

S. A. Clemens.

Hemp Brake.

N^o 34,349.

Patented Feb. 11, 1862.

Fig. 1.

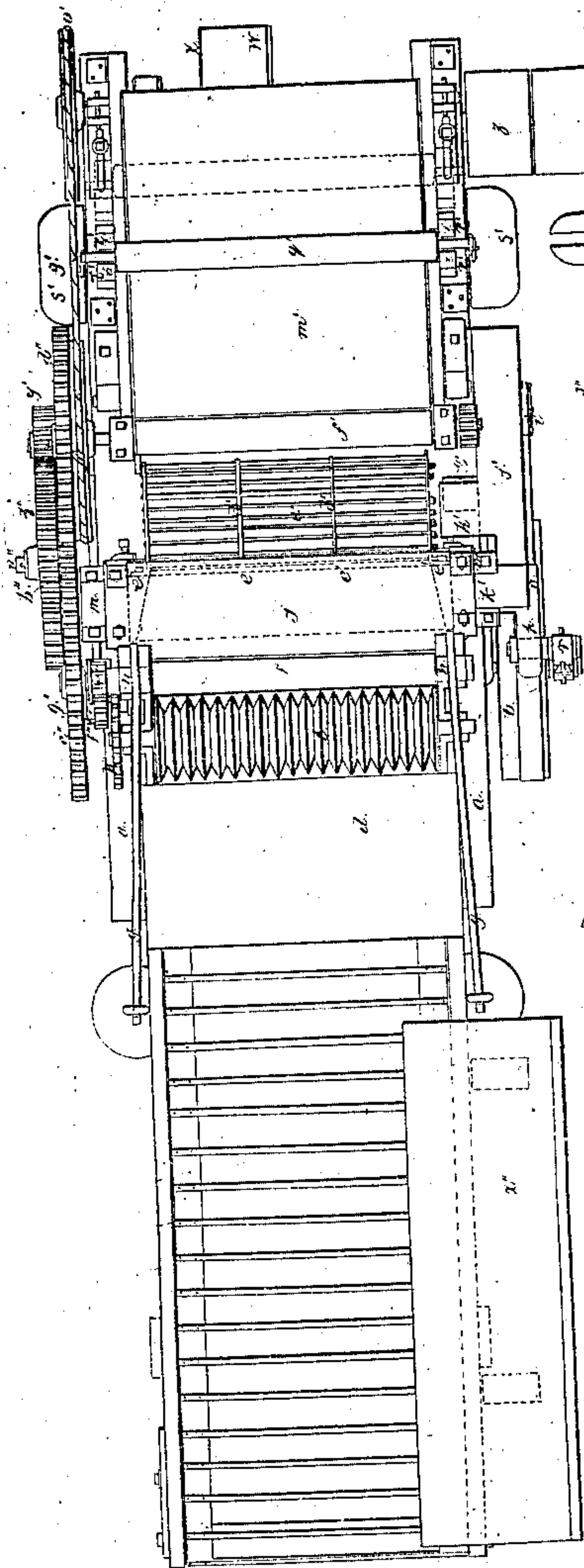


Fig. 2.

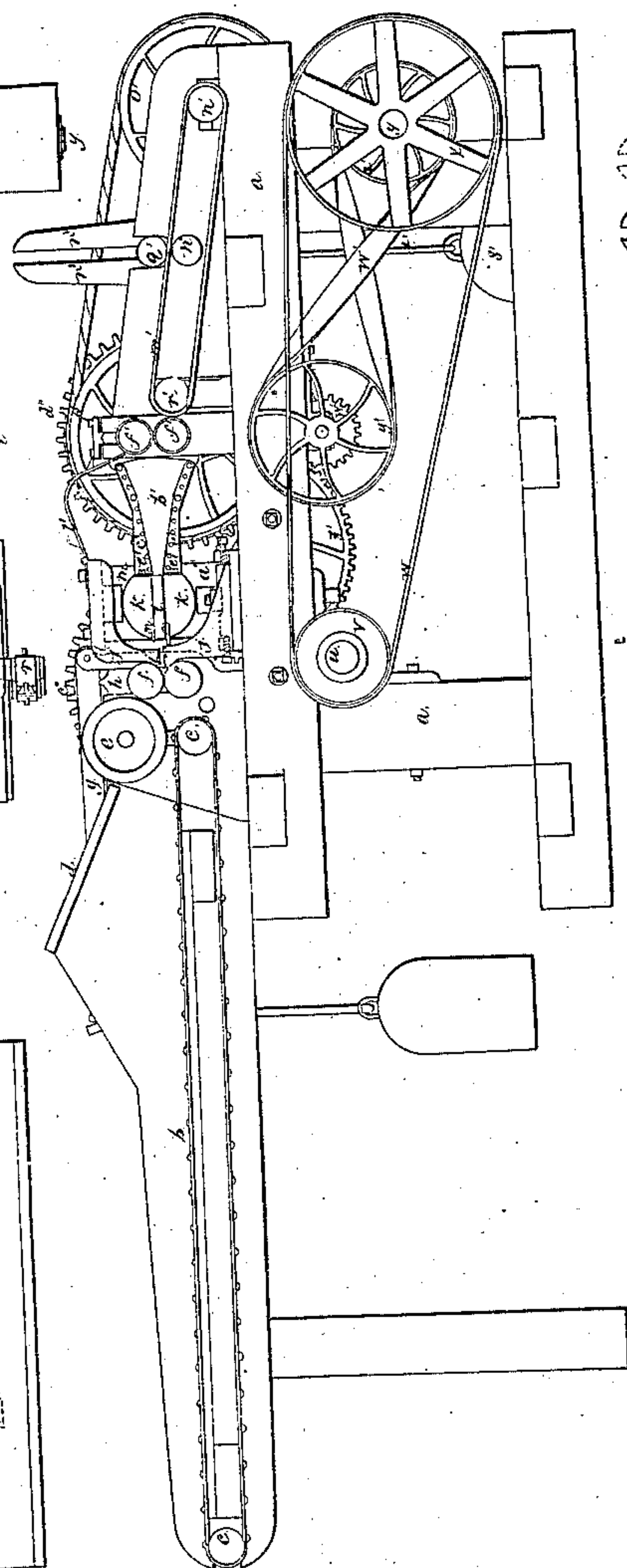
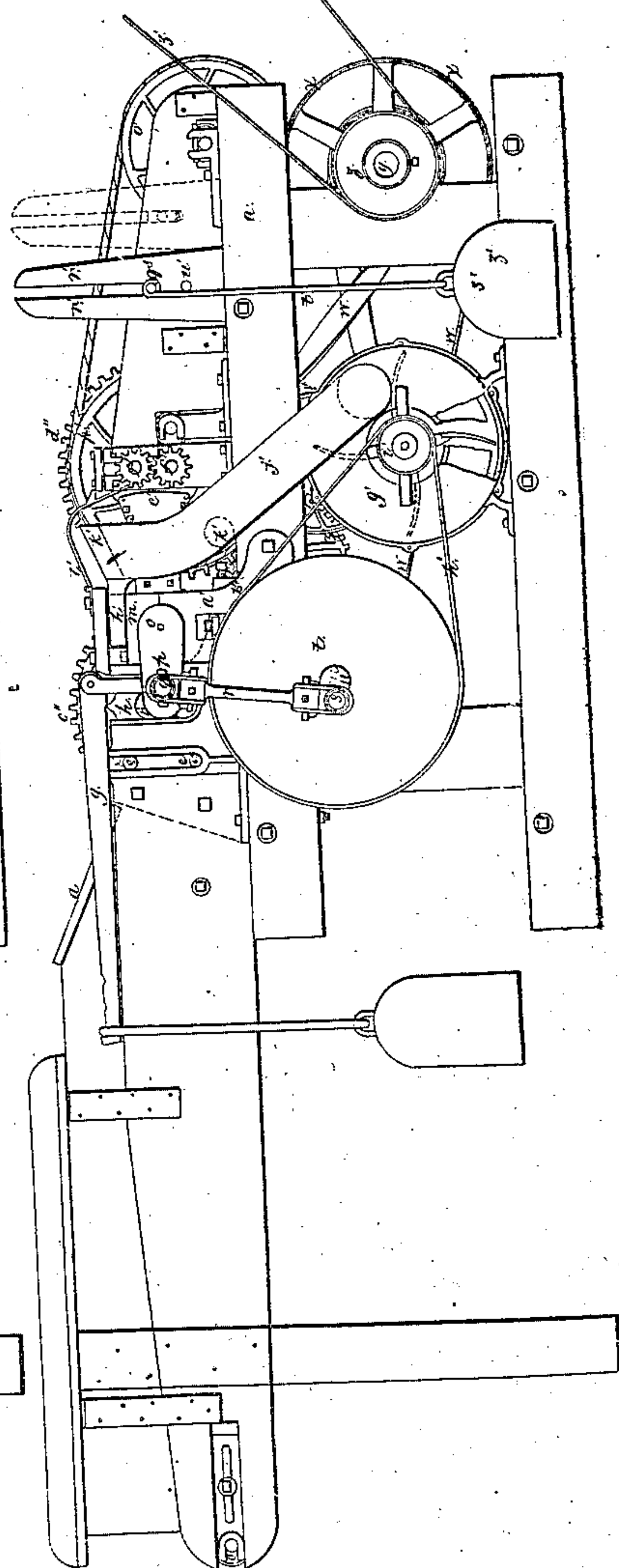


Fig. 3.



Witnesses:

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UNITED STATES PATENT OFFICE.

STILLMAN A. CLEMENS, OF ROCKFORD, ILLINOIS.

IMPROVEMENT IN HEMP-BRAKES.

Specification forming part of Letters Patent No. 34,349, dated February 11, 1862.

To all whom it may concern:

Be it known that I, STILLMAN A. CLEMENS, of Rockford, in the county of Winnebago and State of Illinois, have invented a new and useful Machine for Breaking Flax and Hemp; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, in which—

Figure 1 is a plan; Fig. 2, a longitudinal vertical section, and Fig. 3 a side elevation, the same letters referring to like parts in all the figures.

In my machine the flax or hemp to be broken is placed upon an endless feed-apron, by the movement of which it is advanced under a circumferentially-grooved roller, which rests upon the apron, and thence between a pair of plain feed-rollers, which pass it into a narrow space between two fixed bars, and thence between the opposite faces of an oscillating beater, the two breaking-edges of which approximate the bars at unequal distances from the axis of the beater. From the beater the flax passes between the two gratings of a whipper, by the vibrations of which the broken flax is further cleaned. An artificial current of air is directed across the machine above the whipper to remove flax-shives, which are thrown upward by the whipper.

In the accompanying drawings, *a* is a frame; *b*, an endless feed-apron; *c c*, rollers carrying the apron *b*.

d is an inclined guard-board to direct the ends of flax or hemp stalks down under a circumferentially-grooved receiving-roller, *e*.

f f are plain feed-rollers.

g g are weighted levers resting upon cap-boxes *h h* over the journals of the upper roller, *f*.

i is a long narrow space between two bars, *j j*, which have steel edges on the back side, next which is an oscillating beater, *k*, having a horizontal slotted opening, *l*, through it nearly the whole distance between its journal-boxes *m m*, the space *l* having steel edges *n n* next those of the bars *j j*. The lower edge of the slotted space *l* in the vibration of *k* upon axis-journals resting in the boxes *m m*, barely passes the like steel edge of the lower fixed bar *j*, while the upper edge of beater *k* and the corresponding edge of the upper bar *j* are both equally distant in opposite directions from the cylindrical plane which the lower

edge of *k* describes in the vibrations of the latter.

o is the journal-axis of *k*.

p is an arm on one end of *o*, holding a pin, *q*, fastened to a connecting-rod, *r*, which is attached to a crank-pin, *s*, fixed in a balance-wheel, *t*, which is fastened on a shaft, *u*, carrying a pulley, *v*, around which passes a band, *w*, also encircling a pulley, *x*, on a driving-shaft, *y*.

a' a' are stands, in which are the journal-boxes of *k*, and to the upper and lower part of which are respectively fastened the upper and lower bars *j j* by bolts in slotted holes, which allow the adjustment of the steel edges of the bars in proper relation to those of the beater.

b' is a space widening as it recedes backward between two rows of wire or other rods, which are supported by iron plates or posts *d'*, fastened to the back side of the beater, and together constituting a whipper, *c'*.

f f are a pair of plain pressure-rollers.

m' is an endless apron carried by rollers *n'*. Lying upon this apron is a roller, *q'*, which has its journals in the slotted stands *r'*. On the extreme ends of the axis of *q'* are supported weights *s' s'* by rods *t' t'*, which are hooked upon grooves around the ends of the axis.

u' is a roller directly under roller *q'* and below the apron *m'*.

g' is a rotary fan, conducting from which is an air-pipe, *j'*, with its discharging-spout *k'* so arranged as to direct a current of air from the fan across the machine, over and above the whipper *c'*.

l' is a bonnet placed above the whipper.

Through a driving-band, *z'*, and pulley *z* motion is communicated to the shaft *y*, and thence by the band *w* to the crank-shaft *u*, which, through the connecting-rod *r* and its attachments, gives vibratory motion to the beater *j*. A band, *h'*, which passes around the balance-wheel *t*, and also a pulley, *i'*, on the axis of the fan *g'*, give rotation to the latter.

The rollers of each of the pairs *f f* and *f' f'* are geared together, usually, and the two pairs move with equal speed, being driven from a pulley, *a'*, on the shaft *y* through a band, *w'*, which passes around a pulley, *x'*, on an axis, which carries a toothed wheel, *y'*, which engages a larger wheel, *z'*, supported

on a stud-pin, a'' , and which has attached on its inside a pinion, b'' , which engages both of the large wheels c'' and d'' , the wheel c'' being fast on the axis of the lower feed-rollers, f , while the wheel d'' is on the axis of the lower discharge-roller, f' . A pulley, p' , attached to the latter by a band which also passes around a pulley, o' , on the axis of the rearward apron-roller, as shown in the drawings, gives motion to the discharging-apron m' , which is arranged to move a little faster than the delivery-rollers $f' f'$. The annular grooved receiving-roller e is either driven by geared connection with the feed-rollers, or, lying upon the apron or material to be broken, it moves with their motion.

x'' is a shelf used in some cases for hemp.

For breaking hemp, the upper steel edge of the beater extends about one-eighth of an inch less distant from the axis of the beater than the lower steel edge of the same, and, also, the steel edge of the upper bar j is withdrawn about one-eighth of an inch from the vertical plane of the steel edge of the lower bar. The motion of the feed-rollers being adjusted to move forward the material to be broken one-eighth of an inch each revolution of the crank-shaft, the described arrangement of the steel edges of the bars and beater, by the vibration of the latter, causes its edges to strike in the same vertical line on opposite sides of the hemp at each revolution of the crank, breaking the stalks both up and down at the same points and into fragments of about one-eighth of an inch in length. This arrangement of breaking edges differs from an analogous device for breaking hemp and flax for which Letters Patent of the United States were granted to me on the 8th of March, 1853, in which the edges of the bars and the edges of the beater were respectively advanced equal distances toward each other, which gives but a single breaking action at one point on the material to be broken, and consequently is less effective.

By adjusting the connecting-pin q in the slotted hole in the arm p farther out or inward, the arcs of vibration described by the steel edges of beater k are made to be longer or shorter according to the material to be worked, the usual adjustment being such that each edge of the beater passes the corresponding edge of a bar about one-sixteenth of an inch in the breaking stroke. For flax the feed-rollers are usually geared to move about one-sixteenth of an inch to each revolution of the crank-shaft, and the upper edge of the bars is adjusted distant from the upper edge of the beater but one-half as much as for hemp, which gives a double breaking action each sixteenth of an inch on the flax-stalk. In breaking tangled flax-straw it is found best to give a faster rate of motion to the discharging-rollers $f' f'$ than that of the feed-rollers.

In operating the machine the flax or hemp is spread upon the feed-apron in a longitudinal direction, with the successive layers overlapping each other. Moving with the apron,

the ridges between the grooves of the receiving-roller e enter between the stalks of the material and prevent them from getting out of line, which otherwise is liable to result from the crushing action of the weighted feed-rollers. Advanced by the movement of the latter, the flax passes into the space between the bars $j j$ and into the slotted opening through the beater, where it is subjected to the breaking action of the edges of the bars and beater. Coming out back side the beater through the opening l , the broken material passes into the space b' between the wire gratings, which, with their supports, constitute the whipper, by the vibrations of which the fragments of broken stalks are violently whipped out from the fiber and thrown upward and downward between the interstices of the wire rods. The current of air from the pipe j' projects from the machine the shives or broken fragments thrown upward by the whipper, and thus prevents them from falling back and again becoming entangled with the fiber. From the whipper the fiber is taken in the bite of the discharging-rollers $f' f'$, from whence it is removed by hand; or it can be formed into a round bale on the machine by passing an end of the sheet of fibers under and over the winding-roller q' by hand, when, by the movement of the apron, the flax will be rolled up under pressure of the weights $s s$. This round package, when of suitable size, is removed from the machine, and the roller q' , being withdrawn from its center, is again replaced in the stands and upon the apron.

The beater k and whipper c' , connected as described, both vibrate upon a common axis, o ; but the whipper c' can be made to vibrate upon its own independent axis, so attached and operated as to sustain substantially the same relation to the other parts of the whipper as is borne by the axis of k , and the whipper thus supported and operating upon an independent axis can obviously be connected with any other breaking apparatus used to work flax or hemp, and for some purposes may be usefully employed without any attached breaking apparatus.

I do not claim the use of an annular grooved receiving-roller, otherwise than when placed over a feed-apron and before plain feed-rollers, for the purpose described; nor do I claim the use of an artificial current of air to directly remove impurities from fiber, or otherwise than as described.

What I claim is—

1. The method of breaking flax or other fibrous substances by a beater constructed substantially as described, which oscillates upon an axis on one side of its center, and has its breaking-edges on the other side extending at unequal distances from the axis, when combined with two bars the breaking-edges of which are in correspondence with those of the beater, substantially as described, and for the purpose specified.

2. A whipper vibrating either upon an in-

dependent axis on one side or upon an axis common to it and the beater, when combined with a beater or pair of feed-rollers substantially as described, and for the purpose specified.

3. An air-pipe, *j'*, with its discharging-spout so arranged as to direct an artificial current of air across the machine above the whipper in connection with the latter, substantially as described, and for the purpose specified.

4. An annular grooved receiving-roller, *d*, resting over or upon an endless apron, and in connection with a pair of plain pressure feed-rollers, substantially as described, and for the purpose specified.

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Witnesses:

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A. R. SPROUT.