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E. Brasier,

Flax Brake.

No. 103,135. Patented May 17. 1870.

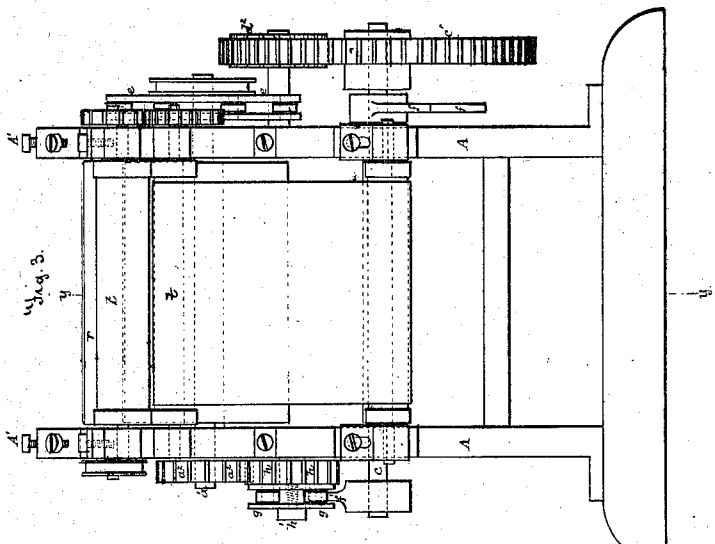

Fig. 3.

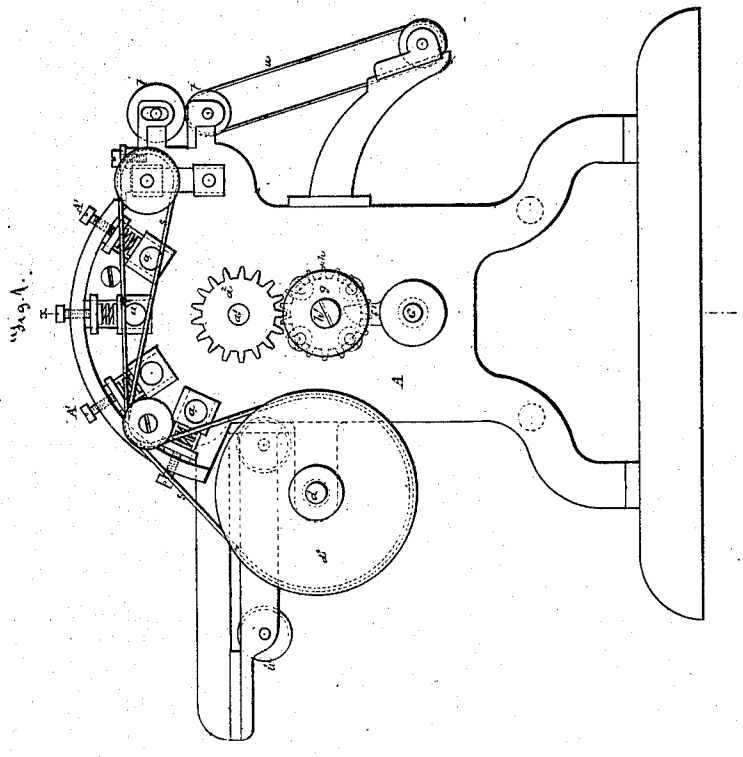

Fig. 4.

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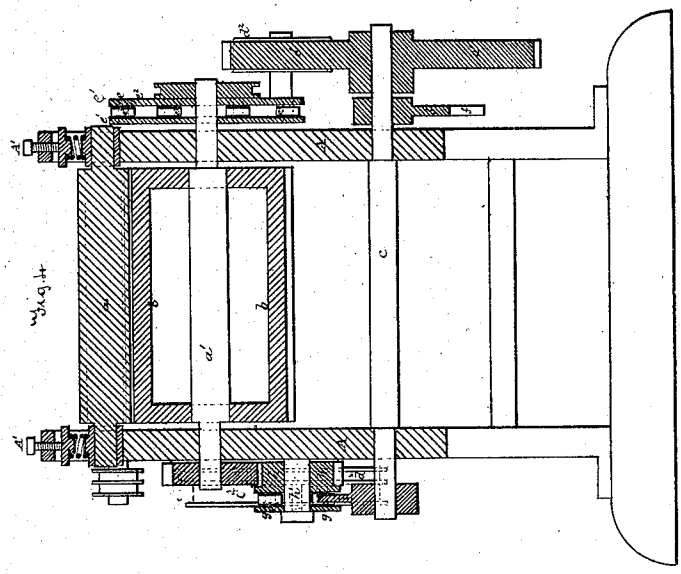

Fig. 1.

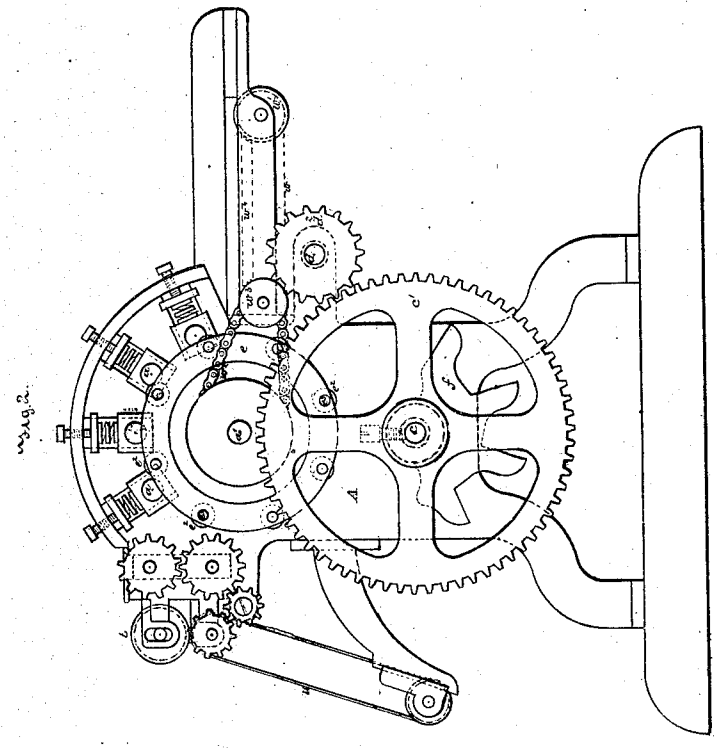

Fig. 2.

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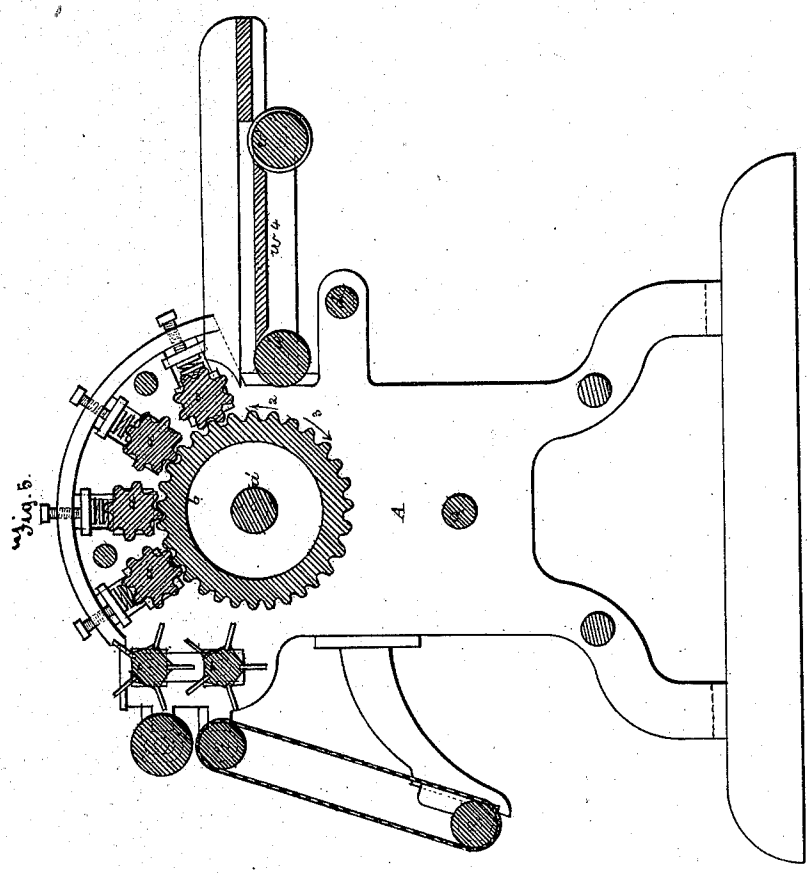

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No. 103,135. Patented May 17. 1870.

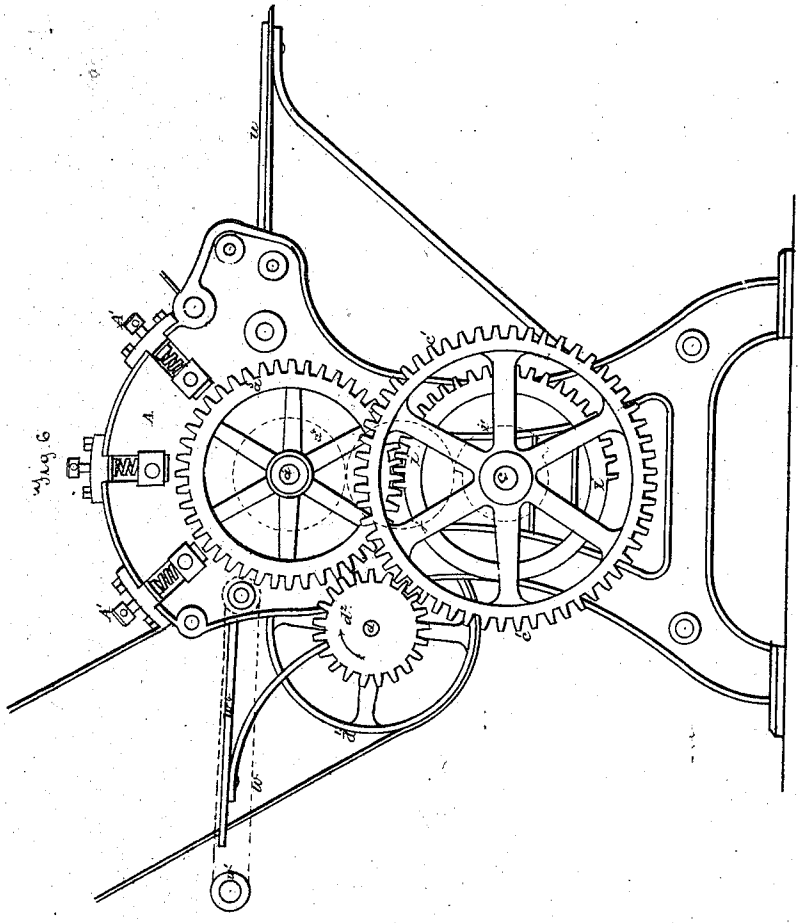

Fig. 6.

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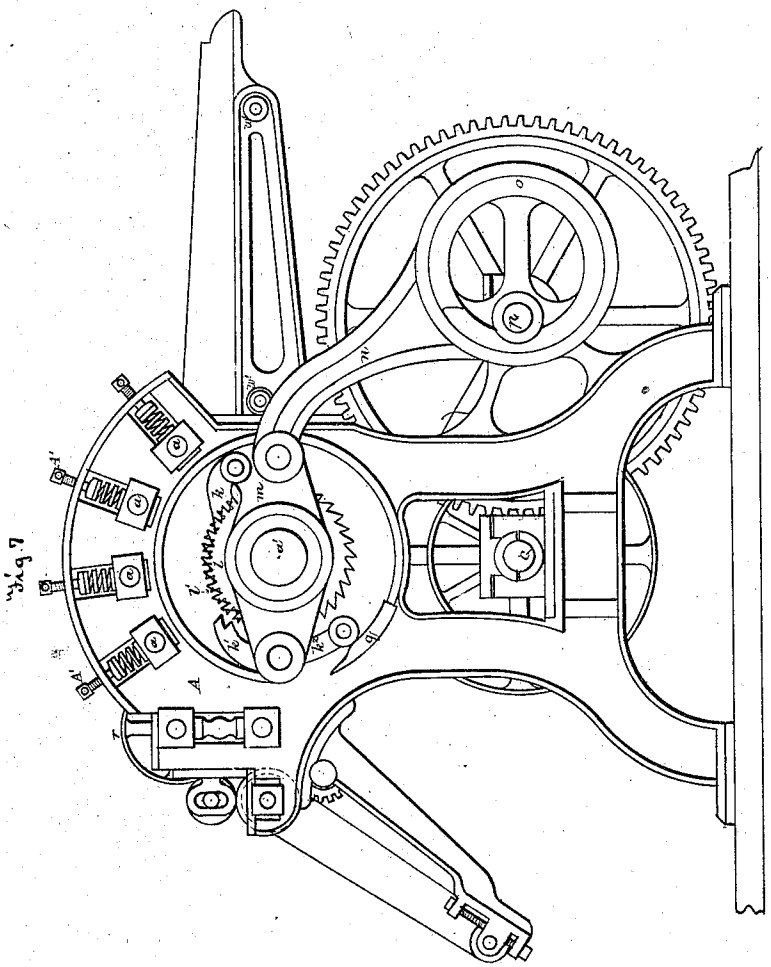

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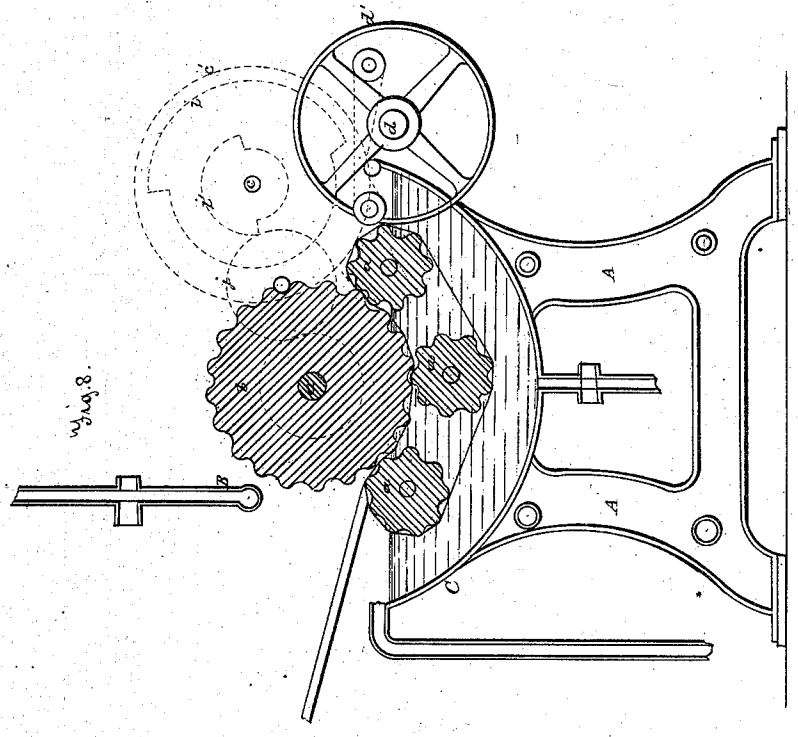

Fig. 8.

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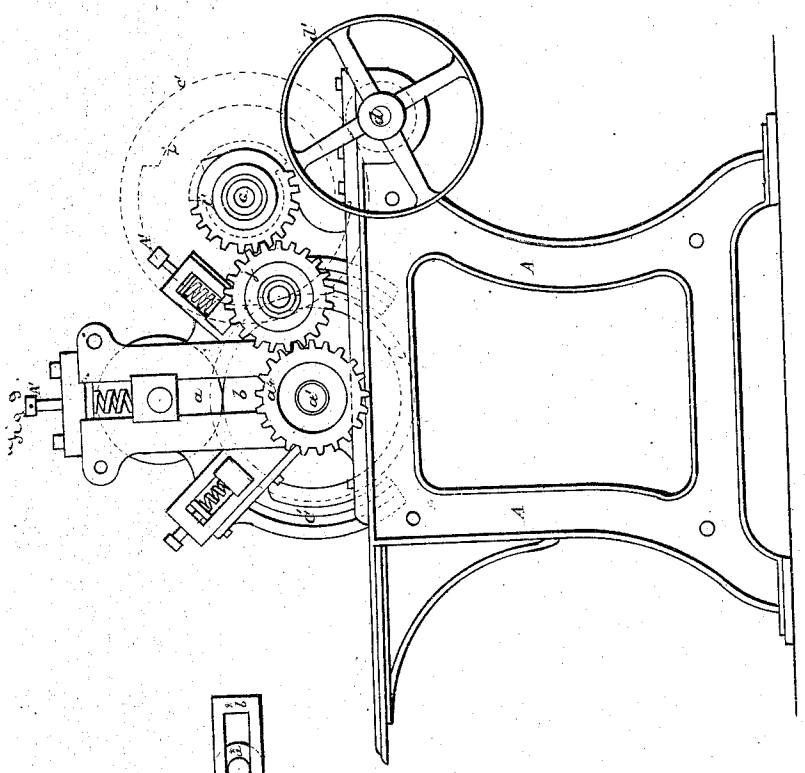

Fig. 9.

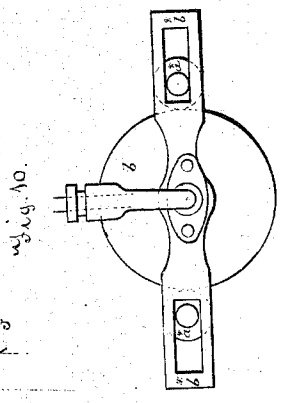

Fig. 10.

Witnesses
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EDWARD BRASIER, OF NEW CROSS, ASSIGNOR TO JOHN ELIOT HODGKIN, OF LIVERPOOL, ENGLAND.

Letters Patent No. 103,135, *dated May* 17, 1870.

IMPROVEMENT IN MACHINE FOR BREAKING, SCUTCHING, AND SEPARATING FIBROUS MATERIAL.

The Schedule referred to in these Letters Patent and making part of the same

I, EDWARD BRAZIER, of New Cross, in the county of Kent, England, engineer, have invented certain new and useful "Improvements in Machinery for Breaking, Scutching, and Separating Fibrous Materials, part of such machinery being applicable for glazing or calendering woven fabrics," of which the following is a specification.

This invention relates, first, to machinery for breaking, scutching, softening, discharging, and separating the fibers of fibrous materials (such as flax, hemp, China grass, and others) from the "boon," for the subsequent processes of bleaching, carding, combing, and spinning.

For this purpose I arrange, by preference, a series of three or more rollers around the circumference of a drum or cylinder of large diameter. I do not, however, confine myself to any particular number of such rollers, as one or other number may be employed.

The rollers and the drum or cylinder, thus arranged to work together, may be either plain, fluted or serrated, or may have corrugated teeth formed thereon, as may be found most suitable for the treatment of different kinds of fibrous materials.

A reciprocating rotary motion is communicated to the drum or cylinder by suitable mechanism alternately in opposite directions, the movement in one direction, or forward, being greater than in the backward direction.

The fibrous material to be operated upon is fed into the machine between the drum and the roller or rollers, upon its circumference, and after moving a certain distance forward the movement of the drum or cylinder is reversed by the action of the driving gear, so as to cause the fibrous materials to travel backward part of the distance it had previously been fed forward.

The drum or cylinder is then again caused to move the fibrous material forward the same distance as before, by which a portion of the fibrous material, after being operated upon by the rollers in opposite directions, is fed forward a given distance, and it is thus delivered from between the drum and rollers upon a frame of bars or a perforated surface, where it is subjected to the action of a revolving brush or beaters, in order to brush or beat out the refuse or woody particles separated from the fibers during their passage between the drum and rollers.

The fibrous materials may, if desired, be passed first through a machine of this character, in which the surfaces of the drum and rollers are serrated, fluted, or corrugated, and afterward through a similar machine having a drum and rollers with plain or smooth surfaces.

The revolving beaters may be made of vulcanized India rubber, or other elastic material, or they may be composed partly of beaters and partly of brush surfaces. Suitable feed-rollers or apparatus may be arranged to work in combination with the machinery previously described.

The forward movement of the fibrous materials may, if desired, be arrested for a time, whilst the brusher or beaters are allowed to act for a time upon the stationary fibrous material previously fed forward to be so acted upon.

When operating upon fleshy fibers, such as the aloe, or upon fibers combined with a considerable quantity of refuse matters, I prefer to discharge streams or jets of water upon the same as they pass over the surface of the drum or cylinder, or the rollers may be arranged to work on the under side of the drum or cylinder in a vessel containing water, an endless band being arranged upon the rollers to conduct the fibrous material below the surface of the water whilst under operation in its passage to and fro between the drum and rollers. The fibrous material may thus be subjected to a washing and discharging process, if desired.

The second part of my invention consists in arranging such machinery for glazing or calendering woven fabrics.

The drum and rollers, which in this arrangement have plain polished surfaces, are caused to rotate alternately in opposite directions, as previously described, the forward movement being in excess of the backward movement thereof.

The woven fabrics to be glazed or calendered are fed into the machine and operated upon alternately in opposite directions between the polished surfaces of the drum and rollers, so as to glaze or calender the same.

The said drum and rollers may be heated by steam or otherwise, in order to dry the fabrics as they pass between them, the position of the rollers being capable of variation in relation to the surface of the drum or cylinder, so that the fabrics may be caused to travel over a larger or smaller surface of the heated drum or cylinder, as may be found necessary for drying the same. The brush and beaters in this arrangement of machinery are dispensed with.

Description of the Drawings.

Figures 1 and 2 are elevations of the two opposite sides of my improved machine for breaking, scutching, and dressing fibrous materials.

Figure 3 is an end view of the same.

Figure 4 is a transverse vertical section on the line *x x*, fig. 1.

Figure 5 is a longitudinal vertical section on the line *y y*, fig. 3.

Figures 6 and 7 are side elevations illustrating

modifications in the mechanism for producing the reciprocating motion of the rollers.

Figure 8 is a vertical section of my machine, with parts arranged for softening and discharging the fibrous materials.

Figures 9 and 10 illustrate the machine adapted for glazing or calendering woven fabrics.

Like letters indicate same parts throughout the drawings.

The rollers *a* are arranged round the upper circumference of the drum or cylinder *b*, which is of a much larger diameter than the rollers.

The drum *b*, as shown in the drawings, is corrugated or fluted, the rollers *a* being also fluted or corrugated so as to gear with and be driven by the drum *b*.

I do not, however, confine myself to the use of such fluted rollers, but, as hereinbefore stated, may use rollers having plain surfaces, or otherwise, according to the nature of the fiber to be operated upon, and it may be necessary, where the said drum and rollers are not geared together, as shown, to impart motion thereto by ordinary toothed or other driving gear, as will be well understood.

The drum *b* is mounted on the shaft *a'*, and, in the machine illustrated in figs. 1, 2, 3, 4, 5, is caused to rotate alternately in opposite directions by the following mechanism.

Below the drum *b* is a second or intermediate shaft, *c*, which receives motion from the main driving shaft *d*, this shaft having suitable fast and loose pulleys mounted thereon, and the two shafts *c d* are geared together by the toothed pinion d^2, fixed on the shaft *d*, which takes into and drives the wheel *e'* fixed on the shaft *c*.

Upon the end of the shaft a^1 is a wheel, *e*, between whose flanges e^1 are fitted anti-friction rollers e^2 which turn on the pins e^3.

Upon the shaft below the wheel *e* is keyed the toothed sector *f*, and at the other end of the said shaft is the arm *f'*, below the wheel *g*, which is attached to the pinion *h*.

The said wheel and pinion turn together upon the stud *h'*, and the pinion gears into the pinion a^2 on the roller shaft a^1.

The wheel *g* has anti-friction rollers like those of the wheel *e*.

When the machine is working, the intermediate shaft *c*, which carries the sector *f* and arm *f'* through the driving shaft, is caused to turn continuously in one direction, and in one part of its revolution the sector *f* is in gear with the wheel *e*, the teeth of the said sector acting upon the friction rollers and moving the wheel (and with it the roller *b*) in the direction of the arrow 2, till the sector is disengaged from the said wheel.

Then the arm *f'* comes round to the wheel *g*, and, acting upon the friction rollers thereof, turns the said wheel, which, through the medium of the pinions *h* and a^2, moves the roller *b* in the direction of the arrow 3.

It will be obvious that, as the sector *f* has a number of teeth or arms, it will act upon the wheel *e* longer than the arm *f'* acts on the wheel *g*, and consequently the reciprocating motion of the rollers is longer in one direction than in the other, as hereinbefore stated.

The peculiar reciprocating motion of the rollers may also be produced by the means illustrated in fig. 6. In this modification of my machine the intermediate shaft *c* has at each end a toothed quadrant, one of which, *i*, gears with the toothed wheel a^3 on the drum-shaft a^1, causing it to revolve in the forward direction; the second toothed quadrant, *i'*, which, instead of being directly geared with a toothed wheel on the shaft a^1, communicates its motion thereto, through an intermediate toothed wheel, *j*, placed between the toothed quadrant *i'*, and a toothed wheel, a^4, on the shaft, a^1.

The backward or return motion of the rollers is less than that of the forward motion, for, in consequence of the introduction of the intermediate toothed wheel *j*, the radius of the second toothed quadrant *i'*, and the diameter of the second toothed wheel a^4 are less than those of the toothed quadrant *i* and the toothed wheel a^3, and as their surface contact is proportionately less, it follows that the amount of motion will be diminished in the same proportion.

In the arrangement of parts illustrated in fig. 7, the peculiar reciprocating motion of the rollers is obtained through the medium of the two pawls *k* k^1 and ratchet-wheels *l l'*.

The two ratchet-wheels, or series of ratchet-teeth, are arranged in opposite directions, and keyed upon the shaft a^1.

The lever *m*, which carries the pawls, is fitted to turn loosely on the said shaft outside the ratchet-wheels. The lever *m* is connected by the rod *n* to the eccentric *o* on the rotating shaft *p*, and this eccentric imparts a reciprocating motion to the arm *m*, thereby causing the pawls *k* k^1 alternately to engage with the ratchet-wheels *l l'*, and thus move the rollers alternately in opposite directions.

The pawl k^1 has an arm, k^2, which extends downward into contact with the piece *q*, fixed on the frame of the machine. This piece *q* is so formed and arranged in relation to the arm k^2 as to throw the pawl out of gear with the ratchet *l'* before the arm *m* has completed its backward movement, so that the backward movement is less than the forward movement, as required.

It is obvious that this excess of the forward over the backward motion at each successive change in the rotary motion of the drum and rollers will result in the fiber being gradually passed through the machine.

After passing through the rollers, already described, the fiber is caused to pass, by preference, between a pair of revolving fans or beaters, *r*, which are caused to rotate with considerable velocity by an endless strap or band, *s*, leading from a pulley, *d**, on the shaft *d*, the strap or band *s* being, for the sake of convenience, passed over a loose pulley, running at the side of the machine.

The fans or beaters are caused to run together by suitable gearing.

After passing between the fans or beaters, the fibrous material may, if desired, be passed between a pair of rollers, *t*, having plain surfaces, and actuated by an endless strap or band, or by a pinion, as shown.

From the rollers *t* the fibrous material is conducted onto the delivery-board *u*.

In place of employing a pair of beaters, arranged as previously described, the fibrous material may be delivered upon a frame of bars or perforated surface, upon which the revolving brush or beaters act to separate the refuse matter from the fiber.

In consequence of the reciprocating motion of the rollers *a* and drum *b*, as previously described, it becomes necessary that the fibrous materials operated upon should be fed into the machine in a suitable manner. For this purpose, in place of having a fixed feed-board, I employ an endless band or web, *w*, fig. 1, passing over two rollers w^1, and this band or web receives a reciprocating motion corresponding with the reciprocating motion of the rollers *a*, by means of an endless chain, w^2, passing around a chain-wheel fixed on the drum-shaft a^1, to and around a chain-wheel, w^3, on the axis of one of the rollers w^1. The web *w* is kept steady and free from "sagging" by passing it over a suitable board or frame, w^4, fig. 6.

In order that any hard or extraneous substance

which may be mixed up with the fibrous material being operated upon shall be allowed to pass through the machine without causing any derangement thereto, the rollers *a* are mounted in brasses, which slide in suitable bearings in the frames A, the requisite contact between the rollers and the drum being maintained by means of spiral or other springs capable of being adjusted by the set-screws A′, as shown.

In operating upon some descriptions of fibrous materials I employ jets of water, thrown upon the surface of the drum and rollers in the form of spray from the perforated pipes B.

Fig. 8 is a section of another modification of my invention for softening, washing, discharging, and separating fibrous materials.

In this arrangement of apparatus I place the rollers *a* on the under side of the drum *b*, in a suitable vessel or trough, C, and in order to conduct the fibrous materials effectually through the water, and to and fro between the rollers, I employ an endless band or web, D, passing over the said rollers.

Motion is communicated to the various parts of this machine in a similar manner to the one previously described, but for convenience of construction the different parts communicating motion are changed in position, the shaft *c* being placed at one end of the machine instead of at the lower part thereof.

The corresponding parts are indicated by corresponding letters of reference, the nature of which will be readily understood on examining the drawings, aided by the previous description thereof.

Fig. 9 is an elevation of a modification of the machine, arranged according to the second part of my invention, which has for its object the glazing or calendering of woven fabrics.

For the accomplishment of this purpose I employ a central drum or cylinder, *b*, as before described, the drum in this case being formed with a plain polished surface.

On the upper side of this drum, and in contact with it, I place a roller, *a*, mounted in suitable bearings, and capable of adjustment, as already described.

In addition to this roller I may employ two other rollers *a**, one on either side, (see fig. 10.) These rollers *a** are mounted in frames *b**, which vibrate on the axis of the drum *b*, their position in relation to the surface of the said drum being capable of variation by means of the curved slotted guides or arms C′, so that by elevating or depressing the frames and and rollers, the amount of surface of the drum *b* passed over by the woven fabric is increased or diminished as may be required.

In order that the process of drying the fabric may be efficiently performed, the axes of the drum *b* and roller *a* are made hollow, and fitted with suitable tubes and stuffing-boxes, through which steam or heated air, of the requisite temperature, is introduced, and as the amount of the drum surface passed over by the fabric may be regulated, as described, so that the drying of the said fabric may be effected with very great facility and accuracy.

All the rollers in this arrangement of parts are constructed with plain polished surfaces, and they are driven by similar arrangements of gearing to that already described in connection with the other parts of my invention.

d is the main driving-shaft, on which are mounted the fast and loose pulleys d^1. This shaft gears, by means of the toothed pinion d^2, with the toothed wheel *c′*, fixed on the intermediate shaft *c*, at each end of which is keyed a toothed quadrant or sector, the quadrant *i* being directly geared with the toothed-wheel a^3, which is keyed to the shaft of the drum *b*, and so imparts the forward motion thereto.

The toothed quadrant *i′* at the opposite end of the shaft *c* gears with the intermediate driving toothed-wheel *j*, which gears with the toothed wheel a^4, keyed on the shaft a^1, whereby the necessary return motion of the drum and rollers is effected, as hereinbefore described.

It will be seen by examining the drawings that the same arrangement of parts for the adjustment of the requisite amount of contact between the rollers and the drum are employed in this instance as in those previously described.

I claim as my invention—

1. A large central drum and a roller, or series of rollers, having either fluted, roughened, or plain surfaces, arranged in combination and geared together and moving to and fro upon their axes, and further in one direction than in the other, for the purposes set forth.

2. The said drum and rollers, in combination with the wheels *e* and *g*, the sector *f*, and arm *f′*, and the pinions *h* and a^2, or the equivalents of these parts, substantially as and for the purposes set forth.

3. The said drum and rollers, in combination with the quadrants *i* and *i′*, and toothed wheels a^3, *j*, and a^4, or their equivalents, substantially as and for the purposes set forth.

4. The said drum and rollers, in combination with the ratchet-wheels or teeth *l l′*, pawls *k* k^1, arm *m*, and fixed piece *q*, or their equivalents, and with the rod *n*, and eccentric *o*, or other means for operating the said arm, substantially as and for the purposes set forth.

5. The large central drum and the small rollers, operating with an unequal to-and-fro motion, produced by either of the arrangements of mechanism herein described, or by any other suitable means, in combination with the feeding devices and other parts of a machine for breaking, scutching, or otherwise treating fibrous materials, or for glazing or calendering woven fabrics, substantially as set forth.

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Witnesses:

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