(No Model.) 3 Sheets—Sheet 1.

S. COX.

MACHINE FOR MAKING CONVEYER FLIGHTS.

No. 328,013. Patented Oct. 13, 1885.

Fig. 1. Fig. 2.

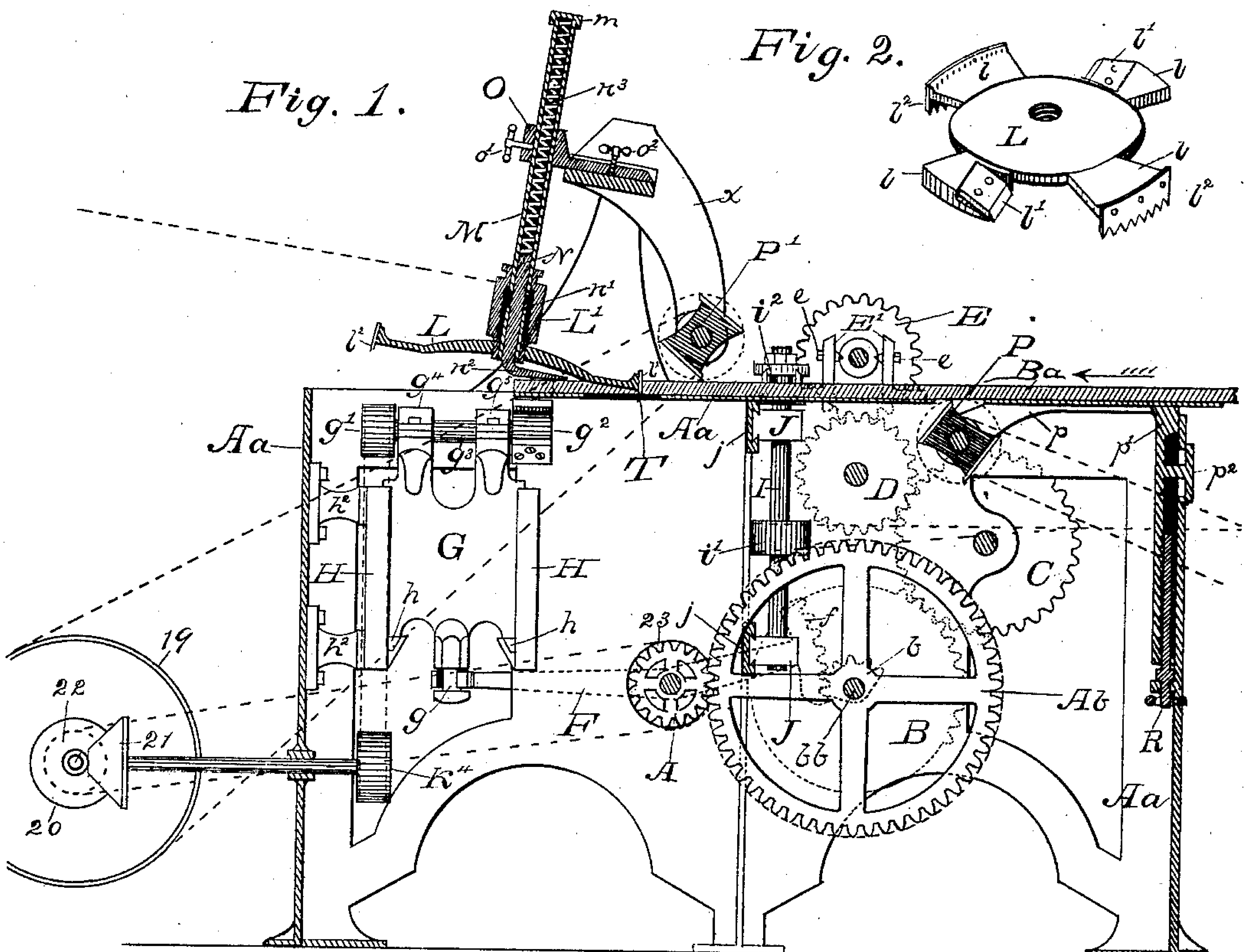

Fig. 3.

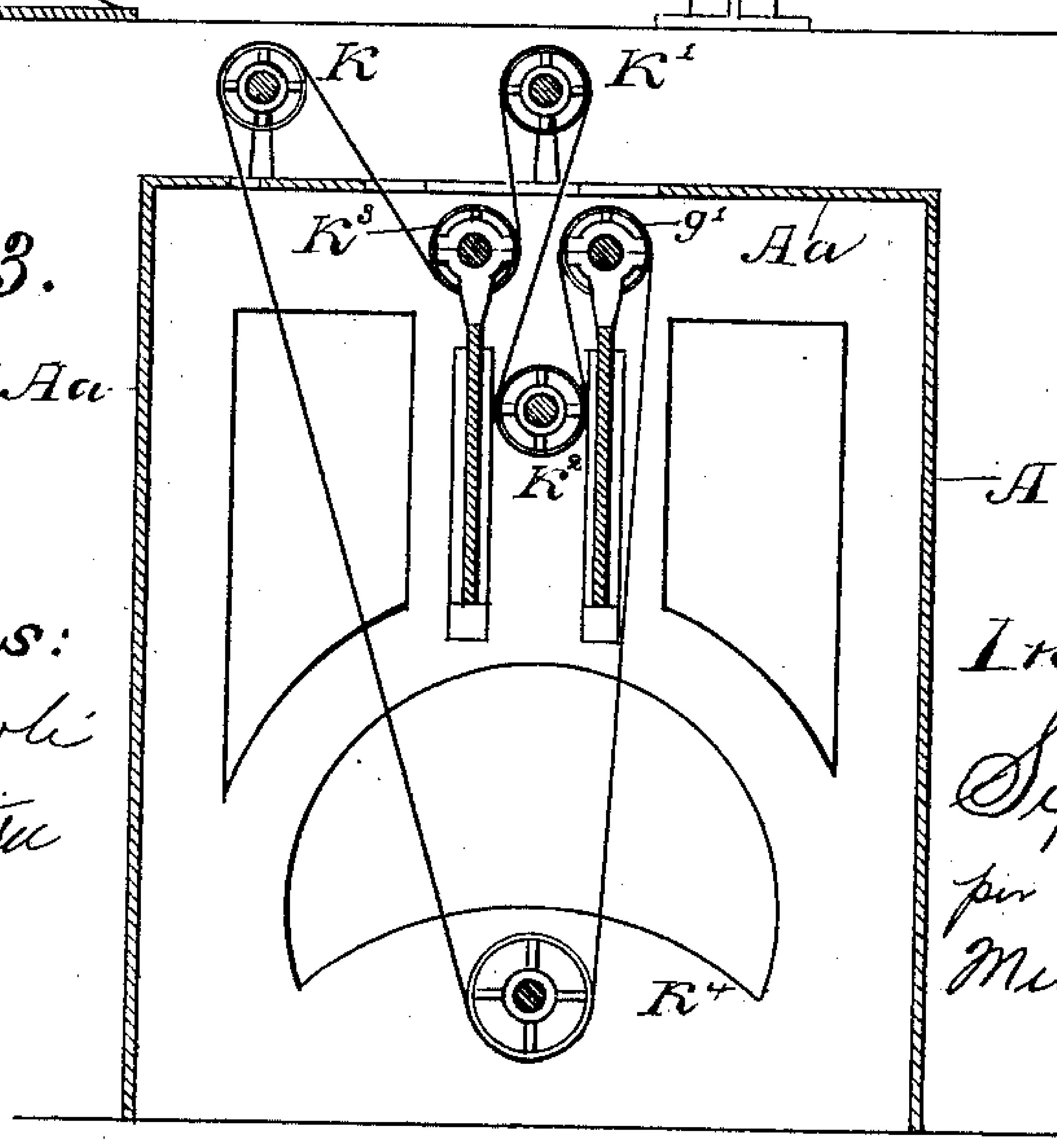

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Fig. 4.

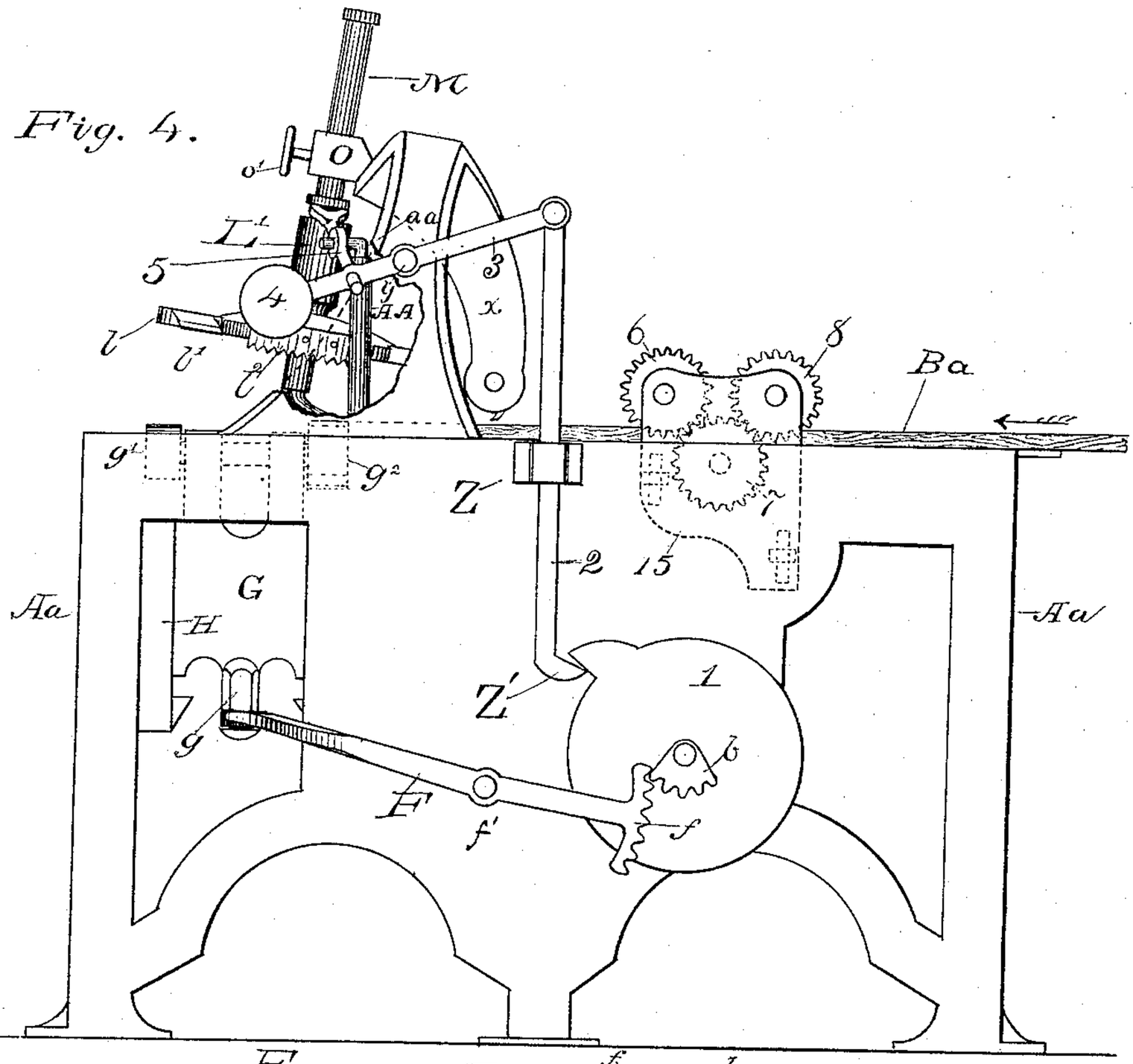
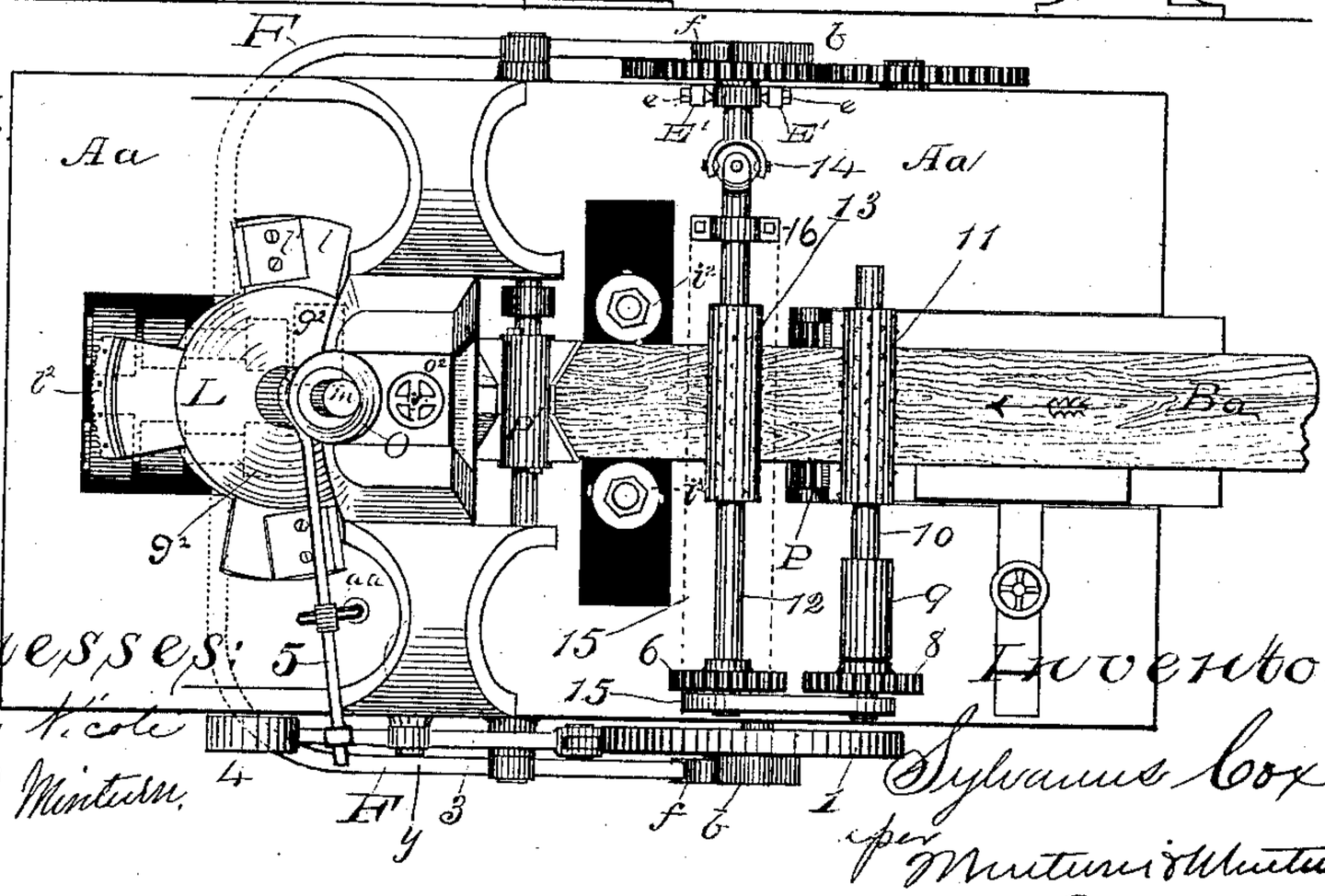


Fig. 5.



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(No Model.) 3 Sheets—Sheet 3.

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MACHINE FOR MAKING CONVEYER FLIGHTS.

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Fig. 6.

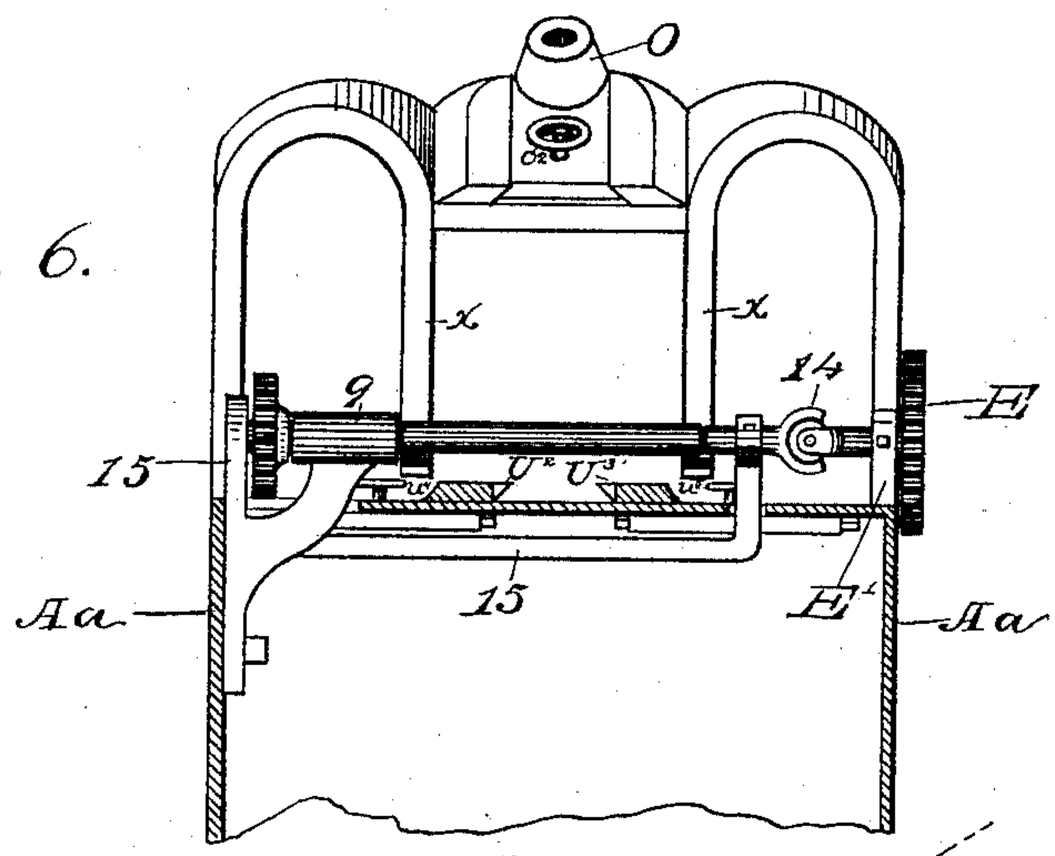
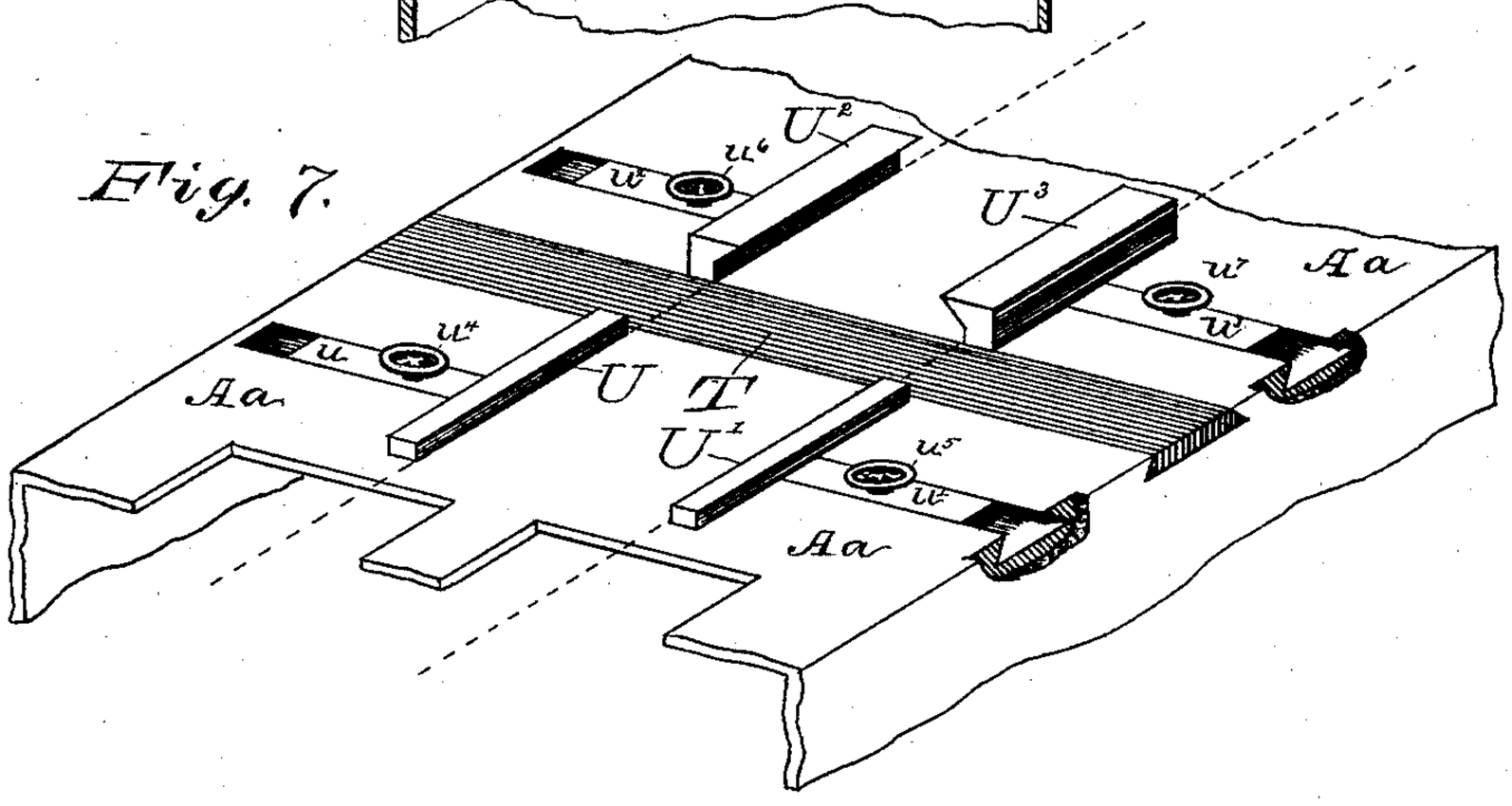


Fig. 7.



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UNITED STATES PATENT OFFICE.

SYLVANUS COX, OF INDIANAPOLIS, INDIANA.

MACHINE FOR MAKING CONVEYER-FLIGHTS.

SPECIFICATION forming part of Letters Patent No. 328,013, dated October 13, 1885.

Application filed March 3, 1884. Serial No. 122,904. (No model.)

To all whom it may concern:

Be it known that I, SYLVANUS COX, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented a new and useful Automatic Machine for the Manufacture of Conveyer-Flights, of which the following is a specification.

My invention relates to improvements in the manufacture of conveyer-flights, in which the material, when fed into the machine in rough strips, is shaped automatically into perfect flights for flour-mill conveyers.

The objects of my invention are to dispense with hand-labor and cheapen the cost of constructing the flights. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a vertical sectional view of my entire machine. Fig. 2 is a perspective view of the cutter-head for beveling the ends and cutting off the flights. Fig. 3 is a vertical section across the end of the machine, showing the arrangement of the pulleys and belts which run the movable tenon-heads. Fig. 4 is a side view of machine, with the frame supporting the oblique cutter-head L broken away to show the arrangement of the levers for raising the head. This figure also shows the mechanism for raising the tenon-heads g^2. Fig. 5 is a top view of the machine. Fig. 6 is an end view of the frame supporting the oblique and beveled cutter-heads, with the cutters removed; also, a vertical section of a part of the body of the machine, showing the brackets and bearings for the feed-rolls. Fig. 7 is a perspective view of a portion of top of machine, showing the guides and the safety-strip.

Similar letters refer to similar parts throughout the several views.

A*a* is the frame or body of the machine, and B*a* the material to be made into conveyer-flights, said material being fed into the machine in the direction of the arrows. The belt (shown by dotted lines running from the pulley 22, Fig. 1) turns the pulley 23. These may be cone-pulleys to regulate the speed of the machine.

The pinion A is keyed to the same shaft as the pulley 23, and revolves with it. The pinion A gears into the wheel A*b* on the shaft *bb*. This shaft *bb* extends through the machine, and has its bearings at each end in the frame A*a*. It extends beyond the frame on each side of the machine, far enough on one side to receive the wheel B and intermittent gear *b*, (shown in dotted lines, Fig. 1,) on the other side far enough to receive the lugged wheel 1 and intermittent gear *b*, Fig. 4, all of which are keyed firmly to the shaft and receive their motion through the gears A and A*b*. The object of the wheel B on the end of shaft *bb*, Fig. 1, (shown in dotted lines,) is to transmit an intermittent motion to the feed-rolls 11 and 13, Fig. 5. These rolls feed the rough material into the machine as it is needed, and the intermittent motion which is given them is very important, as will be fully explained hereinafter. I secure this intermittent motion by the peculiar form of the wheel B, as shown in dotted lines in Fig. 1, in which, instead of making the cogs to extend around the entire circumference of the wheel, I make them to extend only a portion of the way around—as one-third or one-fourth—or such part as I may find necessary. These cogs mesh into others on the gear C, and thence through the wheel D the motion is transmitted to the wheel E on the end of the shaft 12, Fig. 5, to which shaft the feed-rolls are secured. The train of gears 6, 7, and 8 transmits the motion from the shaft 12 to the shaft 10. A second feed-roll, 11, is fixed on this said shaft 10. These feed-rolls are of the ordinary form for wood-work.

As the material B*a* to be made into flights varies in thickness, it is necessary to so construct the feed-rolls that they may be raised and lowered to accommodate the varying thickness of the stuff. To accomplish this I make the universal joint 14 in the shaft 12, and swing the journal-box next the wheel E on the pivots, as shown at E′ E′ *e e*. The gear-wheel E is placed directly above the gear D in order that the slight tipping of the wheel E occasioned by raising the opposite end of the shaft 12 will not interfere with the working of the gears D and E. The extreme end of the shaft 12, opposite the gear E, is journaled in the adjustable plate 15, as is also one end of the shaft 10. The journal-box 16, near the universal joint 14, is rigidly connected with the movable plate 15 by an arm or bracket running beneath the bed of the machine. (See Figs. 5

and 6.) The long bearing 9 for the shaft 10 is connected by an arm or bracket in a similar manner to the movable plate 15, (Figs. 5 and 6.) The bearing 9 is made long in order to give a solid support to the shaft 10. The opposite end of 10 is not supported. The plate 15 has vertical slots with clamping-screws, and when the plate is raised and lowered the feed-rolls will be raised and lowered in like manner, and will remain parallel at all times with face of the bed A*a*. The object of the universal joint and pivoted journal-box is plainly seen from the foregoing description.

The material for making the flights is fed into the machine in rough strips B*a*, and first comes in contact with the cylinder P, which in construction is similar to the common planing-cylinder. This head planes the under side of the strip B*a*, and is operated by the belt shown in dotted lines. The cutter is attached by the brackets *p* to an adjustable bed, which can be raised and lowered by means of the screw R, Fig. 1. After the strip B*a* leaves the cutter P it comes in contact with the two cutters i^2 and i^3, Figs. 1 and 5, which dress it down to the proper width. These cutter-heads are fastened on the upper end of the shafts I, Fig. 1, and are journaled at J and J. These boxes J J are dovetailed, and can be moved laterally in the slides *j j*, by which means the shafts I I and their attached cutters i^2 and i^3 may be brought closer together or separated, as desired. The cutters are driven by the belt shown in dotted lines, Fig. 1, passing around the pulleys i' on the shaft I.

The next operation in my machine is to plane the top of the strips B*a*, bringing it down to the proper thickness and cut the bevel on the two sides, all of which is done in a single operation by means of the cutter P'. This cutter P' is of the ordinary kind, with the exception of the two outside bits, which are longer on their outside edges and slope toward the center at the same angle as the bevel required on the sides of the flights. These bits are shown at P', Fig. 5. This cutter has bearings in the ends of the arms *x x*, and is driven by the belt shown in dotted lines, Fig. 1, running down to the pulley 19 on the counter-shaft.

The next operation before the flight is severed from the strip B*a* is to cut the tenon on the front end of said flight. This is done by means of the two revolving tenon-heads g^2. (Shown in Fig. 1 and in dotted lines in the side view, Fig. 4, and top view, Fig. 5.) These tenon-heads g^2 revolve on shafts g^3, which turn in boxes g^4 and g^5, on top of the follower or sliding head *g*. The followers G have a vertical motion in the slides H H, and are moved up and down by the levers F. The operation of these levers will be readily understood from the drawing in Fig. 4. On the power end of the lever is the segment of a cog-wheel whose center is at the fulcrum of the lever F. The intermittent gears *b* on the ends of the shaft *bb* engage in said segment *f* during part of every revolution of the gears *b*, thereby operating the levers F and raising the attached followers G and tenon-heads g^2. The tenon-heads g^2, Fig. 5, are just as far apart as the required tenon on the flight is wide, and are driven by the belt shown in dotted lines, Fig. 1, over the pulleys *g'* from the pulley K^4. The shifting position of the pulleys on the followers G make an arrangement to take up the slack in the belt necessary. By the use of three idle pulleys with an arrangement of the belt as shown in Fig. 3, I am able to keep the belt constantly tight. In Fig. 3, K^4 is the stationary driving-pulley, and K^3 and *g'* the movable pulleys on the tenon-head shafts g^3. K, K', and K^2 are idle pulleys, and stationary. The belt runs from the driving-pulley K^4 to the idle stationary pulley K. From K it passes around the movable pulley K^3 and thence to the idle stationary pulley K'. From K' the belt passes around the idle stationary pulley K^2 and thence over the movable pulley *g'* back to the driving-pulley K^4. By this arrangement, when the pulleys K^3 and *g'* are raised or lowered the pulley K^3 will exactly take up the slack from pulley *g'* or vice versa.

The next and last operation is to cut the conveyer-flight off at the proper length and make the bevel on the broad end. This I accomplish in a single operation by means of the oblique cutter-head L. This head is of peculiar construction, as shown in perspective in Fig. 2. It has the four wings *l l l l*, radiating from the center at right angles to each other. To two of the opposite wings the cutting-bits *l' l'* are fastened, and to the circumference of the remaining two are secured the saws l^2 l^2. The saw-blades l^2 l^2 project below the under face of the head L, and have their teeth on the lower edge, as shown in Fig. 2. The shaft on which the head L revolves is fixed obliquely to the bed of the machine at such an angle as to cause the head to cut the proper bevel on the end of the flight at the same time that the saws l^2 l^2 are sawing it off.

L', Fig. 1, is the pulley by which the head L is driven. The two are rigidly connected, and are free to slide up and down the shaft *m*. The direction of the belt driving the pulley L is shown by the dotted line.

The shaft M is stationary. It can be raised and lowered, and is held in position by the screw *o'*. The sliding block O can be adjusted by means of the screw o^2. The shaft M is made hollow to secure the end of a clamping device, n^2. On the upper end of the shaft is the cap *m*, and between the rod n^2 and cap *m* is the spring n^3, which bears against the rod and keeps its lower end constantly against the work. After the flight is beveled and cut off the head L must raise to allow a new length to come into position. The head is raised automatically by means of the wheel 1 in connection with the levers 2, 3, and 5, Figs. 4 and 5.

The forked end of the lever 5 bears against the collar on the upper side of the pulley L'.

This lever is fulcrumed on the arm *a a*. The arm *a a* is inserted in the standard A A. The standard A A is made hollow to receive it. The opposite end of the lever 5 engages the lever 3. This lever 3 is fulcrumed to the frame at *y* and has the draw-bar 2 suspended from its opposite ends. The draw-bar passes through the guide Z, and has the lug Z′ on its lower end to engage the lug on the wheel 1.

The practical operation is as follows: The lug on the wheel 1 comes in contact with the lug on the draw-bar 2. The revolution of the wheel 1 draws the bar 2 down, which raises the opposite and short end of the lever 3, and this in turn lowers the cutter-head L on the end of the lever 5. As soon as the lugs on the wheel 1 and bar 2 are disengaged, the weight 4 draws the end of lever down and raises the cutter-head. Fig. 1 shows the lowered or cutting position of the head L, and Fig. 4 the elevated position of same.

A safety-strip, of wood, T, Figs. 1 and 7, is dovetailed into the bed of the machine to saw upon. It may be replaced when worn.

The guides U and U′, Fig. 7, are adjustable by means of the slides *u u* and screws u^4 and u^5. They are to hold and guide the material B*a*.

The guides U^2 and U^3 with their dovetailed projections are to hold the stuff more firmly while the tenon is being cut.

The upper projecting portions prevent an upward motion of the strip B*a*. These said projections can be adjusted by means of the slides and screws u^2 u^3 u^6 u^7.

The object of the intermittent feed before alluded to is to give the tenon-heads g^2 time to cut the tenons on the end of the flights and the oblique head L time to bevel the broad end and saw off the completed flight before new material is fed in. Immediately after the feed stops, the tenon-heads g^2 are raised and do their work, and as soon as they have dropped back to their original position the oblique head L is lowered and bevels the flights and saws them off.

In cutting the tenon on the conveyer-flight a series of saws may may be used instead of the tenon-head.

The force of the fall when the follower G drops is broken by the rubber springs *h h* at the bottom of the guards H H.

Having thus fully described my invention, what I claim as new, and wish to secure by Letters Patent, is—

1. In a machine for making conveyer-flights, the cutter-head L, having the pulley L′ attached thereto, and both revolving on a stationary shaft at an angle sufficiently oblique to the bed of the machine to make the required bevel on the end of the conveyer-flight, the cutter-head L provided with knives or bits, and with circumferential saws constructed to cut the bevel on the flight and to saw off the flight at required lengths, in combination with the foot n^2, projecting from the lower end of the hollow shaft M, and constructed to hold the material by pressing it firmly against the bed plate immediately under the cutter-head L, intermittent feed-rolls 11 and 13, adapted to feed the material under the cutter-head, and the automatic lever 5, attached at one end to the pulley L′ on the cutter-head L, and at the other end connected by the lever 3 and draw-bar 2 with the lugged wheel 1 on the driving-shaft, in such a manner as to cause the lever 5 to raise and lower the pulley and attached cutter-head at proper intervals, substantially as described and specified.

2. In a machine for making conveyer-flights, the combination, with the cutter-head L and intermittent feed-rolls 11 and 13, of the wheel 1, keyed to the main driving-shaft, and having a lug on its rim adapted to engage the end of the draw-bar 2, the draw-bar 2 having its upper end hinged to the lever, the lever 3 hinged at one end to the draw-bar 2, and having on its opposite end the weight 4, and adapted to operate the lever 5, to which it is connected, and the lever 5 connected at one end to the lever 3, and at the other end to the pulley L′ and its attached cutter-head L, all for the purpose of automatically raising and lowering the cutter-head L, substantially as described and set forth.

3. In an intermittent feed for conveyer-flight machines, the combination of the gear-wheel B on the end of the driving-shaft *b b*, said wheel B gearing into the gear-wheel C, and having teeth only around a portion of its circumference, so that the wheel C will be revolved during only a portion of the revolution of the wheel B, said gear-wheel C being geared into the gear-wheel D, and the gear-wheel D into the gear-wheel E, and the gear-wheel E being fixed to the end of the shaft which carries the front feed-roll, substantially as described and specified.

4. In a machine for making conveyer-flights, the combination of the feed-rolls 11 and 13, adapted to revolve in the same direction and feed the material B*a* into the machine, the two rolls being connected by a suitable system of gear-wheels, and the front roll, 13, having the gear-wheel E keyed to the end of its shaft, the intermediate gears, D and C, the wheel B, keyed to the main driving-shaft *b b*, and having cogs around only a portion of its circumference, adapted to engage with the cogs on the gear-wheel C and revolve the wheel C during a portion only of each revolution of the wheel B, thereby imparting an intermittent motion to the feed-rolls 11 and 13, substantially as described and specified.

5. In a machine for making conveyer-flights, the combination of segments of wheels *b*, keyed to the driving-shaft, and having cogs adapted to engage during a part of each revolution with the levers F, the levers F having on their short arms the cogged segments *f*, adapted to engage with the segments *b* and raise and lower the followers G, which operate on the ends of the long arms of the levers, the followers G carrying the tenon-cutting heads g^2,

and adapted to be raised and lowered by the lever F in order to cut the tenon on the end of the flight, the foot n^2, and guides U^2 and U^3, adapted to hold the material firmly while the tenon is being cut, the intermittent feed-rolls 11 and 13, to feed the material between the tenon-heads at proper intervals, and the cutter-head L, having the circumferential saws adapted to saw the flights off at proper lengths, all substantially as described and specified.

6. In a machine for making conveyer-flights, the parallel adjustable guides U^2 and U^3, having beveled inwardly-projecting upper edges to fit and hold the beveled material down firmly while the tenon-heads are cutting the tenon on the end of the flight, substantially as described.

7. In a machine for making conveyer-flights, the combination of the cutter-head P and bracket *p*, the two cutter-heads i^2 i^2 on the laterally-adjustable shafts I I, the bevel cutter-head P′, to cut the side bevel on the flights, said cutter-head being supported by the arms *x*, the tenon-cutting heads g^2 g^2 on the followers G G, raised and lowered by the lever F, and intermittent gear-wheel *b*, the oblique cutter-head L, sliding up and down on the hollow shaft M, and having a forward adjustment by means of the sliding block O, the intermittent feed mechanism, and the table or frame A*a*, as described and specified.

In testimony whereof I affix my signature, in presence of two witnesses, this 7th day of February, 1884.

SYLVANUS COX.

Witnesses:
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