

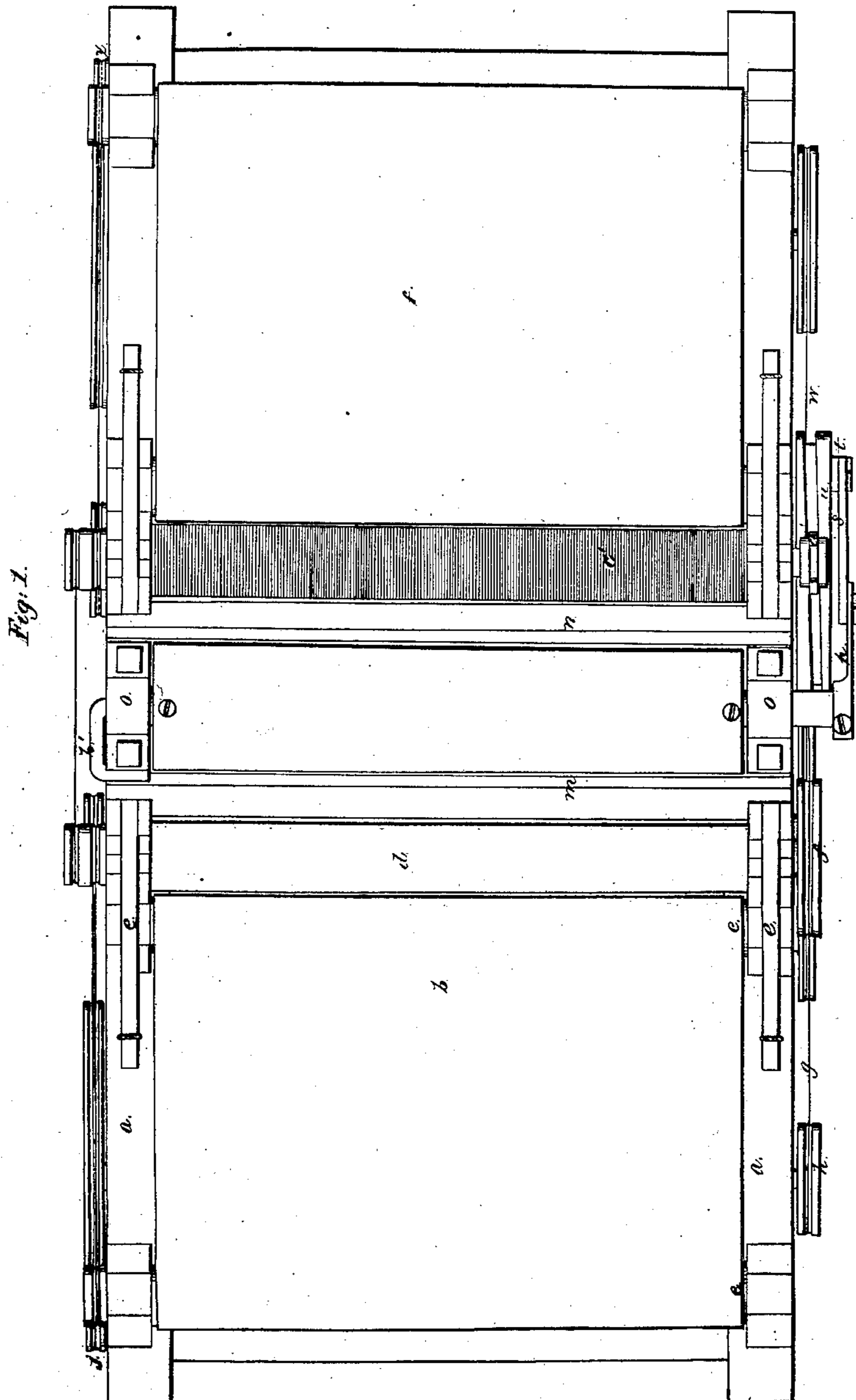
Sheet 1, 3 Sheets.

S. A. Clemens

Hemp and Flax Bracke.

$$\mathcal{N}^0 q, 60q.$$

Patented Mar. 8, 1853.



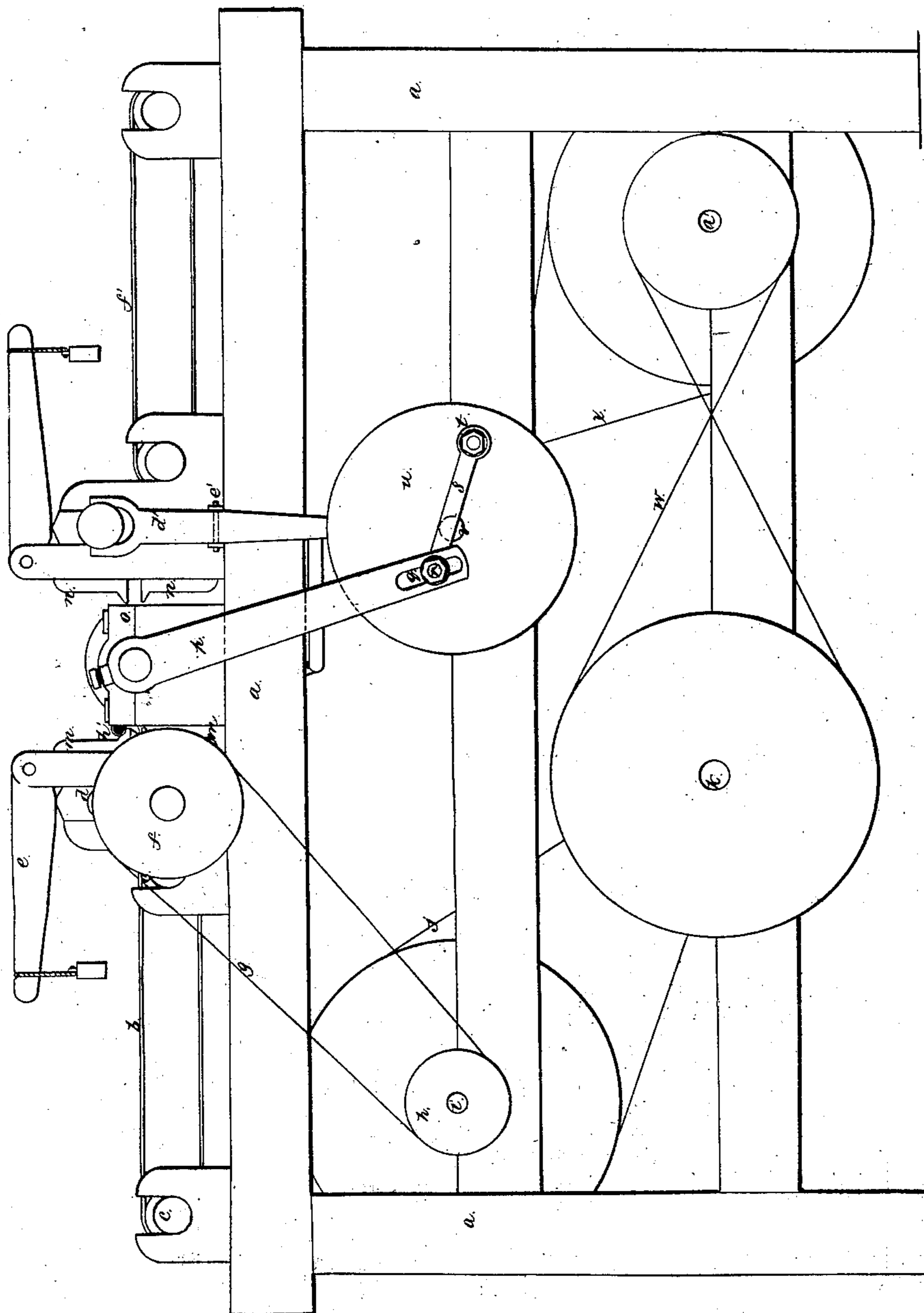
S. A. Clemens.

Hemp and Flax Brake.

N^o 9,609.

Patented Mar. 8, 1853.

Fig. 2.

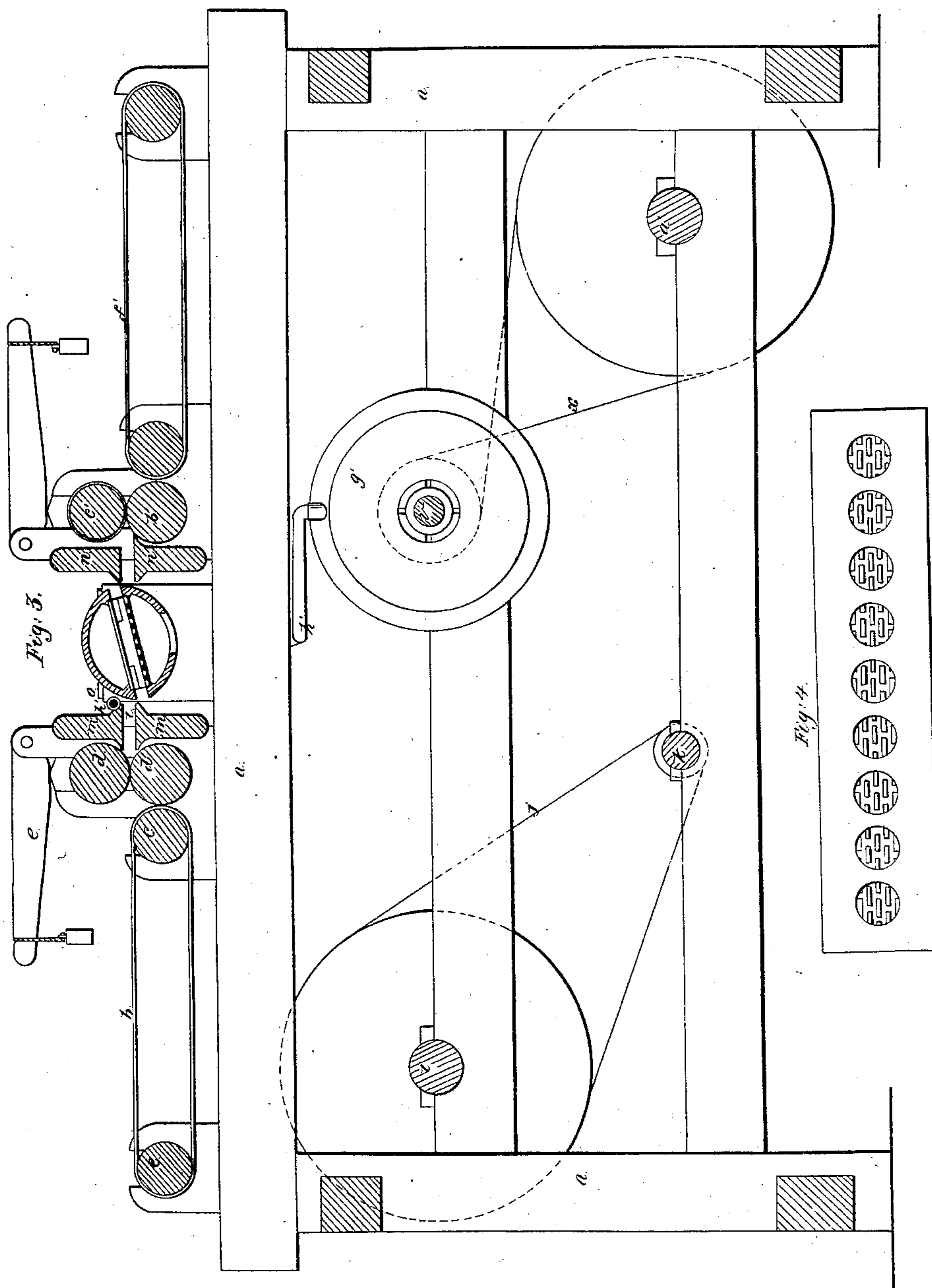


S. A. Clemens.

Hemp and Flax Brake.

 $N^2q, 60q.$

Patented Mar. 8, 1853.



UNITED STATES PATENT OFFICE.

S. A. CLEMENS, OF SPRINGFIELD, MASSACHUSETTS.

IMPROVEMENT IN MACHINES FOR BREAKING AND DRESSING FLAX.

Specification forming part of Letters Patent No. 9,609, dated March 8, 1853.

To all whom it may concern.

Be it known that I, STILLMAN A. CLEMENS, of Springfield, Massachusetts, have invented a new and useful Machine for Breaking and Dressing Flax, &c.; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a plan, Fig. 2 a side elevation, Fig. 3 a longitudinal vertical section, and Fig. 4 a bottom view, of the vibrating breaker and dresser.

The same letters indicate like parts in all the figures.

In my improved machine the substance to be broken and dressed is placed upon an endless apron, by which it is regularly supplied to the bite of a pair of feed-rollers, which pass it into a space between two rests, and thence to a space between the two opposite faces of a vibratory beater placed in near proximity to the rests, and which vibrates on an axis midway between the two faces and the two sets of edges thereof, that it may be balanced. From this the flax may pass between two other rests to the bite of two rollers, each of which is grooved in the direction of its periphery, the upper roller having, if desired, a longitudinal vibratory motion to open and soften the fibers and aid in removing all foreign substance. When the machine is, however, applied to the dressing of Spanish moss, which requires the fibers to be rubbed and opened before being submitted to the action of the beater, vibratory grooved rollers are placed between the feed-apron and the first pair of rests.

In the accompanying drawings, *a* represents the frame adapted to the purpose, but which may be varied at pleasure; and *b*, an endless apron passing around two rollers, *c c*, in the usual manner of mounting and working feed-aprons. The flax or other substance to be dressed is placed and spread by an attendant on this apron, which by its motion gradually presents it to the bite of a pair of feed-rollers, *d d*, the upper one of which is kept down in the usual manner of feed-rollers by pressure-levers *e e*, and the other provided with a pulley, *f*, to receive a band, *g*, from a pulley, *h*, on a shaft, *i*, receiving motion by a band, *j*, from the driving-shaft *k*. As the feed-rollers

carry forward the flax or hemp, it passes through a space, *l*, between two rests, *m m*, by which it is prevented from being carried up or down.

At some distance from the rests just above described there are two other like rests, *n n*, and between the two sets of rests is placed a beater composed of two flat faces, with a space between the two about equal to the space between either pair of rests. This compound beater is provided with journals at each end and hung in boxes *o o*, and one of the journals projects out far enough to have an arm, *p*, projecting downward from it. This arm has a slot, *q*, near its lower end, in which is secured the joint-pin *r* of a connecting-rod, *s*, that takes hold of a crank-pin, *t*, on a wheel, *u*, on the end of a shaft, *v*, that receives a rapid rotary motion from the main shaft by means of two bands, *w x*, and an intermediate shaft, *a'*.

From the connections above described it will be seen that a quick vibratory motion will be given to the double-faced beater, and that the extent of the vibration may be increased or decreased at pleasure by shifting the joint-pin *r* in the slot of the arm *p*. The edges of the beater for flax should vibrate within about one thirty-second of an inch of the edges of the rests. The distance should be greater for hemp, and, if desired, the rests can be connected with the frame by means of set-screws, so that the distance may be varied and adjusted at pleasure, and in some instances rollers may be substituted for the rests and become the equivalents thereof. The fibers separated from the woody parts pass between a pair of rollers, *b' c'*, which receive rotation by a band, *i'*, and are similar to the feed-rollers *d d*, except that each is grooved in the direction of its periphery, and the upper one receives, in addition to its rotary, a longitudinal vibratory motion in the direction of its axis by means of a lever, *d'*, hung on a fulcrum-pin at *e'*, one end of the said lever being forked and embraced by a collar on the end of the roller, the other end of the said lever being fitted to a cam zigzag groove in the periphery of the wheel *u*. The vibratory motion given to this roller, together with the grooved surfaces, has the effect to soften, open out, and separate the fibers of flax as they come

from between the rests; but ordinary rollers without longitudinal motion may be substituted. From these rollers the fibers are received and conducted off by an endless apron, *f'*, similar to the feed-apron before described.

For dressing Spanish moss and other analogous fibrous substances, to loosen the refuse coating of the fibers by rubbing before the action of the beater, I make and operate the pair of feed-rollers *d d* like the rollers *b' c'*.

On the shaft *v* are secured the vanes of a fan-blower surrounded by a casing, *g'*, the discharge-spout *h'* of which is carried up and curved around, so as to discharge a current of air above and between the two faces of the beater in the direction of their length and near the line of their action against the first pair of rests. The purpose of this current of air is to blow out the particles of wood and other foreign matter as these are broken and separated from the fibers; and, still further, to facilitate the discharge of the fragments of foreign matter, the lower face of the beater is pierced with numerous small holes, through which the small fragments escape. The back set of rests can be dispensed with, as the woody parts are thoroughly broken by the action of the beating-faces in connection with the first pair of rests, and the main object of the beating-faces back of the axis of vibration is to flip, whip, or toss the fibers to aid in separating the foreign substance—that is, in producing an action on the fibers resembling in some measure what would be produced by holding the fibers about the middle of their length in the hand and rapidly turning the wrist alternately in opposite directions; and this action is also important in aiding the progressive motion of the fibers through the space between the faces of the beater, for the tangent action of the faces forward of the axis of vibration aids the feeding motion, while their action back of the axis of vibration resists it, the two balancing each other, so that the feeding motion is not materially affected by the action of the beaters on the fibers. The flax being held by the bite of the feed-rollers, which forces it forward with a regular and positive motion between the two fixed rests, presents it to the action of a double-faced beater, which vibrates with a rapid motion in a curve, so that the beating-edges are nearest the rests when at the middle of their motion, and gradually receding from and approaching them in the vibration, by means of which and the close proximity of the beating-edges and rests the woody part of the flax is broken and beaten into small, nay, minute fragments, while the harl is pressed and flattened in such manner as to lead to the inference that the small fragments of wood were forced out laterally by compression when the harl is pressed and flattened by the action of the beater, and as one beating-face strikes the flax the other in receding from the rests affords room for the escape of the woody fragments.

Another important action of the double-

faced beater arises from the vibration on an axis midway between the two faces and midway between the two pairs of beating-edges, so that in the rapid vibration on this axis thus located the flax is flipped or shaken, the upper face beating down forward of the axis and the under face beating up back of the axis, and vice versa, on the return motion, so that the fibers are loosened and the remaining fragments shaken out, and without any serious or injurious strain on the fibers.

I am aware that machines for breaking flax and hemp have been made with double swords or breakers one above the other, and hung in a gate or frame having a rectilinear reciprocating motion to act on the flax in both directions; but the mode of operation and the action of these on the flax in some respects are different from mine. In the first place the swords or breakers are made beveling—that is, thinnest at the striking-edges and thickest at the back—or wedge-formed in the cross-section. They are placed at a comparatively great distance from the rest, and cannot from their form be put so close as to have the desired action on the flax in passing the plane of the rests, for then the backs, which are much thicker than the edges, could not pass, and if placed near enough, as they do not recede from the rest in their vibrations, (as in mine,) but rather approach by reason of their beveled form and the rectilinear motion, the feeding motion will be either impeded or the machine choked; but the leading and characteristic difference is to be found in the fact that on my plan the beaters in their vibration alternately approach and recede from the rests, while the double swords or beaters moving in a straight line do not. This produces a different action on the flax, &c. On the old plan the swords in descending below the rests draw the flax down, and what is not crushed or broken by this downward motion will not be by the return upward motion, for what will be uncrushed between the swords and the rests in moving down will leave room for the return motion, the space between the swords and rest being the same during the entire operation; but on my plan as the flax is drawn down the beaters recede from the rests, and in returning they gradually approach the rests, and thus crush and squeeze out the woody particles from the fibers, producing much the same action as if the flax were grasped by both hands and bent alternately in opposite directions, while the hands are forced toward each other. It is this approaching and receding action, together with the rapid vibration and comparatively close relations of the beaters to the rests, which produces the improved result.

I do not claim, therefore, as my invention simply the double action of beaters, as that is well known in a great variety of machines for various purposes.

What I do claim as my invention, and desire to secure by Letters Patent, is—

1. The method of breaking and dressing flax

or other fibrous substances by a beater constructed in the manner described, (vibrating on a central axis,) between the faces of which the flax, &c., passes, as described, when this is combined with one or two pairs of rests placed in close proximity to the edges of the beaters between which the flax passes, substantially as described.

2. In combination with the beater and rests for breaking and dressing, as described, the employment of a pair of rollers each of which

is grooved in the direction of its periphery, and one of which is made to vibrate in the direction of its axis, for the purpose of opening and softening the fibers, substantially as herein described.

S. A. CLEMENS.

Witnesses:

CHAS. M. KELLER,
CHAS. N. BAMBURGH,
H. C. BANKS.