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J. O. WALLACE.

APPARATUS FOR BREAKING, SCUTCHING, AND CLEANING FLAX, &c.

No. 385,737. Patented July 10, 1888.

FIG. 7.

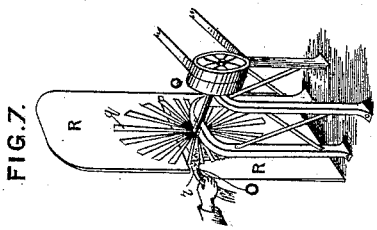


FIG. 7a.

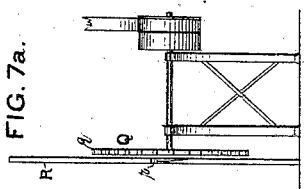


FIG. 1.

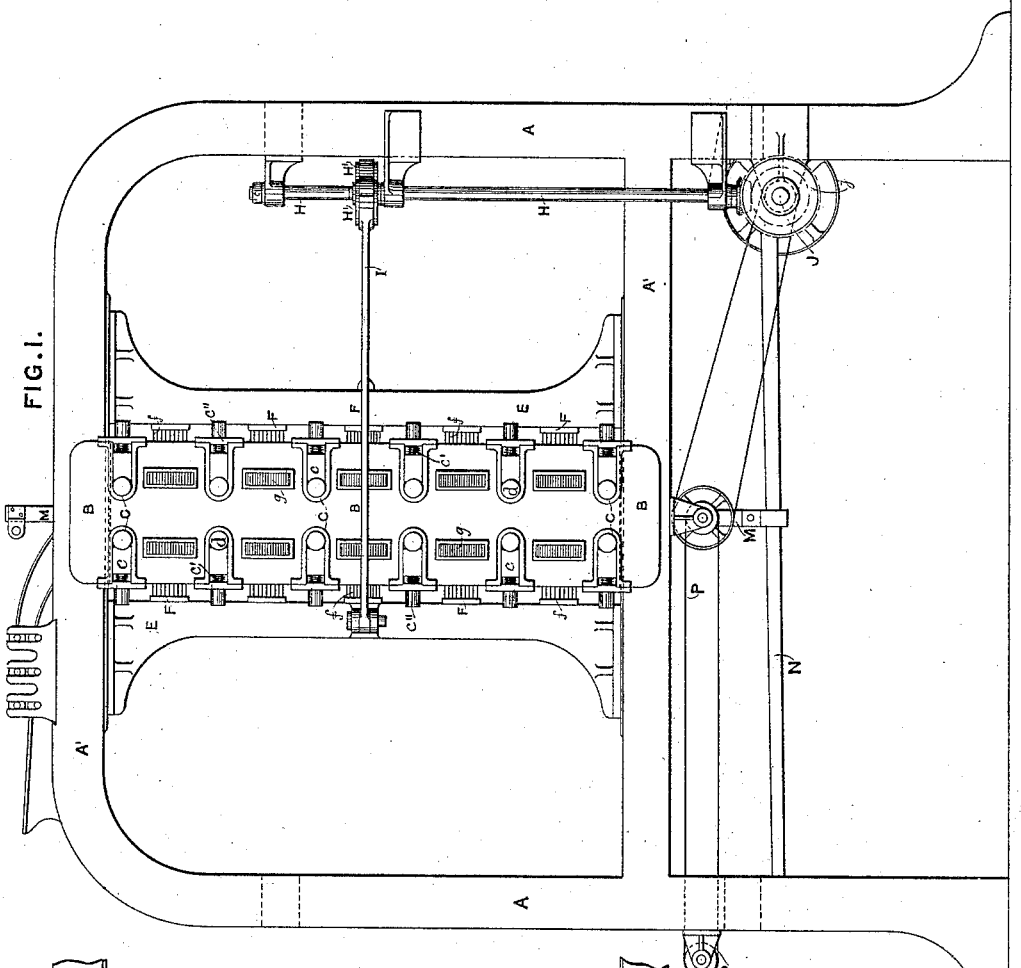
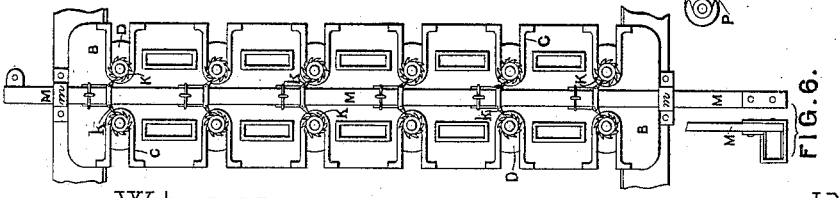


FIG. 6.



Witnesses

James F. DuHamel

Walter S. Dodge

Inventor:

John Orr Wallace

by Dodger Lee,

his Attys.

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J. O. WALLACE.

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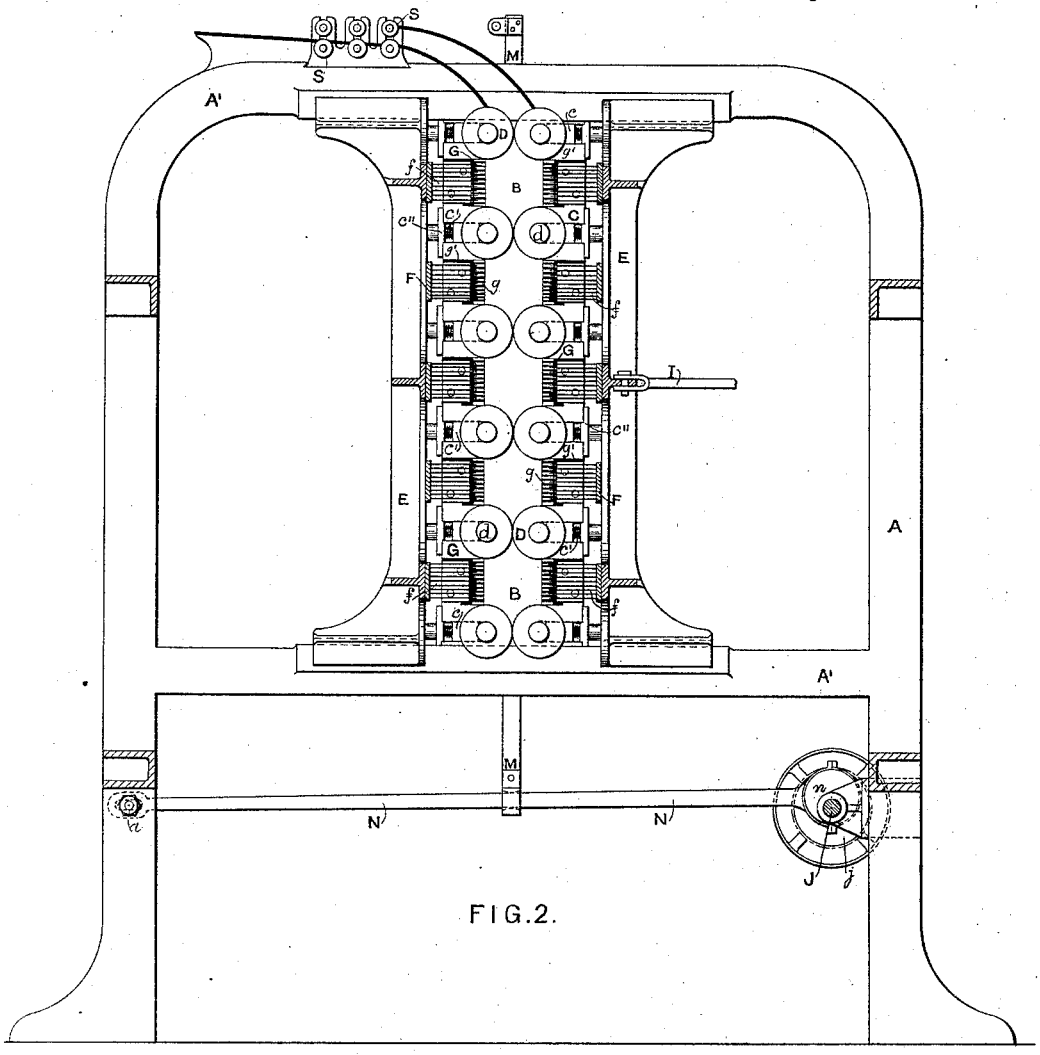

FIG. 2.

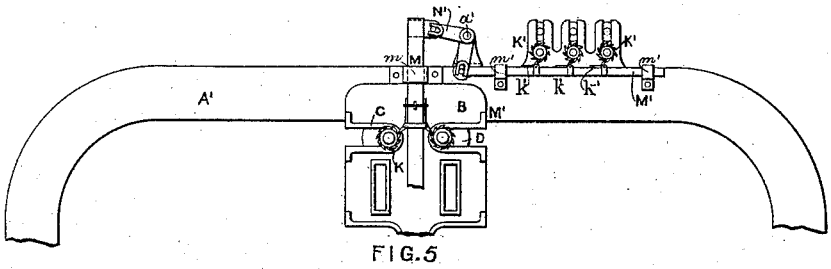

FIG. 5.

Witnesses
James F. Duhamel.
Walter D. Dodge.

Inventor:
John Orr Wallace,
by Dodger Son,
his Attys.

(No Model.) 4 Sheets—Sheet 3.

J. O. WALLACE.

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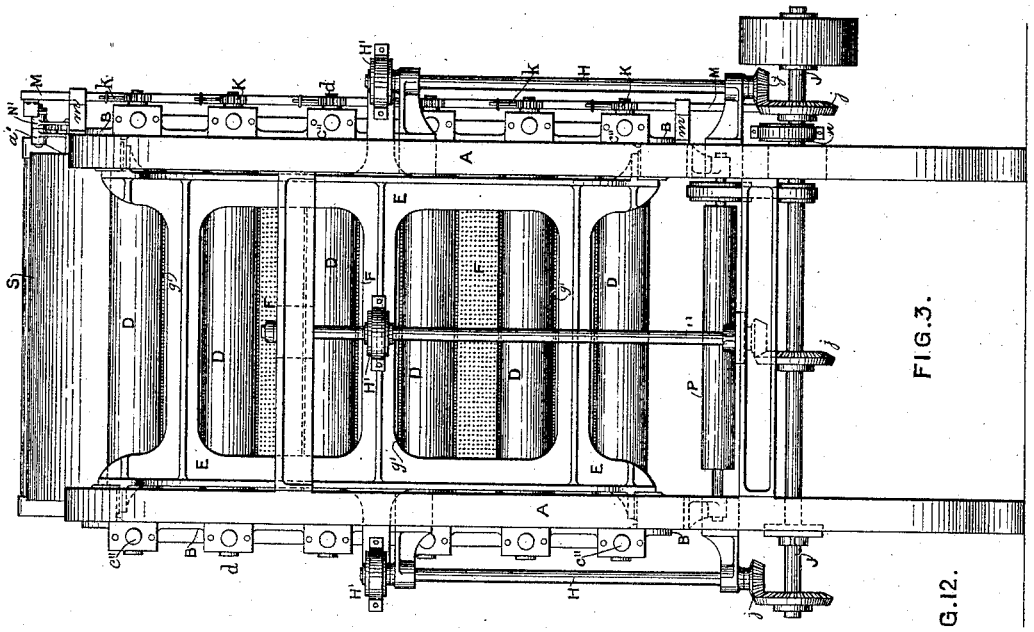

FIG. 3.

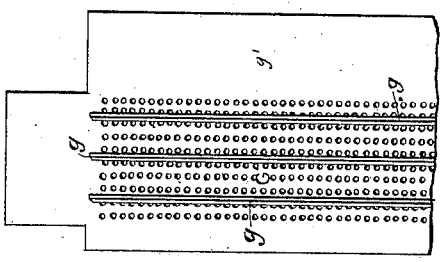

FIG. 11.

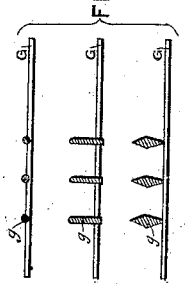

FIG. 12.

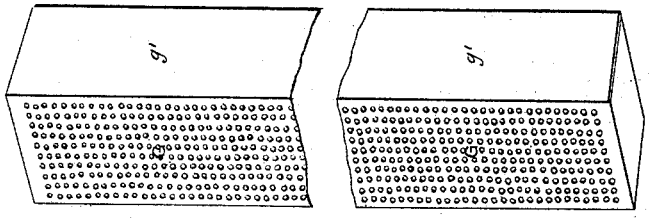

FIG. 10.

Witnesses

James F. DuHamel

Walter S. Dodge

Inventor:

John Orr Wallace,

by Dodger Sons,

his Attys.

(No Model.) 4 Sheets—Sheet 4.

J. O. WALLACE.

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FIG. 8.

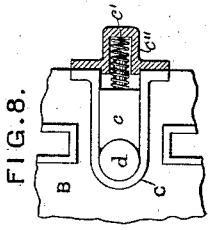


FIG. 4.

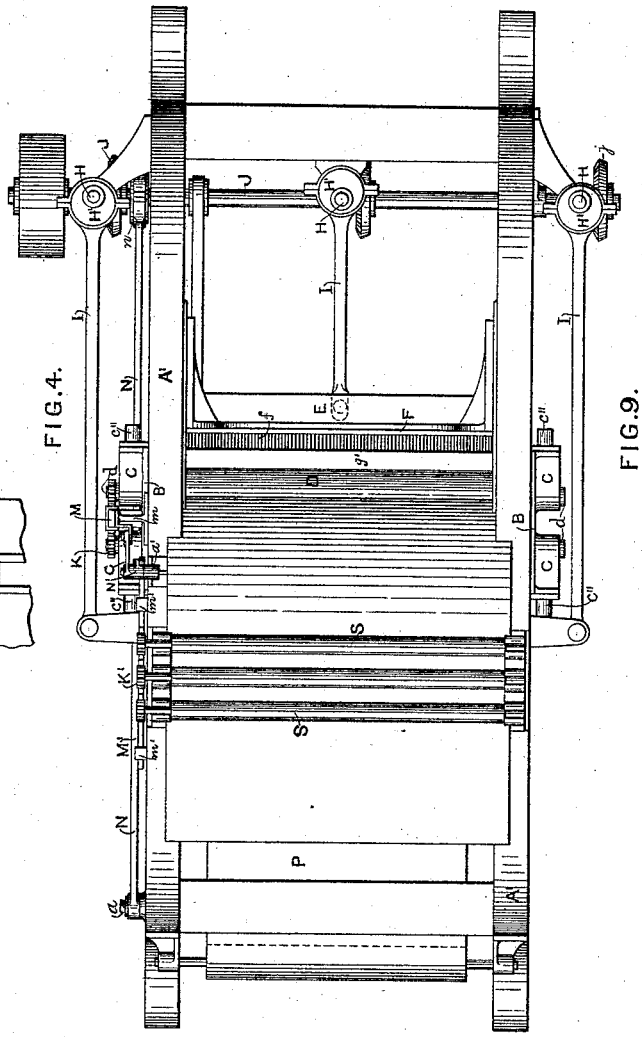
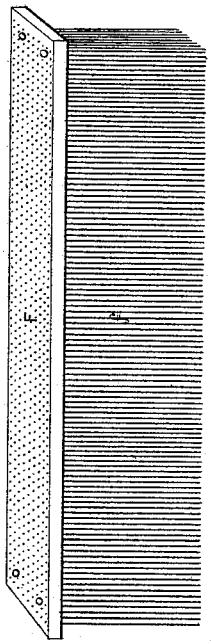


FIG. 9.



Witnesses

James F. Duhamel

Walter S. Dodge

Inventor:

John Orr Wallace,

by Dodger Son,

his Attys.

UNITED STATES PATENT OFFICE.

JOHN ORR WALLACE, OF BELFAST, COUNTY OF ANTRIM, IRELAND.

APPARATUS FOR BREAKING, SCUTCHING, AND CLEANING FLAX, &c.

SPECIFICATION forming part of Letters Patent No. 385,737, dated July 10, 1888.

Application filed April 6, 1887. Serial No. 233,952. (No model.) Patented in England January 6, 1887, No. 193; in France April 26, 1887, No. 180,392; in Belgium April 27, 1887, No. 77,238, and in New Zealand May 6, 1887, No. 2,322.

To all whom it may concern:

Be it known that I, JOHN ORR WALLACE, a subject of the Queen of Great Britain, residing at Belfast, in the county of Antrim, Ireland, have invented certain new and useful Improvements in Apparatus for Breaking, Scutching, and Cleaning Flax, &c., (for which I have obtained Letters Patent in France No. 180,392, dated April 26, 1887; Belgium, No. 77,238, dated April 27, 1887; New Zealand, No 2,322, dated May 6, 1887, and in England, dated January 6, 1887, No 193, sealed March 17, 1888,) of which the following is a specification.

The chief object of this invention is to produce cheap and effective apparatus for breaking, cleaning, and scutching the fibers of flax and other similar plants.

In the machine constructed according to my invention the fiber, or rather the whole stalks, of the flax or other plant are passed through it in the direction of their length, and in their passage through the machine are acted upon first by feeding and breaking rollers and then alternately by rollers and pins, as will be hereinafter fully described, which thoroughly break up and remove the woody parts, leaving the fiber clean for the hackling or other preparing machine.

Referring to the accompanying drawings, Figure 1 is a side elevation of a machine constructed in accordance with my invention; Fig. 2, a longitudinal section, some of the parts being in elevation; Fig. 3 an end elevation, and Fig. 4 a plan, of same. Figs. 5 and 6 are elevations of parts upon the opposite side of the machine to that depicted in Fig. 1 and showing devices for actuating the rollers. Fig. 7 is a perspective view of beating apparatus, which is shown in side elevation in Fig. 7ª. Fig. 8 is an enlarged view of one of the sliding bearings for the rollers. Fig. 9 is an enlarged view of the gill or splitting-tool. Fig. 10 is a perspective view of the perforated protecting plate for the pins of the gill. Fig. 11 is a face view of the blank from which the protecting-plates are formed, and Fig. 12 presents cross-sectional views, showing differing forms of strengthening-strips.

A is a strong frame-work for the machine, made of wood, iron, or other suitable material. It may be of any convenient shape, and that shown in the drawings and made of cast-iron will probably be found to be the most suitable.

B is an upright or standard at each side of the frame. In it are formed, as shown, the bearings C for the rollers D. The bearings are cast in the upright when made of metal, and each may be lined with a brass bush, if preferred. The rollers are each held in position in their bearings by means of a sliding piece, *c*, (see Fig. 8,) which is pressed against the axle or spindle *d* of the roller by a suitable spiral or other spring, *c'*. The spring at the other end abuts against the cap or plate *c''*, into which the shank of the slide projects. This arrangement of the roller-bearings is to allow of a lateral movement of the rollers, so as to enable them to adjust themselves to the thickness of material fed in and to maintain thereon an approximately equal pressure.

The frame or standard B is itself rigid and stationary. Either of the rollers D can at any time be removed from the frame without moving or disturbing the others. If desired, the bearings for the spindles of the rollers may be formed of brackets bolted or screwed to the frame B on the outside; but I prefer the arrangement shown.

E are two frames or slides, which move to and fro upon the members A' of the frame A. The slides E move to and fro in a horizontal direction and at right angles to the longitudinal axes of the rollers D. They carry a series of gills or tools, F, formed with pins *f*, which as they move to and fro first approach each other until the pins pierce the straw and then recede. One set or pair of these tools, F, is placed between each two pairs of rollers. The pins *f* of the tools F pass through guides formed of perforated or slotted plates G, (herein shown perforated,) strengthened by bars or rods *g*. (See Figs. 11 and 12.) The plates G are made in the form shown in Fig. 10, with a projecting piece, *g'*, on top to prevent any dust or dirt falling down onto or between the pins *f*, which would be likely to clog them. As seen in Fig. 12, the form of the strengthening-strips may be varied considerably. The slides E receive motion from the eccentric-shafts H, Figs. 1 and 4, through the eccentrics H' and eccentric-rods I, or the shaft

H may be a crank-shaft and work the slides E through connecting-rods I. The shafts H are driven from the horizontal shaft J by means of the bevel-wheels *j*. It is necessary that the fiber should not be dragged or pressed forward while it is engaged by the pins *f*. Therefore the rollers D and the feed-rollers S (hereinafter described) must have an intermittent motion and that at the time when the tools F are drawn back. They are therefore driven by means of pawls engaging with ratchet-wheels on their axles. The ratchet-wheels K for driving the rollers D are keyed to the spindles *d*, and the pawls *k* are carried by a rod, M, working in brackets *m*. At each downward movement of the rod M the rollers are rotated part of a revolution. The rod M is reciprocated vertically by means of the lever N, which passes through a loop or socket in the lower end of the rod. This lever N is pivotally connected to frame A by means of a bolt, *a*, passing through the slotted end of the lever, the opposite end of said lever being connected with the strap of an eccentric, *n*, on the shaft J, as shown in Figs. 1 and 2.

S are feed-rollers to conduct the straw to the machine. They receive an intermittent motion synchronously with the rollers D.

The ratchet-wheels K′, Fig. 5, on their spindles are worked by pawls *k*′, carried by the bar M′, which slides in the brackets *m*′. The bar M′ is worked from the bar M by means of the bell-crank N′, which is pivoted at *a*′ on the frame A.

P, Figs. 1, 3, and 4, is a traveling band or apron, upon which the fiber drops and is carried from beneath the rollers to any convenient place where the attendant can receive the fiber.

Q, Figs. 7 and 7ª, is a revolving beater formed of a series of arms, *q*, radiating from a center like the spokes of a wheel. The beater revolves close to a flat board or partition, R, with a slit or slot, *r*, in it. Through this slot the attendant presents the end O of the fiber to the beater—first one and then the other—until the adhering woody matter is knocked off. Motion may be imparted to beater Q by belt from the driving-shaft of the machine or from any other source.

The machine is herein shown and described with the different pairs of rollers superimposed and the slides and pins moving horizontally. This I consider the best arrangement, but do not limit the invention thereto, as the rollers may be placed horizontally and the slides and pins work vertically; or they may be set at any inclination to the perpendicular that may be for any reason found desirable.

The operation of the machine is as follows: The machine is set in motion and the fibrous straw fed in by the feed-rollers S on the top of the frame, and carried forward by the rollers D at each movement given to them by the pawls and ratchets. Between each forward movement of the fiber the slides E, carrying the tools F, are caused to advance and recede by the eccentrics H′ on the shafts H. The pins *f* then penetrate and are withdrawn from the fiber. The action of the pins on the fibrous material is to split up the woody part of the straw and subdivide the fiber. This they do while the material is held by the rollers, and at each successive movement of the machine a different part is acted upon by the pins, and as it travels through each length engages with each set of pins once or oftener, as may be required. The pins set at the top of the machine or at the end where the material first enters it may be made coarser than those which subsequently act upon it. The fibers pass from the rollers onto the traveling band P, by which they are carried to one side of the machine, and are then passed by the attendant into the slot *r* in the partition R, where they are acted upon by the beater Q and the adhering woody material removed, leaving the fibers in condition to be hackled.

I claim as my invention—

1. In an apparatus for treating flax, the combination, with a frame-work, of a series of rollers, D D, arranged in pairs, one pair above another, and each roller provided with a ratchet-wheel, a bar, M, provided with pawls to engage the ratchet-wheels, mechanism for imparting a reciprocating motion to the bar, tools F, provided with pins *f*, and located between the pairs of rollers, and a mechanism for imparting motion to the tools F, all substantially as shown, the rollers and tools alternating in their movements, as and for the purpose set forth.

2. In combination with a frame-work, a pair of rollers, D D, each provided with a ratchet-wheel, a vertically-reciprocating bar, M, provided with pawls to engage with and rotate the ratchet-wheels and the rollers, a main shaft, J, provided with an eccentric, a bar, N, connected at one end with the eccentric and at the other end with the frame and passing through the lower end of the reciprocating bar M, a set of tools, F, beneath the rollers, shafts H, provided with eccentrics and receiving motion from the main shaft, and pitmen I I, connecting the tools with the eccentrics, the eccentrics on the shafts H and J being so timed, respectively, as to cause the rollers and the tools to alternate in their movements.

3. In a machine for treating flax, the combination, with a suitable frame-work, of the crushing-rollers D D, the tools F F beneath the rollers, the feeding-rollers S S, a main shaft, and intermittently-acting connections, substantially as shown, between the main shaft and the rollers and between the main shaft and the tools, whereby the feeding-rollers and breaking-rollers are actuated positively before each inward movement of the tools.

4. In a machine for treating flax, the combination, with a suitable frame-work, of rollers D D, provided with ratchet-wheels, feeding-rollers S, also provided with ratchet-wheels, a

reciprocating bar, M, provided with pawls to engage with the wheels on the rollers D D, means for reciprocating said bar M, a bar, M′, provided with pawls to engage the wheels on rollers S, and a connection between the bars M and M′.

5. In a machine for treating flax, the combination, with a suitable frame-work and the uprights B, of a pair of rollers, D D, mounted therein and provided with ratchet-wheels, a series of rollers, S, arranged to one side of the rollers D and provided with ratchet-wheels, an upright reciprocating bar, M, provided with pawls to engage the ratchet-wheels upon the rollers D, means for reciprocating the bar and guiding it in its movement, an approximately-horizontal bar, M′, provided with pawls to engage the ratchet-wheels of rollers S and guided in its movement by means of brackets *m′*, and an elbow-lever, N′, connecting the bars M and M′.

6. In a machine for treating flax, &c., the combination, with the frame-work, of the rollers D D, tools F F beneath the rollers, endless belt P beneath the tools, driving-shaft J, and connections, substantially such as shown, for imparting necessary motion to the several parts from the driving-shaft.

7. In a machine for treating flax, &c., the combination, with the reciprocating frames E, provided with a series of pins, *f*, of a perforated plate, G, provided with strengthening-strips, as *g*, between the rows of perforations.

8. In a machine for treating flax, &c., the combination, with the reciprocating frames E, provided with pins *f*, of a perforated plate, G, having the protecting-plate *g′*, all arranged for operation substantially in the manner shown.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN ORR WALLACE.

Witnesses:
JNO. M. SAVAGE,
ARTHUR W. MCILVEEN.