32, engaging cog-wheels 33, mounted rigidly upon shafts 34, journaled in bearing brackets or bars 35, bolted or otherwise suitably secured to the standards 3 and 4 of the framework, and said shafts are provided also with handles or levers 36, by which they may be operated, for a purpose which will hereinafter appear.

Vertically below the rollers 27^a and 28^a are the rollers 27^{a''} and 28^{a''}, respectively, and said rollers are journaled in bearings 29, provided with slots 30, engaged by clamping and steering bolts 31, projecting, as above explained, from the framework. These bearings are also provided with rack-bar extensions 32, engaged by cog-wheels 33, mounted rigidly on shafts 34. Said shafts are also journaled in bearing brackets or bars 35, secured to the framework, and are provided with handles 36. Each pair of superposed or vertically-aligned bearing-boxes are held toward each other with a yielding force by means of the retractile springs 37, which are attached at their opposite ends to said bearings and tend, therefore, to move the rollers 27^b and 28^b down toward the stationary rollers 27 and 28, respectively, and the movable rollers 27^{a''} and 28^{a''} upwardly toward the rollers 27^a and 28^a, respectively, so as to hold the blocks of wood 38 firmly and reliably in position, one of said blocks being arranged between each pair of rollers, the latter impinging firmly against the ends of the block, as shown clearly in Fig. 1, and holding it adjacent to and parallel with the vertically-reciprocating knife or plane-carrying plate 12.

Mounted upon the inwardly-extending end of the rollers 27^b, 28^b, 27^{a''}, and 28^{a''} are worm-wheels 27^{b'}, 28^{b'}, 27^{a'''}, and 28^{a'''}, respectively, these worm-wheels being of the same size and located in the same vertical plane as the worm-wheels hereinbefore described.

39 and 40 designate a pair of vertically-aligned shafts which together exceed the distance between the upper and lower sliding bearings 29 and are journaled at their upper and lower ends in bearings 41. At a point

opposite the middle of the space between the rollers 27 and 28^a the meeting ends of said shafts are journaled in a bearing 42.

The shaft 39 is provided with a worm-thread 43, engaging the worm-wheel 27^{b'}, and with a worm-thread 44, engaging the worm-wheel 27'.

The shaft 40 is provided with a worm-thread 45, engaging the worm-wheel 28^{a'}, and with a worm-thread 46, engaging the worm-wheel 28^{a'''}.

At the opposite side of the machine are arranged a similar pair of vertically-aligned shafts 47 and 48, and said shafts are also journaled in bearings 41 and the middle bearing 42, as before described.

The shaft 47, at its upper end, is provided with a worm-thread 49, engaging a worm-wheel 28^{b'}, and near its lower end with the worm-thread 50, engaging the worm-wheel 28'.

The shaft 48 is provided with a worm-thread 51, engaging the worm-wheel 27^{a'}, and with a worm-thread 52, engaging the worm-wheel 27^{a'''}.

At a suitable point the inner standards 4 are connected by a brace-bar 53, and secured thereon are bearings 54 for a pair of vertical shafts 55 and 56. Said shafts, at their upper ends, are journaled in brackets 57, secured to the framework, and carry worm-wheels 58, engaging the cam or switch-wheels 59, secured rigidly upon the shaft 5 at opposite sides of the belt-wheel 6, said switch-wheels being preferably constructed in two parts and bolted together, as shown, and having peripheries in the form of a spiral flange, the convolutions of which for the greater part of the circumference of each wheel extend parallel and have their comparatively abrupt inclined portions 60 arranged at diametrically opposite points, in order that when the inclined or cam portion of one wheel is acting upon its corresponding worm-wheel 58 the parallel portions of the spiral flange of the other wheel will be in engagement with the corresponding worm-wheel 58, so as not to operate it, as will be readily understood.

A sprocket-chain 61 connects sprocket-wheels 62 and 63 on the shafts 55 and 56, respectively, and a similar sprocket-chain 64 connects sprocket-wheels 65 and 66 on the shafts 56 and 47, respectively.

A sprocket-chain 67 connects sprocket-wheel 68 on the shaft 55 with the sprocket-wheel 69 on the shaft 48, and a similar sprocket-chain 70 connects sprocket-wheel 71 on the shaft 56 with sprocket-wheel 72 on shaft 40.

The general operation is as follows: It being assumed that the parts are in the relative positions shown in Fig. 1, with one set of planes or knives depressed and the other elevated and the lower knife or plane 17 at the left-hand side of the machine and the upper knife or plane 16 at the right-hand side of the machine about to perform synchronously their functions—that is, to act upon their respective blocks of wood 38—

and, in conjunction with their precedent scoring-knives, produce excelsior as the resultant product. While the parts are in the positions shown—that is, while the pitmen 10 are passing the dead-center and the planes are for a moment inoperative—the cam or inclined portion of the switch-wheel 60 at the right-hand side of the machine rotatably adjusts the shaft 56 through the medium of its worm-wheel 58. This slight rotatable movement of the shaft 56, through the medium of the gearing hereinbefore described—that is, the sprocket-chains 64 and 70 and the engaged sprocket-wheels—operates the shafts 15 47 and 40, and through the medium of the worm-gearing rotatably adjusts the toothed rollers 28 and 28^b and 28^a and 28^{a''}, so as to move their respective blocks of wood bodily inward about the distance of one one-hundredth of an inch, though this distance of course may be varied as circumstances direct. Immediately this adjustment of the blocks is made the continued movement of the belt-wheel causes the pitmen to reverse 25 the position shown in Fig. 1, and consequently causes the upwardly-moving plane 17 and the downwardly-moving plane 18 to shave from said inwardly-adjusted blocks excelsior of the required thickness. By the time said 30 planes have reached the limit of their movement the other pair of planes 16 and 17 have assumed positions at the upper and lower ends of their respective blocks, and as they take such position said blocks are adjusted 35 inwardly one one-hundredth of an inch by reason of the fact that the cam or inclined surface of their switch-wheel engages and operates rotatably the worm-wheel 58 of the shaft 55, and said shaft imparts movement, 40 through the medium of the chains 61 and 67 and their engaged sprocket-wheels, to the shafts 39 and 48, and therefore rotatably adjust the toothed rollers 27 and 27^b and 27^a and 27^{a''} through the medium of the worm-gear 45 ing hereinbefore described. Thus it will be seen that with each complete revolution of the belt-wheel 26 all four of the wood blocks are operated upon, two of them at diagonally opposite points being simultaneously planed 50 at each half-revolution and alternately adjusted to accommodate the knives which reciprocate continuously in the same vertical planes.

To secure blocks of wood in position, it is

necessary to grasp and operate the handles or 55 levers 36 and, thereby rotating the cog-wheels 33, move the rack-bars 32 and the sliding bearings 29 farther away from the companion stationary bearings 26 and the toothed rollers away from their companion rollers. The 60 block is then inserted endwise and the lever released to permit the springs 37 to cause the bearings to slide back to their original positions and the movable rollers to press with a firm but yielding pressure the blocks against 65 the stationary rollers. After a block has been planed sufficiently and a new one is required the old one is removed by simply grasping the lever and moving the movable roller out of engagement with the block, as will be 70 readily understood.

It will be understood, of course, that the capacity of this machine may be increased by duplicating the mechanism or parts herein shown and described and that various changes may 75 be resorted to without departing from the spirit and scope or sacrificing any of the advantages of my invention.

Having thus described the invention, what I claim as new, and desire to secure by Letters 80 Patent, is—

An excelsior-cutting machine, comprising a suitable framework, a rotating drive-shaft mounted thereon, wheels upon said drive-shaft, pitmen connected to said wheels at diametrically opposite points, sliding or reciprocating plates guided in the framework and operated by said pitmen, oppositely-disposed planes carried by said plate, a pair of toothed feed-rollers journaled upon the framework opposite each plate, a companion toothed roller 85 above and below each pair of said first-named toothed rollers, vertical shafts geared to each pair of companion toothed rollers, a pair of vertical shafts suitably supported, each geared 90 to a pair of the diagonally opposite shafts first named, worm-wheels upon said last-named pair of shafts, and switch-wheels rigidly mounted upon the drive-shaft, and adapted once in each revolution of said shaft to operate its respective worm-gear, substantially 100 as described.

In testimony whereof I affix my signature in presence of two witnesses.

FRANCIS ABEL.

Witnesses:

E. WRIGHT TAYLOR,
G. Y. THORPE.