Sheet 1. 2 Sheets.

Hedge & Johnson,

Circular Saw Mill,

No. 2,677. Patented June 18, 1842.

Fig. 1.

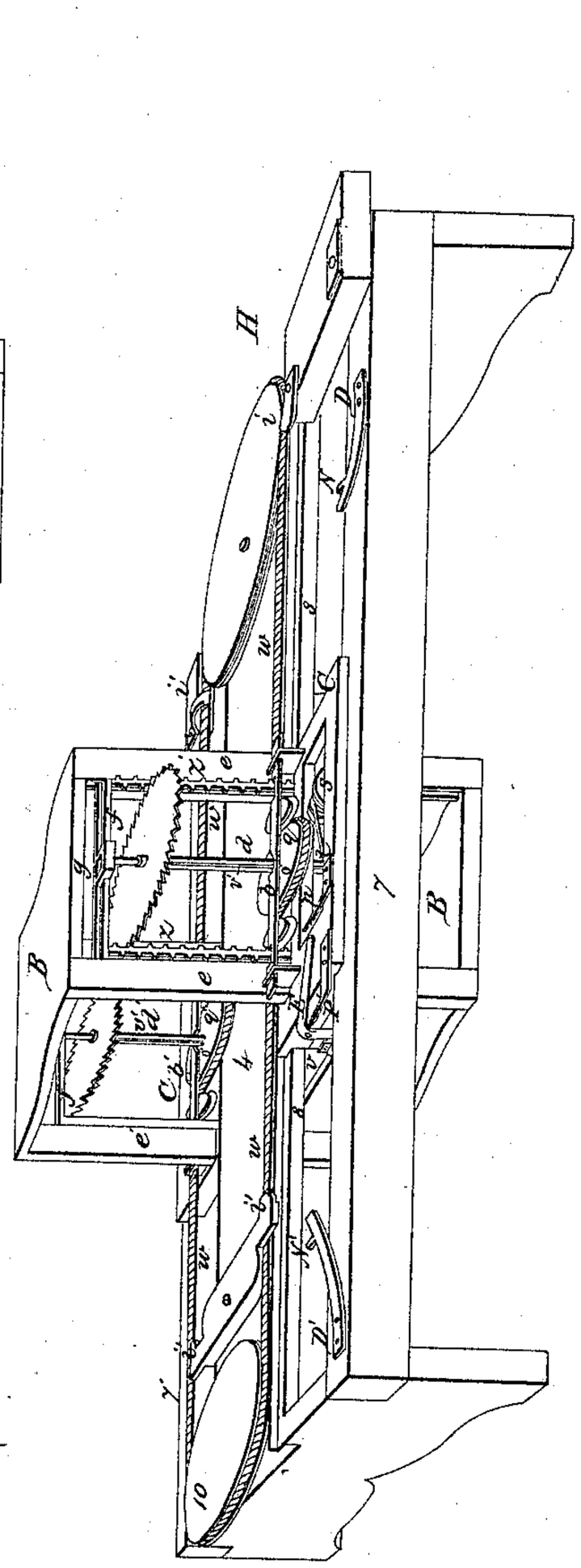


Fig. 2.

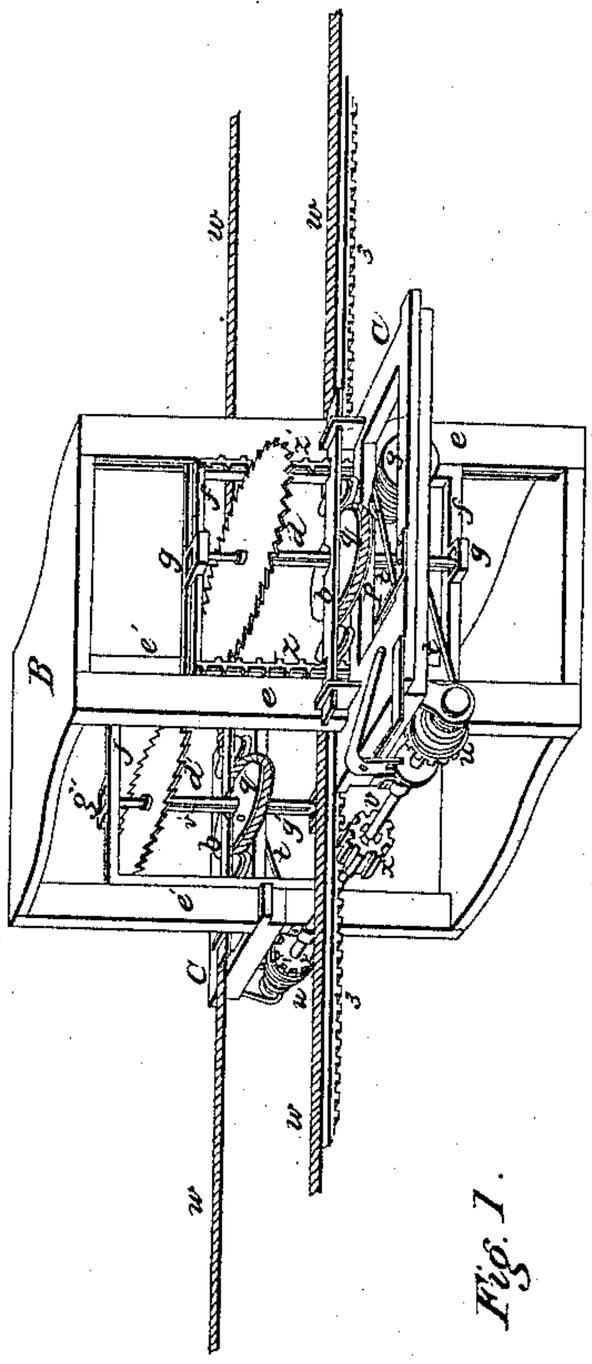
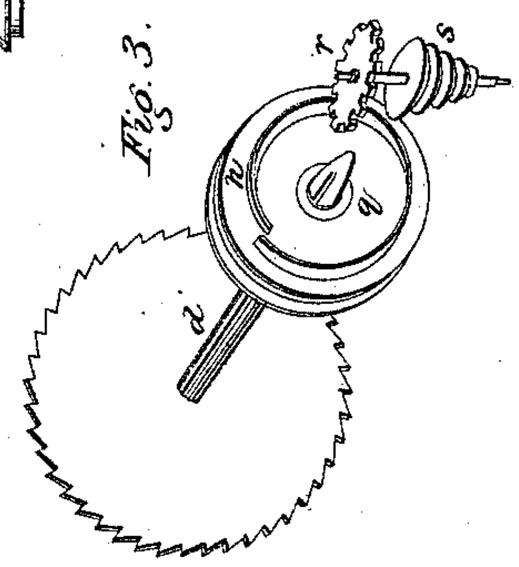


Fig. 3.



Inventors:
Samuel Hedges
Edwin F. Johnson

Sheet 2-2 Sheets.

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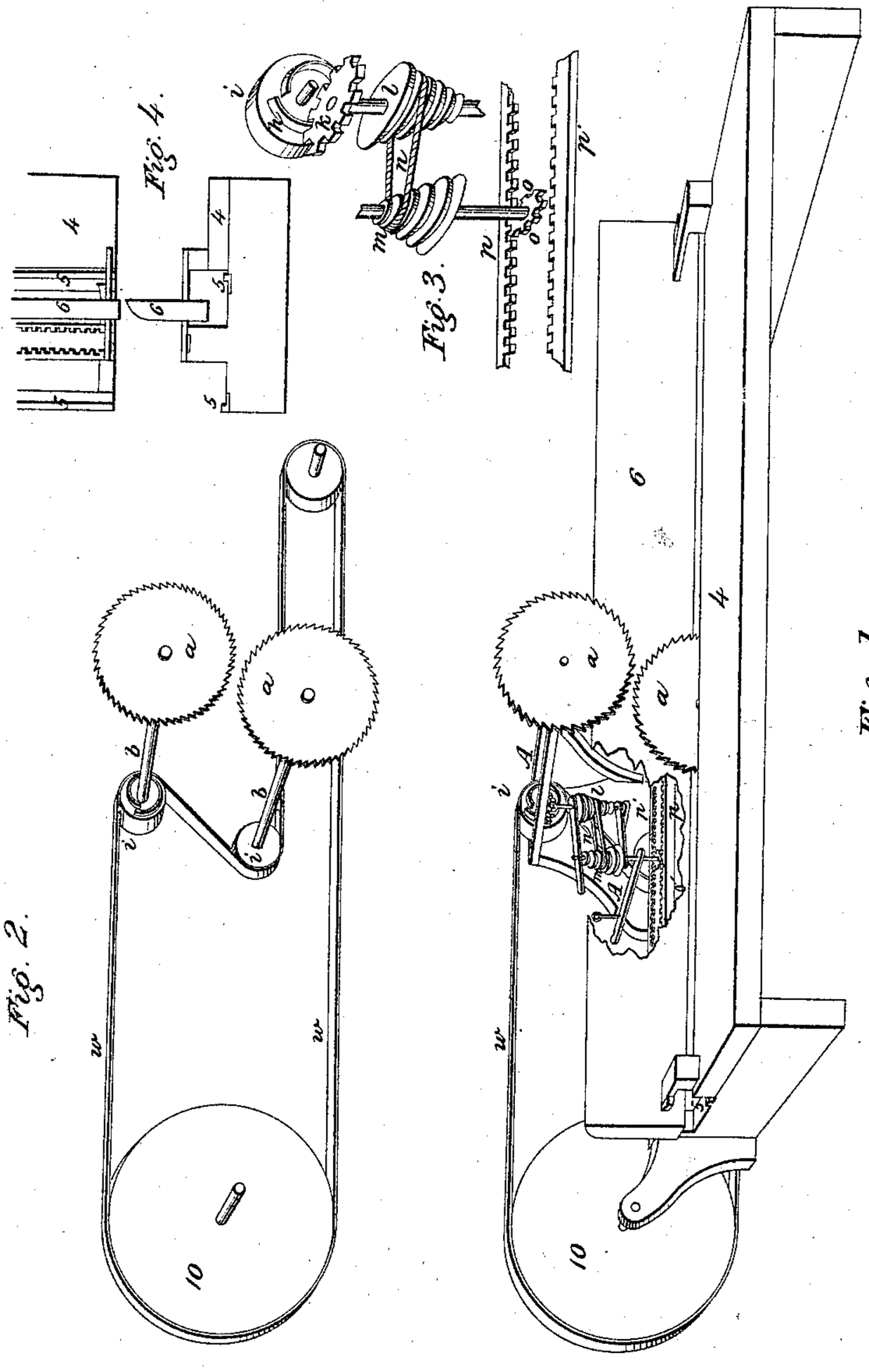

Inventors:
Samuel Hedge
Edwin F. Johnson

UNITED STATES PATENT OFFICE.

LEMUEL HEDGE AND EDWIN F. JOHNSON, OF NEW YORK, N. Y.

SAWMILL.

Specification of Letters Patent No. 2,677, dated June 18, 1842.

To all whom it may concern:

Be it known that we, LEMUEL HEDGE and EDWIN F. JOHNSON, both of the city, county, and State of New York, have invented a new and Improved Mode of Constructing Mills or Machines for Sawing all Kinds of Timber, a full and exact description of which is as follows, reference being made to the annexed drawings, which are intended to constitute a part of this specification.

This invention consists principally in combining circular saws in pairs, each pair to revolve in the same plane, which may be either vertical, horizontal, or inclined at any intermediate angle; but, as the positions in which the saws will be used for all ordinary purposes will be either vertical or horizontal, the machinery proper for their action in these two positions only, will be described in this specification, and to render the description more distinct, we will denominate the vertical position, the first case, and the horizontal position the second case; a single pair of saws being represented in each case. In case 1st, the two saws must be so placed, one above the other *a*, *a*, drawing No. 1, Figures 1 and 2 as that the periphery, or cut of each, shall reach, or meet that of the other. To prevent collision one of the saws is placed a little in advance of the other. The saws in this case are placed each at the end of its axis or arbor *b*, *b*, and revolve in boxes inserted in the movable frame A, A, two boxes to each arbor, one situated at the opposite end from the saw, and the other on the same side of the saw, but as near to it as circumstances will permit. In case 2nd, No. 2, Figs. 1 and 2, the pair of saws retain precisely the same relative positions to each other, but their arbor *d*, *d*, being vertical require a different frame work to support them. In this case the rectangular frame B, B, is used.

Within each of the two pairs of upright pieces *e*, *e*, *e′*, *e′*, of this frame, another frame *f*, *f*, each designed to support one of the saws is fitted to slide vertically in grooves made in the said upright pieces *e*, *e*, *e′*, *e′*. The saw arbors *d*, *d′*, are sustained in their places in these sliding frames by the boxes *g*, *g*, *g′*, *g′*, in which the arbors revolve. To give additional base to the rectangular frame B, B, and to accommodate the apparatus for moving and feeding the saws, to be subsequently described, the two wings C, C, are added. The drawings it is believed will sufficiently illustrate the construction of these parts.

The saws, together with the frames to which they are attached have a progressive motion from end to end of the log or timber sawed, forward and backward, alternately, cutting each way, the log remaining stationary or having no endwise motion. This progressive motion is obtained in case 1st by means of a bar of metal *h* No. 1 Figs. 1 and 3 arranged in a spiral form, or in a form similar to the involute of a circle, attached to the pulley *i*, of one of the saws. This spiral bar plies into the teeth of the wheel *k*, causing it to advance one tooth or more at each revolution of the pulley *i*. To the axis of the wheel *k*, the conical pulley *l*, is fixed, and consequently revolves with it, and drives the corresponding conical pulley *m*, by means of the belt *n*. To one end of the axis of the pulley *m*, the pinion *o*, is fixed. These parts are shown on an enlarged scale at Fig. 3. This pinion together with the conical pulley *m*, attached to the same axis, is so constructed as to admit of a vibratory motion sufficient to bring the pinion *o* alternately into and out of gear with each of the racks *p*, *p′*. Thus when the pinion *o*, is geared with one of the racks *p*, if a rotary motion be given to the driving pulley *i* which carries the spiral *h*, it will drive with it the wheel *k*, and the pinion *o*, which acting in the rack *p*, will necessarily give a progressive rectilineal motion to the frame A, A, with all the fixtures attached to it, in one direction. If the pinion *o*, be now changed by its vibratory motion, and geared into the other rack *p′* it is evident that a like motion will be given, but in the contrary direction. This change may be performed by hand or by a self acting apparatus arranged for the purpose. In case 2nd the movement above described is modified by applying a spiral similar to that shown at *a*, to each of the driving pulleys *q*, *q′* in such a manner as that they will drive their respective toothed wheels in directions contrary to each other. These parts for one of the saws are represented on a larger scale at Fig. 3, No. 2, where the position is changed to show the the spiral *h*, this being situated on the underside of the pulleys *q*, *q′*, when in their proper positions. To the axes of the wheels *r*, *r′*, the conical pulleys *s*, *s*, are attached, which by means of

the belts t, t, drive their corresponding conical pulleys w, w'. The pulleys u, u' revolve loosely, at the ends of the shaft v, which serves as an axis for them.

The pinion x is attached to the shaft v, and is made to ply into the teeth of the rack 3, which for convenience is made fast to the underside of the platform 4, not yet described, and when thus acting the progressive motion of the frame B, is effected. Instead of one pinion and one rack, two may be used, placed at the ends of the shaft v, the racks being attached to the side timbers 7, 7′. Inclosing the shaft v, is a tube extending nearly the whole distance between the pulleys u, u', with openings in it for the arms of the pinion x. This tube is movable upon the shaft v, endwise by means of the bent lever E, and is provided with rods or arms 2, 2′, at each end, which alternately clutch into the teeth 1, 1, &c., formed on the inner face of both the pulleys u, u'.

It will now be understood that when the arms of the tube are clutched with one of the pulleys u that pulley will give to the shaft a rotary motion corresponding with its own, which causes the pinion x, acting in the rack 3, to drag with it the frame B, B, together with the apparatus attached to it, rectilineally in one direction, and when clutched with the pulley u', at the opposite end of the shaft, it will necessarily propel the frame B, B, in an opposite direction corresponding with the movement of the pulleys u, u' as described above. The endwise movement of the tube must be sufficient to allow it to be unclutched at the same time from both the pulleys, in which condition the frame B, B, with its apparatus will have no progressive motion. The clutching movement may be performed by hand, or by a self acting apparatus as hereinafter explained.

The platform 4 to sustain the log to be sawed, should be of sufficient width to receive the log, and of sufficient stiffness to sustain it, and of a length so much greater than that of the log as to allow the saws to pass clear of the log. The arrangement of the ways for giving support and direction to the frames of the saws differ somewhat as applied to one or the other of the two cases, as will appear by reference to 5, 5. Fig. 4 No. 1 case 1 which shows a plan and elevation of these parts and to 7, 7′, and 8, 8′, Fig. 1 No. 2, case 2nd. In case 2nd the thickness of the stuff sawed is effected by changing the position of the saws as hereafter described. In case 1st it is accomplished by giving at each interval between the cuts, a lateral movement to the log; the amount of this movement is determined by the position given to the movable fence 6, which is placed in the rear of, and has its plane parallel to that of the saws. This fence is supported in such manner as to allow the axis of the lower saw to pass along freely under its lower edge and that of the upper saw over its upper edge.

The change in the position of the saws in case 2nd corresponding to the thickness of the stuff sawed is effected by the aid of the graduated racks z, z' which are fixed vertically to the sides of the sliding saw frames f, f. The sliding saw frames f, f, are supported by one tooth of each rack resting upon the horizontal sliding bolts b, b'. In the intervals of the passage of the saws through the log, an endwise movement is given to each of these bolts by which the teeth of the racks resting upon them are disengaged, and the next teeth above on the opposite edges of the racks, are brought to bear upon the bolts in consequence of the descent or falling of the sliding frames to which they are attached. The total endwise movement of the bolts each way, is but the length of one of the teeth, by which means the downward motion of the frames is certain to be arrested by the next teeth above, and held by them until the bolts are again moved the opposite way. It may now be understood that at the commencement of operations on a log, the saws are placed so near the top of the log as that their first passage through it will take off a slab of the proper thickness, and that previous to every subsequent passage of the saws through the log, the sliding saw frames with the saws must drop in the manner just described the required thickness of the stuff to be sawed, which is determined by the vertical distance from each other of the teeth upon the racks, the log during the whole time remaining stationary, and the stuff being removed by the attendant as fast as sawed.

The revolving or cutting motion of the saws is communicated to them by means of the belt w, w, passing around the main drum or first mover 10, to, and around the driving pulleys i, i, and q, q', of the saws as exhibited in the drawings. This arrangement of the belt in both cases secures an equal tension and pressure upon the pulleys in all positions of the frames A, A, and B, B. It insures also the revolutions of the saws in their proper directions. The rotary motion in case 2nd is communicated from the driving pulleys q, q', to the saws by means of the tooth or pin o' fastened to the pulleys and entering the grooves v', v', formed longitudinally in the saw arbors d, d, to receive them, thus permitting the saws with their arbors to rise or fall without affecting the bearing of the pins in the grooves. In this case the pressure caused by the belts upon the pulleys is not communicated to the saw arbors in consequence of the interposition of thimbles or collars between the pulleys and the arbors, which thimbles or col-

lars are made fast to the wings C, C. In case 1st the driving pulleys *i*, *i*, are represented in the drawings as made fast to the saw arbors.

To render the dropping of the saws in case 2nd self acting, requires that the barriers *i'' i'' i'' i''* be fixed to the platform at the proper points, so as to force back the bolts *b*, *b'*. This action does not take place until after the saws have left the log. The change of direction in the progressive movement of the saws, or of the frame B, B, is made self acting by an arrangement as follows: In Fig. 1 No. 2 case 2 the arm of the bent lever E, which works the clutches, is represented as raised. The tube inclosing the shaft *v*, is consequently clutched with the pulley *u*, and the frame B, is moved in the direction H. When the cut of the log in that direction is completed, the spring D, which is attached to the frame 7, is pressed upward by an inclined plane P, attached to the wing of the frame B, acting upon a tooth or projection N, of the spring D. When this tooth or projection passes the summit of the plane, the spring D, instantly resumes its original position, bearing with it in its descent the end of the bent lever E, and consequently forcing the tube to which the opposite end of the lever is attached, away from the pulley *u*, and causing it to clutch with the pulley *u'*. This latter pulley having a motion opposed to that of the pulley *u*, the frame B, B, instantly begins to move in the opposite direction from H, and continues this motion until the cut of the log is again completed, when the inclined plane P' attached to the frame B, acting upon the tooth or projection N' of the spring D' forces down the spring. When this projection N' passes the foot of the plane P', the spring D', is suddenly liberated and resumes its original position and forces upward the arm of the lever E, unclutching the pulley *u'*, and clutching the other pulley *u*, when the motion of the frame B, is again reversed and is carried toward H.

The system of conical pulleys mentioned under the preceding heads have their use in regulating the quantity of feed for the saws, or in other words, in limiting the velocity of the progressive motion of the frames A, A, or B, B. Through their means also, as is fully represented in case 2nd a different velocity may be given to the frame when moving in opposite directions, to accommodate the different circumstances under which the saws act, in the one case cutting in the direction of the grain or fiber of the timber, and in the other against it.

The description above given supposes the frames A, A, or B, B, containing the saws to have a progressive rectilineal motion, and the log or timber sawed to remain stationary. This is one mode of operating the machine, another mode consists in giving to the log, or rather to the platform on which it rests a progressive motion, the saws having no other motion than the rotary one upon their arbors, and the change of position necessary to conform them to the thickness of the stuff sawed. Under this arrangement the motion is transmitted from the pulleys on the saw arbors to the platform on which the log rests in the same manner in which it is communicated to the frames A, A, or B, B, as described above. The mode of effecting a change in the direction of the motion being performed also in the same manner either by hand or by the self-acting apparatus as above described.

We claim and desire to secure by Letters Patent the following improvements:

1. The apparatus, self-acting or operated by hand, by which the saws after having completed a cut one way through the timber, are moved in the direction of their axes the requisite distance suited to the thickness of the stuff sawed before commencing the cut in the opposite direction; that is to say we claim the graduated racks *z*, *z*, on the saw frames, and sliding bolt in combination with the saws as herein described.

2. The mode by which the pressure of the driving belt upon the saw pulleys is made to bear upon a thimble or tube inclosing the saw arbors and not upon the arbors themselves, as herein described.

3. The mode of communicating the motion from the saw pulleys so as to produce a progressive motion in the saws and the frame which supports them, or in the platform on which the timber to be sawed rests, in combination with the mode of changing or reversing that motion in the intervals of completing and commencing the cut each way, by an apparatus self-acting or worked by hand, as herein described.

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Witnesses:
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