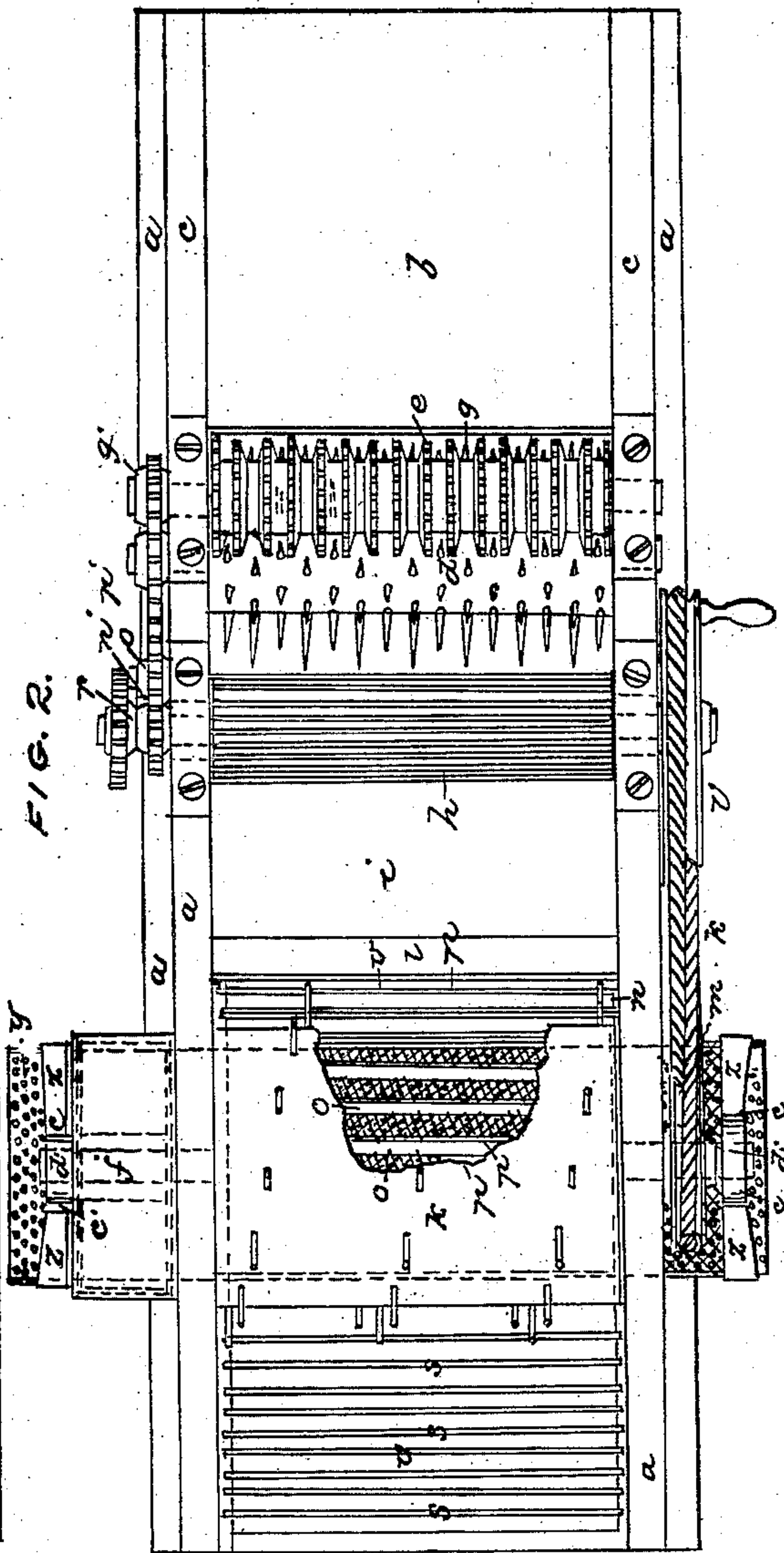
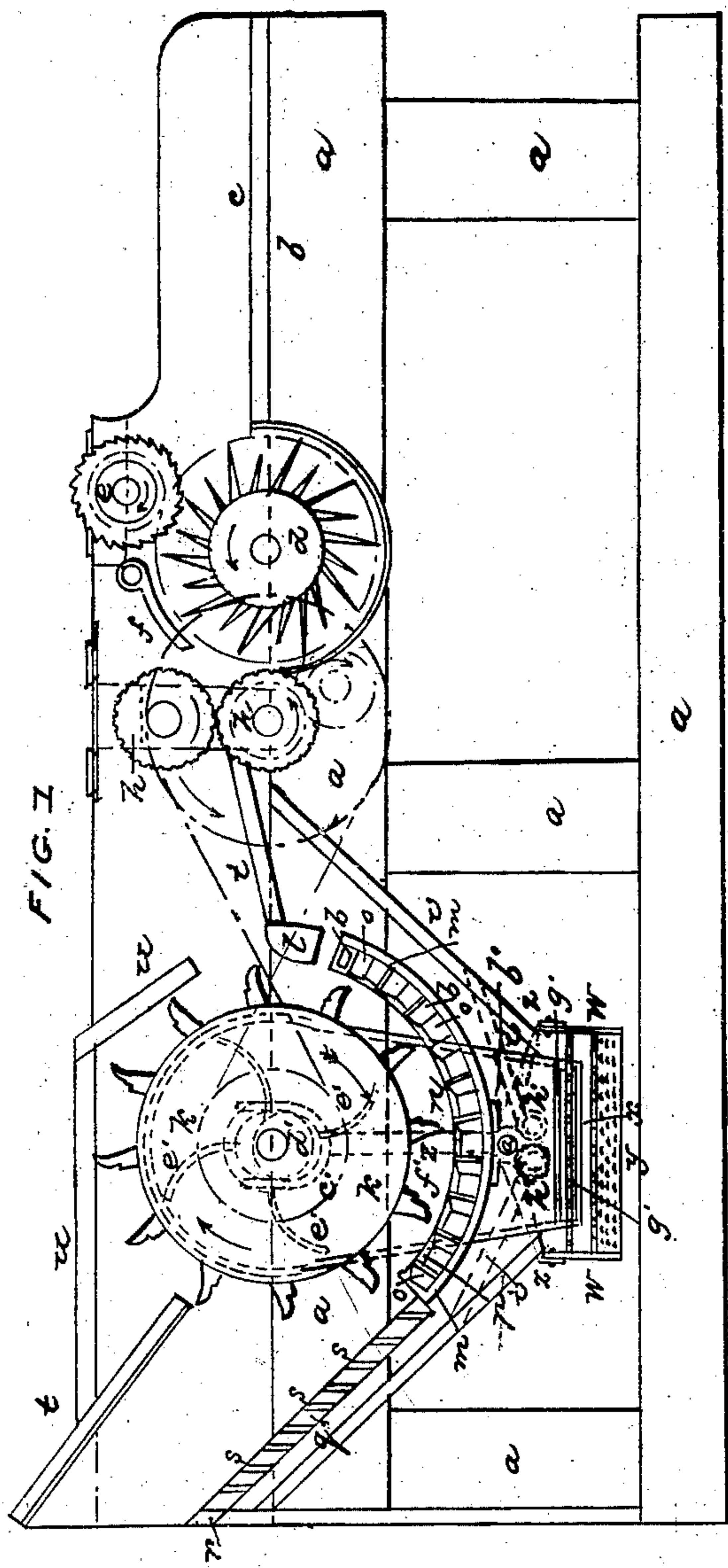


S. A. CLEMENS.

Machine for Straightening and Thrashing Tangled Flax.

No. 59,502.

Patented Nov. 6, 1866.



WITNESSES:

Melville Clemens
Richard Thgt?

INVENTOR,

Stellman A. Clements

UNITED STATES PATENT OFFICE.

STILLMAN A. CLEMENS, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF HIS RIGHT TO JAMES J. WALWORTH.

IMPROVEMENT IN MACHINES FOR STRAIGHTENING AND THRASHING TANGLED FLAX.

Specification forming part of Letters Patent No. 59,502, dated November 6, 1866.

To all whom it may concern:

Be it known that I, STILLMAN A. CLEMENS, of Chicago, Cook county, Illinois, have invented a new and useful Machine for Thrashing Tangled Flax-Straw and Winnowing Flaxseed; and I do declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a vertical and longitudinal section, and Fig. 2 is a plan, of the machine, like letters referring to like parts in both figures.

My said invention consists in mechanical devices for drawing, straightening, and attenuating a thick layer of tangled flax-straw into a thin even sheet of parallel stalks, and at the same time crushing the seed-bolls of the stalks, combined with mechanical devices for thrashing and separating the seeds and seed-bolls from the stalks, and with mechanical devices for winnowing and screening the flaxseed.

In the accompanying drawings, *a* is the frame of the machine. *b* is a feed-table. *c c* are side boards of the latter. *d* is a toothed cylinder, with annular rows of long teeth alternating with annular rows of shorter teeth, all of which are set inclined backward from a radial line drawn through their base to the axis of the cylinder. *e* is a roller placed above *d*, and having on its surface indented annular rings or projections, which project down below and between the points of the rows of teeth of cylinder *d*. *f* is a hinged cover over a part of cylinder *d*, the lower surface of which nearly touches the points of the long teeth of the cylinder. *g* is a concave or shell to cylinder *d*, formed of sheet metal and curved to the circle of the movement of the points of the long teeth of *d*, and set to clear their points. *h h* are pressure, crushing, and drawing rollers, which are channeled or grooved lengthwise on their surfaces, and set in their bearings so as not to touch each other, and the upper one having springs attached to its journal-boxes to give a downward pressure upon its axis. *i* is an inclined table for conveying a sheet of flax from the rollers *h h* to the cylinder *k*, which last is a toothed thrashing-cylinder. *l* is a breast to the thrashing-cylinder, and *m* is a concave to the cylinder *k*, which is

formed of the curved supporting-frames *n n*, which are fastened to the sides of the frame *a*, and to which are secured at their ends the bars *o o*, which have attached to their front sides the face-plates *p p*, with their sides set in radial lines to the axis of the cylinder, and their upper edges higher than the tops of the bars *o o*, and clearing the points of the teeth of cylinder *k*. *q* is a discharge-chute bottom, formed of the inclined supporting-frames *r r*, which are attached to the sides of the frame *a*, and which support at their ends the cross-bars *s s*, which are set with their sides vertical. *t* is a cut-off or air-current-deflecting board to cylinder *k*, and also a cover to the discharge-chute, and is set inclined, as shown in the drawings, with its lower edge just clearing the points of the teeth of cylinder *k*. *u u* is a cover over cylinder *k*. *v v* are two chute or hopper sides extending across the machine and secured to the frame *a*, and placed underneath the chute-bottom *q* and the concave *m* in an inclined position, and converging together at their lower edges, so as to direct material falling through the chute-bottom and concave into the sieve-shoe *w*, which last has an upper inclined coarse screen, *x*, and a lower inclined finer screen, *y*, and which sieve-shoe is suspended underneath the concave *m*, and parallel to the axis of *k*, and supported loosely, so as to be vibrated and shaken by means of the two three-armed levers *z z*, two of the arms of both of which are attached to the sides of the sieve-shoe *w*, and the other arm of each, (shown in dotted lines in Fig. 1,) extending up vertically, has a fork, *e'*, formed at its upper end, which embraces a cam, *d'*, (shown in dotted lines in Fig. 1,) on the axis of *k*. Both levers are supported at the junction of their arms by rods *a' a'*, which are attached to the ears *b' b'*, which last are fastened to the concave *m*.

On one end of the shaft of cylinder *k* is attached a fan-blower, *e' e'*, (shown in dotted lines,) incased in the cover and trunk *f'*, which last at its bottom is curved so as to direct an air-blast horizontally out of the opening *g'* and lengthwise through the sieve-shoe *w*, both above and below the screen *x*.

The motions of the operating parts of the combination are in the directions indicated by the arrows drawn on them in Fig. 1, and are

as follows, viz: The cylinder *d* is made to revolve at a speed sufficient to bear away a thick sheet or layer of tangled flax-straw as fast as it is spread by workmen on the table *b*, and is supplied uniformly to the cylinder. The roller *e* revolves with a surface-speed somewhat faster than the movement of the points of the long teeth of cylinder *d*. The rollers *h h* revolve with equal speed, and have a surface movement several-fold greater than the movement of the points of the long teeth of cylinder *d*. The cylinder *k* revolves with a much greater surface-speed than that of the rollers *h h*, and in each of its revolutions the fan-blower *e' e'* revolves with it, and it gives, by the connections before described, two shaking movements to the sieve-shoe *w*.

The above-described movements of the operating parts of the machine are given when power is applied to the axis of the lower roller, *h*, and giving to it the required motion by means of the following driving parts, (which are shown in Fig. 2, and are indicated by red lines in Fig. 1,) viz: On one end of the axis of the lower roller, *h*, is a large grooved pulley, *l'*, over which passes a cross-band, *k'*, which also passes over a small grooved pulley, *m'*, on the axis of the cylinder *k*, giving a rapid motion to the latter and to the fan-blower *e' e'*, and vibrating and shaking the sieve-shoe *w* through the cams *d' d'* and levers *z z*. On the other side of the machine the rollers *h h* are geared together by spur-gears *r' r'* on their axes. On the same end of the axis of the lower roller, *h*, and inside of the spur-gear *r'*, a smaller spur-gear, *n'*, drives an intermediate spur-gear, *o'*, which drives a large spur-gear, *p'*, on the axis of *d*, which drives a small spur-gear on the axis of *e*.

In operating the machine, tangled flax-straw having the seed upon it is spread by workmen in a thick layer upon the feed-table *b*, and advanced to the cylinder *d*, which receives it upon its teeth and carries it over and under the roller *e*, which, by its annular rings, impales it down upon the teeth of cylinder *d*, the inclined indentures or projections of the rings moving at higher speed than the points of the teeth of *d* and the mass of flax-straw, serving to partially straighten and advance the upper stalks of flax, and prepare them to be presented in a more favorable condition to be seized by the drawing-rollers, while the cover *f*, resting on the mass of flax-straw, serves to keep it down upon the teeth of *d* while being drawn away by the rollers *h h*, which last, running at much higher surface-speed than the layer of flax is moving, seize the flax-stalks as they are presented to them, and draw them away through the teeth of *d*, forming, with the aid of the toothed cylinder *d* and its top roller, *e*, and hinged cover *f*, a thin even sheet of straightened and parallel stalks from the thick layer of tangled flax, and at the same time of the flax-stalks passing between the rollers *h h* the flaxseed-bolls are crushed by the rollers. The shell *g* catches the seeds and seed-bolls,

which are disengaged and fall down from the flax, passing over the cylinder *d*, and in the revolution of the cylinder *d* they are carried over the shell, and, mixing with the continuous moving layer of flax, are advanced with it through the rollers *h h*.

The grooves or channels on the surfaces of the rollers *h h* aid in giving them adhesion to the material passing between them, and their being set in their bearings so that their surfaces shall not touch avoids their crushing the flaxseeds passing between them, which would be the case if their surfaces touched each other.

By the use of the described drawing and attenuating devices the great advantage is attained of passing the flax-straw between the crushing-rollers in a thin, even sheet, moving at high speed, which produces more rapid work and more thorough and effectual crushing of the seed-bolls than when the flax is fed by hand to the rollers; and the consequent delivery by the rollers of a thin even sheet of flax to the cylinder *k* is also more favorable for efficient action of the cylinder than would be the case if an unequal and thicker layer or sheet of flax were passed through the rollers to the cylinder, which would result from hand-feeding to the rollers.

After passing between the rollers *h h* the sheet of flax is projected, by the rapid motion of the rollers, over the inclined table *i* and presented to the thrashing action of the teeth of the rapidly-revolving cylinder *k*, which, as the flax-stalks rest on the table *i* and breast *l*, thrash from the stalks the seeds and seed-bolls, which are thrown down between the bars of the concave *m*, while the flax-straw is carried around between the cylinder *k* and concave *m*, and, after passing the latter, it is thrown off the teeth of the cylinder and up and over the chute-bottom *q*, the seed and seed-bolls carried with it falling down through the chute-bottom, and the straw is thrown out of the machine, the deflecting-board *t*, by deflecting outward the air-currents from the cylinder *k*, aiding in its delivery from the cylinder and its discharge from the machine.

The distance from the rollers *h h* to the cylinder *k* is made such that the flax-stalks of average length shall not be held in the bite of the rollers at one end, while the other end is subjected to the action of the teeth of the cylinder *k*, in order to avoid cutting and tearing the stalks.

The seed-bolls and seeds and chaff, falling down through the concave *m* and chute-bottom *q*, are directed by the chute-sides *v v* into the sieve-shoe *w*, falling first upon the screen *x*, which, by its shaking motion and by the air-blast from the trunk *f'*, separates the seeds from the chaff, the latter being blown out at the rear open end of the sieve and the former falling down through the holes in the screen *x* and upon the finer screen *y*, where they are again winnowed by the air-blast from *f'*, and the flaxseed, by the inclination of the screen *y* and its vibrating and shaking motion, moves down the inclined plane and is discharged from

the lower end of the sieve, the foreign seeds, dirt, &c., being separated from the flaxseed by falling down through the holes in the screen *y*, which are too small for the flaxseeds to pass through.

Certain modifications of the described devices and other combinations may be used, viz:

First. A pair of pressure crushing-rollers, *h' h''*, may be used in combination with the foregoing-described devices, as shown in Fig. 1 by red lines. They are placed underneath the concave *m* and above the sieve-shoe *w*, parallel with it, and the chute-sides *v v* are formed, as shown by the red lines *v' v'*, so as to direct the material upon and between the rollers *h' h''*, which falls through the concave *m* and chute-bottom *q*. The rollers may be supported at their end axes in the frame of the machine, and set in their bearings so that their surfaces shall not quite touch each other, and have spring pressure on the axis of one of them, similarly to the rollers *h h*, and for a similar purpose described of them. The rollers *h' h''* are used to crush and open the seed-bolls, and free the seed from any seed-bolls which may have passed through the rollers *h h* uncrushed. One or both of them may be grooved or channeled lengthwise on their surfaces, like *h h*, and being driven by belt-and-pulley connection with the axis of *k* or either of the rollers *h h*. The rollers *h' h''* may be geared together to revolve with equal surface-speed, or one may revolve faster than the other, giving a drawing and rolling action on the seed-bolls favorable for opening them and freeing the seeds.

Second. The toothed cylinder *d* may be used without the top roller *e*, or without the hinged cover *f*, or without both of them, but with less advantage than with their use; and the teeth of cylinder *d* may be of equal length, or they may be set radial to the axis of the cylinder, or they may be curved instead of inclined backward, as shown.

Third. The rollers *h h* may be, either or both of them, fluted like flax-breaking rollers; or either or both of them may be made plain-surfaced, or of any common form of drawing-rollers.

Fourth. In the place of cylinder *k* and its concave any common forms of toothed cylinders and toothed concaves, or beaters and concaves, or combined beaters and pickers and concaves, may be used.

Fifth. The chute-bottom *q* may be dispensed with, and the chute-side *v*, under it, be used alone in place of it.

Sixth. The described winnowing and screening devices may be dispensed with when the machine is only required for thrashing flax.

Seventh. Various other winnowing and screening devices of the common forms may be used in place of that described, and they may be adapted in combination with the drawing and thrashing devices described and referred to.

Seeds of plants other than flax may be thrashed and cleaned in the same manner as described of flax, with the described combinations, suitable sieves and separators being used.

I do not hereby claim the combined devices, consisting of cylinder *d*, top roller, *e*, cover *f*, and rollers *h h*, as similar devices are claimed in combination in a patent to me of even date herewith.

I claim as new and of my invention—

1. In a machine for thrashing or for thrashing and winnowing and screening the seeds of flax or other seed-bearing plants, the combination therewith of a drawing and straightening feed device, consisting of a toothed feed-cylinder adapted for impalement of the plants upon its teeth, with or without a device or devices for impaling said material upon said cylinder-teeth, and with drawing-rollers which draw and straighten said impaled material, and also crush the seed-bolls and deliver the material to said thrashing machinery, substantially as described, and for the purposes set forth.

2. The combination of toothed cylinder *d*, top roller, *e*, hinged cover *f*, shell *g*, drawing-rollers *h h*, table *i*, cylinder *k*, breast *l*, concave *m*, chute-bottom *q*, chute-cover and deflecting-board *t*, chute-sides *v v*, sieve-shoe *w*, levers *z z*, cams *c' c'*, fan-blower *e'*, and trunk *f'*, substantially as described, and for the purposes set forth.

3. The combination of the pressure crushing-rollers *h' h''* with the described machine, substantially as described, and for the purposes set forth.

STILLMAN A. CLEMENS.

Attest:

MELVILLE CLEMENS,
ISAIAH F. HOYT.