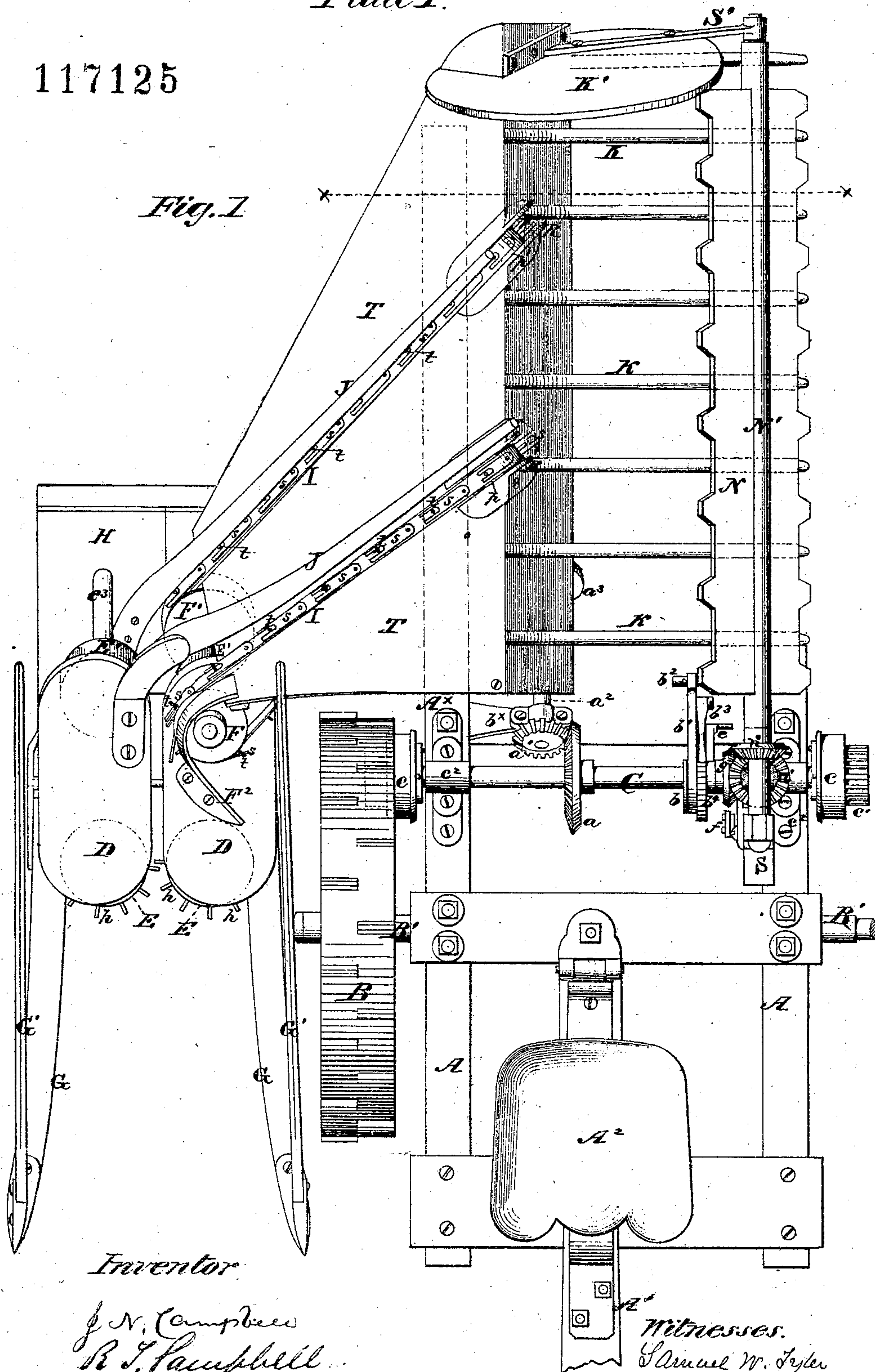


Samuel W. Tyler's Flax Harvester
Plate 1.

PATENTED JUL 18 1871

117125

Fig. 1



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Witnesses.

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Mason, Fenwick & Lawrence.

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Samuel W. Tyler's Flax Harvester
Plate 2

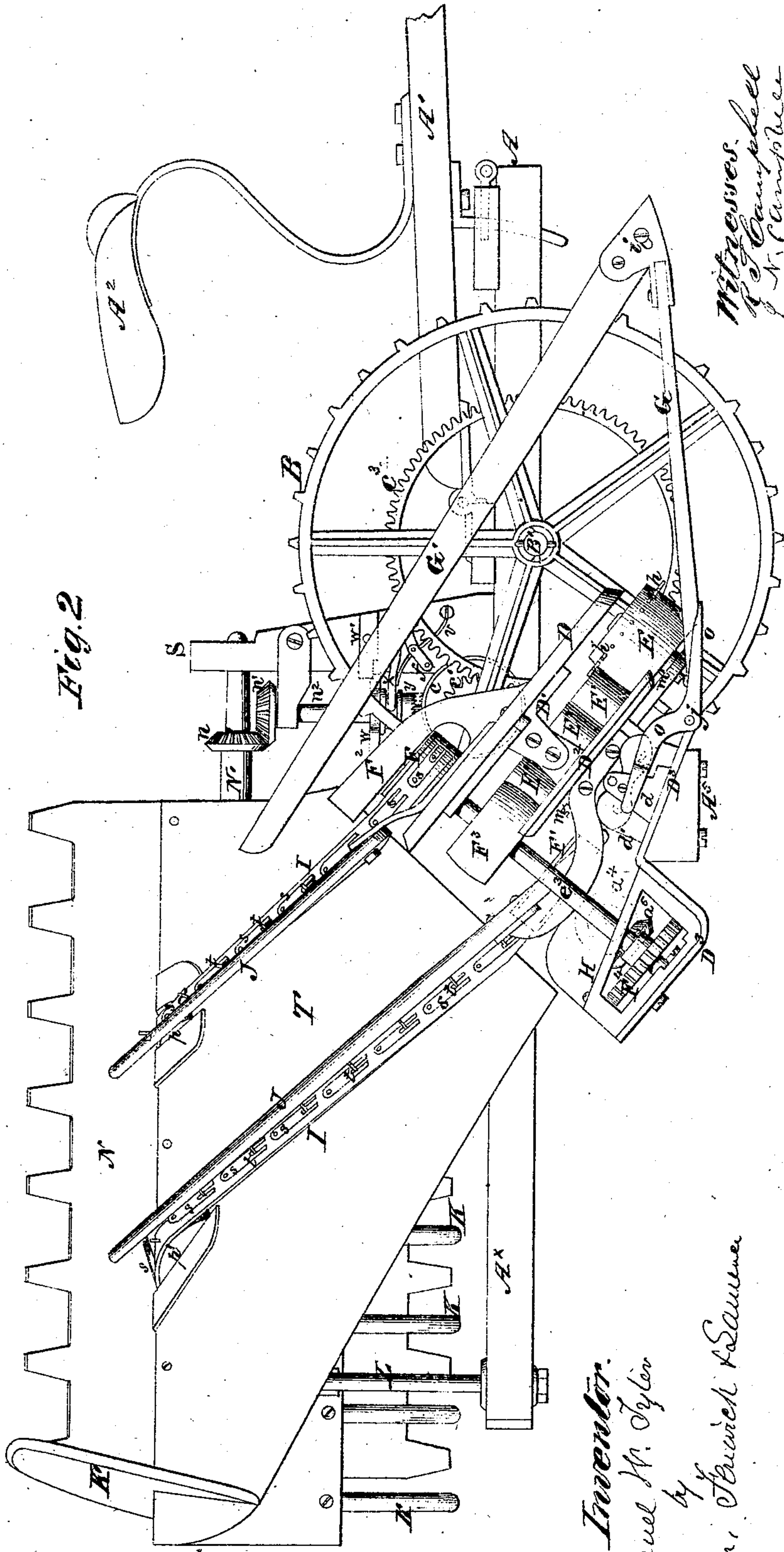


Fig. 2

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Fig. 3

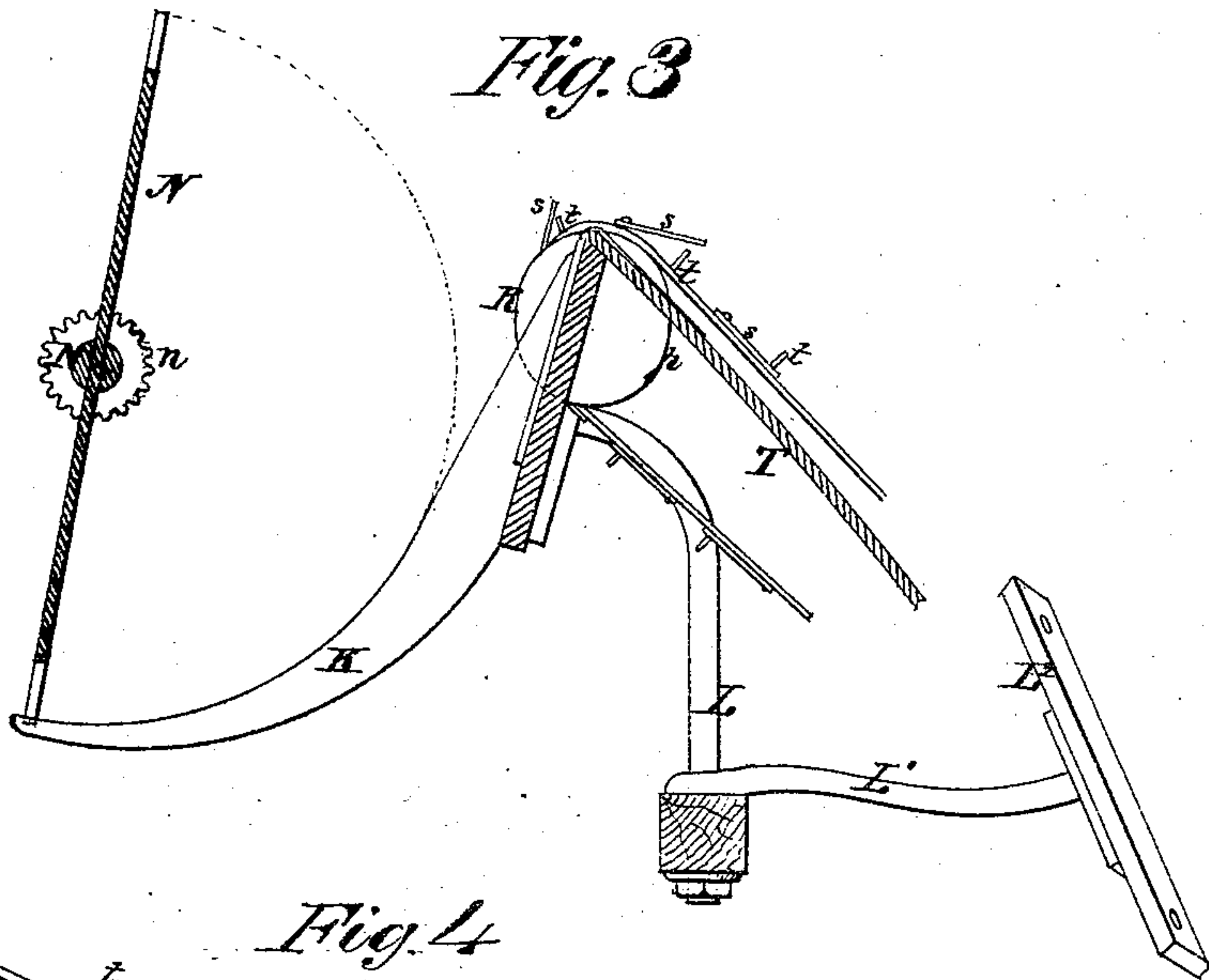


Fig. 4

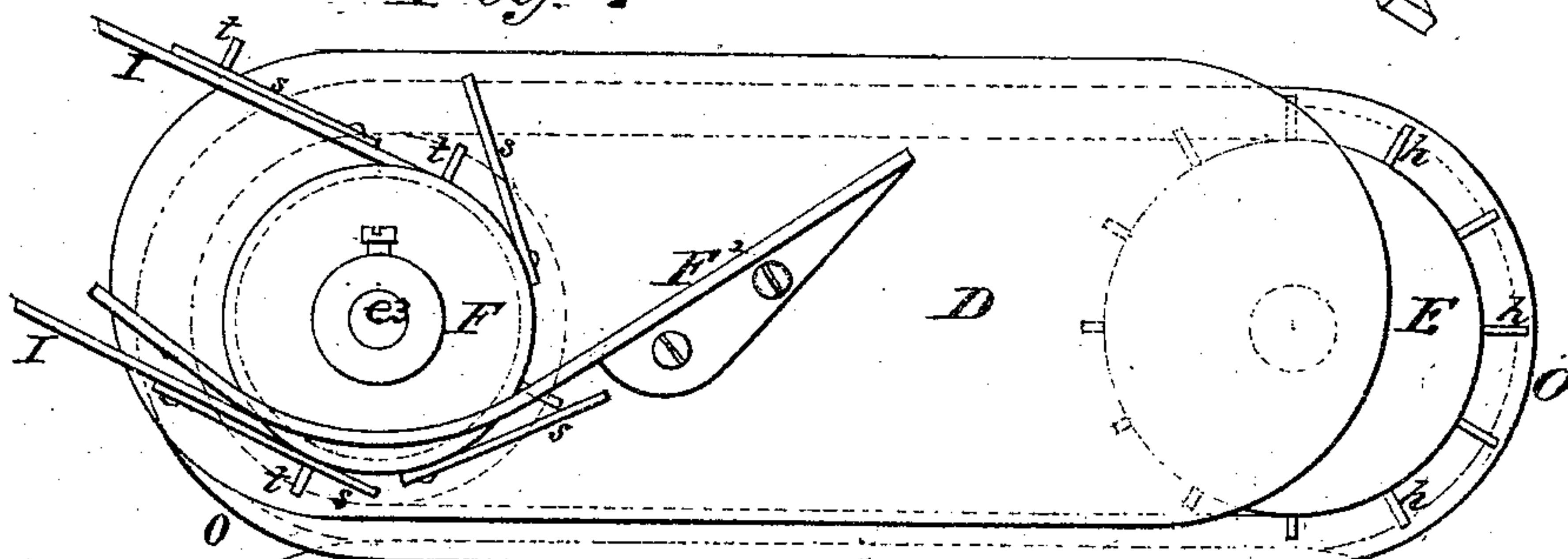


Fig. 5

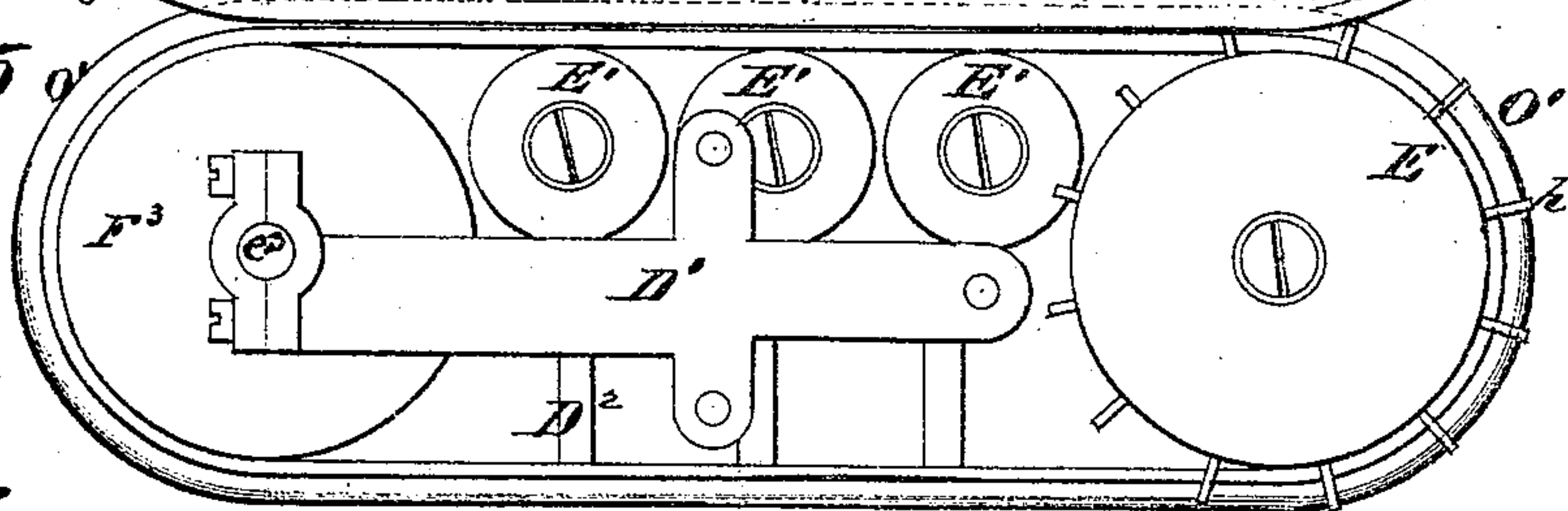


Fig. 6

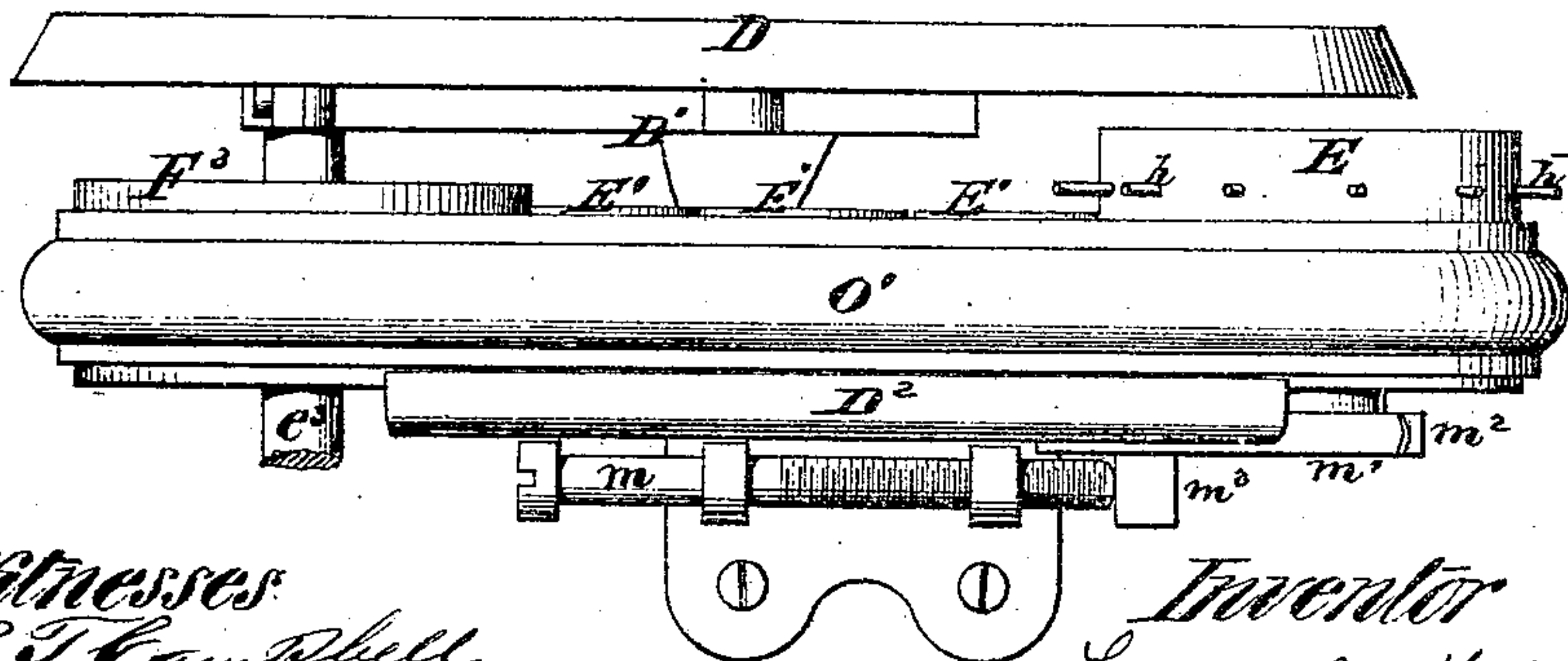


Fig. 7



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Samuel W. Tyler's Flax Harvester
Plate 4

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Fig. 8

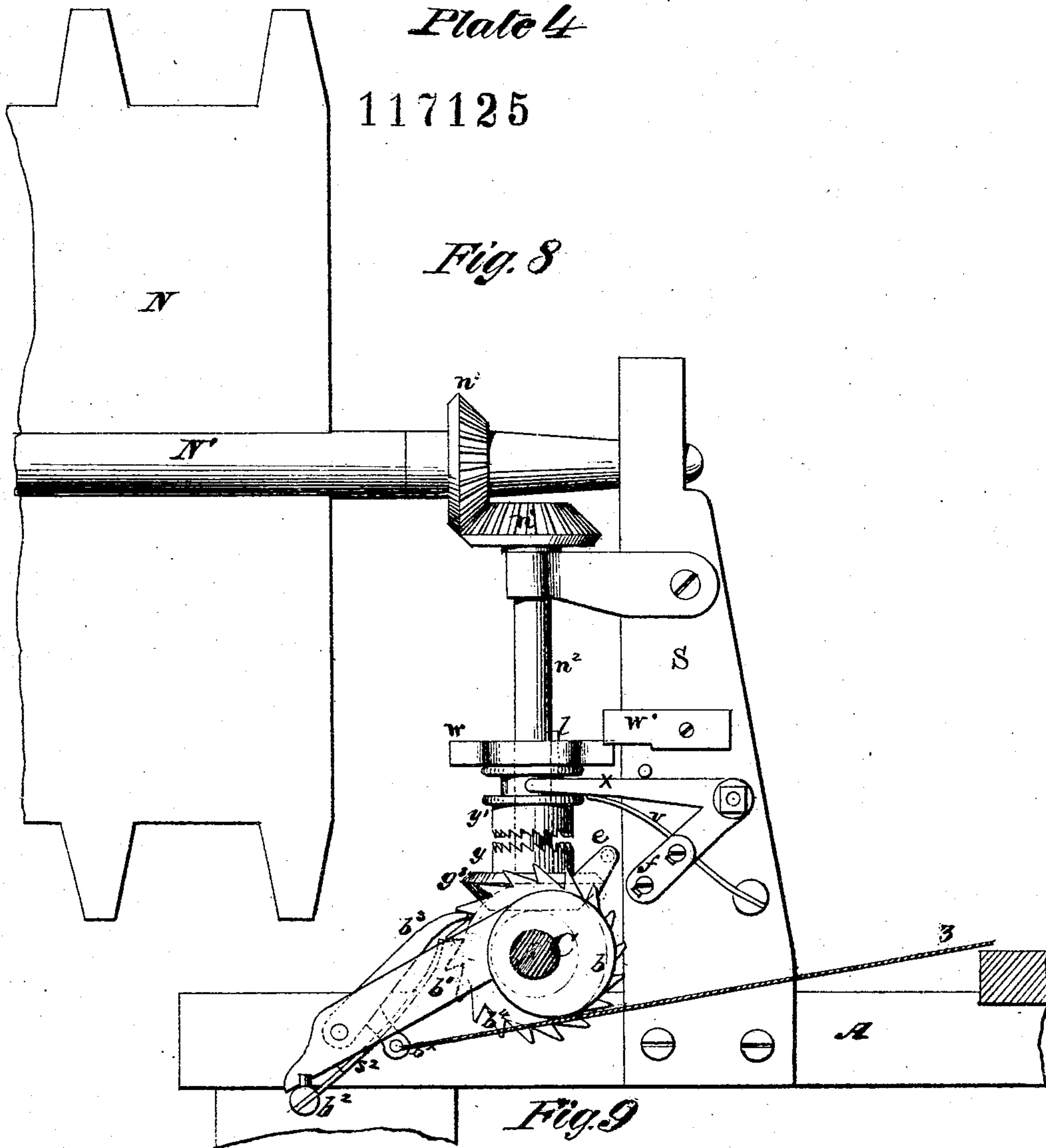


Fig. 9

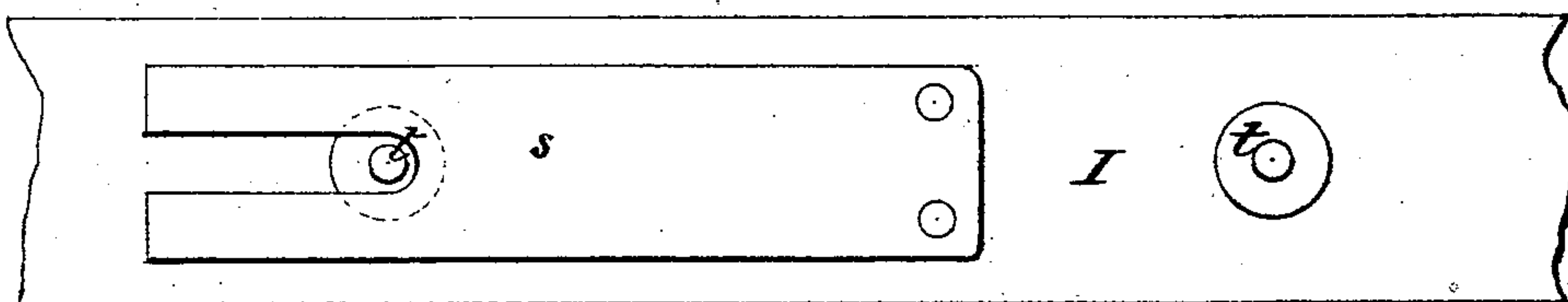
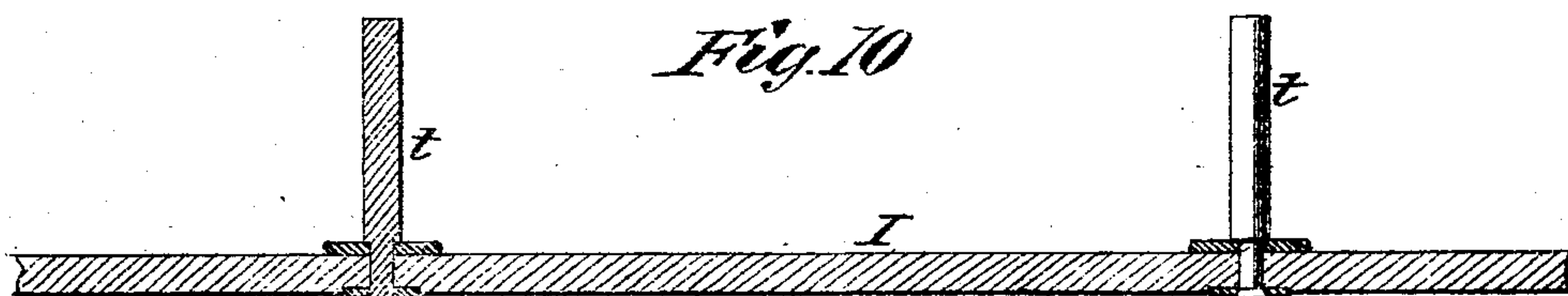


Fig. 10



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Fig. 11

Fig. 11 is a detailed technical drawing of a mechanical device, likely a printing press component. The drawing shows a large, curved arm (17) pivoted at the top (16). The arm is connected to a complex mechanism involving gears (2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15) and a central shaft (C). A cross-section (A) is shown at the base of the shaft. The drawing is labeled 'Fig. 11' and includes the number '117125'.

R. T. Campbell
J. N. Campbell.

Samuel W. Tyler
by
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UNITED STATES PATENT OFFICE.

SAMUEL W. TYLER, OF TROY, NEW YORK.

IMPROVEMENT IN FLAX-PULLERS.

Specification forming part of Letters Patent No. 117,125, dated July 18, 1871.

To all whom it may concern:

Be it known that I, SAMUEL W. TYLER, of Troy, in the county of Rensselaer and State of New York, have invented certain new and useful Improvements in Flax-Harvesters; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing making part of this specification, in which—

Figure 1, plate 1, is a top view of the machine with one of the driving and transporting-wheels removed, and also with the belts removed from the pullers. Fig. 2, plate 2, is an elevation of one side of the machine complete, with the exception that the belts are removed from the pulleys. Fig. 3, plate 3, is a transverse vertical section through the gavel-receptacle and reel, taken in the plane indicated by dotted line *xx* in Fig. 1. Fig. 4, plate 3, is a top view, in detail, showing the pulling apparatus and also a portion of one of the carrying-belts and its clearers. Fig. 5, plate 3, is a top view of one set of pulleys and its belt as seen by removing the covering-board. Fig. 6, plate 3, is a side elevation of one set of pulleys and its belt, showing the belt-tightener and the open guard. Fig. 7, plate 3, is a cross-section through the concave and the convex belts. Fig. 8, plate 4, is a sectional view, in detail, showing parts of the main frame and reel and the mechanism for giving intermittent rotary motions to the reel. Figs. 9 and 10, plate 4, show the manner of applying the spurs and clearers to the carrying-belts. Fig. 11, plate 5, is a side elevation, showing a modification of the mechanism of Figs. 1, 2, and 8, for giving intermittent rotary motions to the reel.

Similar letters of reference indicate corresponding parts in the several figures.

This invention relates to certain novel improvements on machinery for harvesting flax, parts of which improvements are especially applicable to the flax-pulling devices for which Letters Patent were granted to me bearing date, respectively, February 12, 1867, and August 27, 1867. The objects of my invention and improvements are: 1st, to combine, with the flax-pulling devices, gathering-fingers, which are extended forward and from opposite sides of the pullers, and which are allowed vertical self-adjustment, said fingers having applied to them adjustable lifting-swords, which extend backward and upward, whereby

the swath to be pulled is gathered to the pullers, whether the flax be erect or lodged, as will be hereinafter explained. 2d, to support the bearing-frame of the pulling devices, the bearings for the shafts of the rear belt-pulleys, and the gathering-fingers and standard-guides therefor, by means of a single cast frame, constructed as will be hereinafter explained. 3d, to construct the bearing-frames for the belt-pulleys with side guards, which are open to allow a free escape of dust, &c., through them. 4th, to support the front belt-pulleys by means of longitudinally-moving bearing-plates, and to combine, with such plates, the puller, frame, and adjusting-screws, whereby the belts can be tightened without loosening the stud of the belt-pulleys, as will be hereinafter explained. 5th, to employ, in combination with flax-pulling devices, certain mechanism which conveys the flax therefrom and delivers it, as fast as it is pulled, into a gavel-receptacle which is arranged in rear of the main draft-frame, from which receptacle the gavels are discharged, either automatically or at the will of the attendant, and delivered upon the ground out of the way of the team in the succeeding round. 6th, to retain firm hold of the stalks of flax from the point at which they are pulled until they are delivered into a gavel-receptacle, and at the same time to change the position of the stalks from a vertical to a horizontal plane, as will be hereinafter explained. 7th, to combine, with the endless belts which convey the flax from the pullers and deliver it into a gavel-receptacle, clearing devices which will positively discharge the stalks from the studs or spurs on the belts at the point of delivery into said receptacle, thus preventing any of the stalks from being arrested by the studs at such points, as will be hereinafter explained. 8th, to combine, with the gavel-receptacle, a flat board or reel, which will at proper times rotate and effect a discharge of the gathered flax from said receptacle and then assume such a position that it will serve as one of the sides of the receptacle, as will be hereinafter explained. 9th, to combine a fixed head with the gavel-receptacle in such manner that it will prevent the escape of the stalks of flax from the rear end of this receptacle, and at the same time operate as an evener for properly massing the stalks to form gavels. 10th, to give an intermittent semi-rotary motion to the gaveling-reel at proper times

to discharge the gathered product by means of devices which will effect this object automatically, and which will also arrest the said reel and hold it in proper position to gather the flax, as will be hereinafter explained.

To enable others skilled in the art to understand my invention, I will explain its construction and operation.

In the accompanying drawing, A represents a rectangular draft-frame, which is supported upon two transporting-wheels, B, either one or both of which may be used as driving-wheels for giving motion to the pulling and discharging mechanism. These wheels B are applied loosely on a transverse axle, B', and to the spokes of these wheels toothed wheels c^3 are secured concentrically. In rear of the axle B' is a horizontal transverse shaft, C, which is supported upon the longitudinal beams of the draft-frame A. In bearing-boxes c^2 on the extremities of this shaft C spurred pinions c^1 are loosely applied, which engage with the driving spur-wheels c^3 , and which are connected to clutch-boxes c . The clutch-boxes will allow wheels c^1 to turn freely around their shaft when the machine is moved back or turned around short; but when the machine is moved forward the wheels c^1 will be engaged with their shaft C and cause it to turn. On shaft C there are three wheels, a , b^4 , and g , and an eccentric, b . The wheel a , which is a bevel-wheel, engages with a corresponding wheel, a^1 , which is on an inclined shaft, a^2 , supported in front by a bearing, b^x . The inclined shaft a^2 carries on its lower end a bevel-wheel, a^3 , which engages with a corresponding pinion-wheel on a horizontal transverse shaft, which carries on its outer end a bevel-wheel, a^4 , shown in dotted lines, Fig. 2. The bevel-wheel a^4 engages with a beveled wheel, a^5 , on the inclined shaft of pulleys F F¹, which shaft carries a spur-wheel on its lower end, within the housing H, that engages with spur-wheel F⁴ and gives rotation to the shaft c^3 of belt-pulley F³. In this way rotary motion is transmitted from the shaft C to the rear belt-pulleys F³, one of which pulleys is shown in Figs. 2 and 5. These pulleys F³ serve, in conjunction with the pulleys E E, to carry the belts O O', while intermediate rollers E' serve as anti-friction laterally-resisting surfaces to the belts O O' when the machine is in operation. The wheels b^4 and g and eccentric b belong to the mechanism for rotating a reel, N, which discharges the gathered product in gavels, as will be hereinafter explained. A strong beam, A⁵, is rigidly secured to the lower ends of posts that depend from the frame A in rear of shaft C, and one end of this beam extends out laterally from the inner side of the machine and serves as the support for the pulling devices. Upon this beam A⁵ cast-metal frames D³ (see Fig. 2) are bolted, each one of which affords a stirrup-support for the lower bearing of the shafts of rear belt-pulleys F³. Each frame D³ has also cast upon it two standards, d d' , which rise from points directly over the beam A⁵. The front end of frame D³ extends in front of the beam A⁵, and has pivoted to it, by a horizontal transverse rod, j , the metal portion o of a

long gathering-finger, G. Each portion o receives between its rear forked ends the standard d , through which latter holes are made to receive stop-pins that regulate the vertical play of the front end of finger G. The standard d' of each frame D³ has rigidly secured to it a frame, D², that carries the belt-pulleys E F³, which frame is arranged in the same inclined plane as the pulleys and their covering-board D. The wings of each frame D² are open, or of skeleton-form, for the purpose of allowing dirt to pass freely through them. The inner open wing of each frame D² is slotted at several points to allow lateral adjustment of the anti-friction rollers E'. Rising from each guard-frame D² is a standard, to which a casting, D¹, is rigidly secured, which serves as the upper bearing for a pulley-shaft, e^3 , and also as a means for supporting a covering-board, D, as shown in Fig. 2. The axes of all the belt-pulleys and anti-friction rollers are parallel to each other, and are arranged in inclined planes, so that, when the stalks of flax are received between the two belts O O', the stalks will be lifted or pulled out of the ground as they are carried toward the rear pulleys F³. The inclined concave and convex belts O O', and their operation in pulling flax, will be found fully described in the schedule annexed to my Letters Patent above referred to. The lower end of the stud of each one of the front belt-pulleys E is rigidly secured to a longitudinally-movable plate, m^2 , which is dovetailed into an extension, m^1 , of a frame, D³, and constructed with a lug, m^3 . By means of a screw, m , (see Fig. 6,) the plate m^2 , with its pulley E, can be forcibly moved forward and the belt stretched to any desired degree of tension. Both of the front belt-pulleys are in this way adjustable without loosening their shafts from their bearing-plates.

As above described, the long diverging fingers G G are pivoted to their respective frames D³ so as to rise and fall freely, and thus accommodate themselves to inequalities of surface passed over. To the front ends of the fingers G swords G' are attached by adjustable fastenings i , (see Fig. 2,) which swords extend backward and upward and serve to separate the crop at the top in line with the swath and to lift up fallen flax to the pullers, and to assist the fingers in their work of gathering the swath up to the pullers. The swords G' will be inclined more or less, according to the condition of the standing crop. I prefer to make the swords G' of a length sufficient to support the stalks after they are pulled out of the ground until the delivering-belts have taken hold of them. The longitudinal beam of the frame A next the pulling apparatus has a long rear extension, A^x, from which rise two rigid curved posts, L, that support curved tines K, and also the rear portion of an apron, T. The forward and outer end of the apron T is supported by a lateral extension, L¹ L², of the front post L. The front contracted end of apron T extends from the upper edge of the pulley-guard F² nearly to the top of the housing H, as shown in Fig. 2. The highest point of the apron F is in a plane parallel to, but some distance above the plane of the

top of frame A; and, as the front contracted end of this apron is in a vertical plane corresponding to the upright position of the stalks of flax when first received upon it from the belts O O', it will be seen that the surface of this apron has a slight spiral twist and inclines toward the pulling apparatus. The highest point of the apron forms a longitudinal ridge which is parallel with the line of draft of the machine, and from which descend the curved tines K that form one side and the bottom of a receptacle into which the flax is gathered preparatory to its delivery upon the ground in gavels. The inner side of this gavel-receptacle, or that side furthest from the standing flax, is formed by means of an intermittently-revolving flat board or reel, N, having teeth on both edges, which comb the gathered product from the teeth K at proper times, hereinafter explained. The reel N is secured centrally to a longitudinal shaft, N', which is supported at its extremities by an arm, S', and a post, S.

Thus it will be seen that I arrange a receptacle for the flax in such relation to that side of the machine furthest from the standing crop that, when the gathered quantity is discharged by the reel N, it will be delivered upon the ground out of the path of the team in the succeeding passage around the field.

For the purpose of conveying the pulled flax from the pulling-belts O O' and delivering it into the gavel-receptacle I employ two endless belts, I I, the upper one of which passes around a pulley, F, on upper end of the shaft e^3 of the rear belt-pulley which is next the frame A, and also around a pulley, p , which is located at the ridge or highest point of the apron T, and the lower one of which belts is passed around a pulley, F^1 , and also around a pulley, p' , at the highest point of the apron T, as shown in Figs. 1 and 2. The return portions of the belts I I are beneath the apron T, and the conveying portions lie flat upon the surface of the apron, and are for all practical purposes continuous with the pulley-belts O O'. The surfaces of the belts I I have pins or studs t fixed to them at proper distances apart for taking hold of the stalks, and between the studs t forked plates s are secured, with their forked ends astride of their respective studs. The forked plates s are fastened to the belts at one of their ends, so that as the studs t successively pass over the pulleys $p p'$ the forked ends of the said plates operate to clear the stalks of flax from these studs and prevent the stalks from being carried around with the pulleys, which would either break off the studs or cause the belts to slip. The flanges R, which are of a convex form, and which are arranged on each side of each one of the upper belt-pulleys, also assist in clearing the belts of the stalks and serve as guards to the pulleys. The manner of fastening the studs t to the carrying-belts I is clearly represented in Figs. 9 and 10.

For the purpose of causing the stalks of flax to be turned from a vertical position to a horizontal position on their way from the pulling-belts O O' to the highest ridge of apron T, the

pulley F^1 is of greater diameter than the pulley F, which will cause the lower elevating-belt I to travel faster than the upper belt, and with a proper relative speed thereto, to effect the object named. It is important to keep the stalks of flax in contact with the belts I I and the apron T while they are being conveyed from the pulling-belts to the gavel-receptacle, and to this end I employ the rods or keepers J J, which are respectively secured at their forward ends to the outer covering-board D and to the frame D^2 beneath this board. The keepers extend upward and backward in close relation to their respective belts, as shown in Figs. 1 and 2. The upper ends of the keepers are free so as to yield outwardly more or less. Thus it will be seen that the stalks of flax are all held securely from the moment they are gripped between the belts O O' until they are carried to their place of discharge into the gavel-receptacle. At the rear end of the gavel-receptacle is a circular head, K' , which is secured partly to the rear portion of apron T and partly to a board to which the tines K are secured. This head is intended to serve two purposes, to wit: It prevents the expulsion of the flax-stalks from the rear end of the gavel-receptacle while being delivered therein, and it also receives against it the butts of the flax-stalks, and thus operates to even the gavels. As the flax-stalks are delivered obliquely from the elevating-belts into the gavel-receptacle without the head K' , there would be a tendency to discharge the stalks from the rear end of the gavel-receptacle; the head will prevent this. The shaft N' of the reel-board N has a bevel spur-wheel, n , keyed on it near that end which has its bearing in the post S, which wheel engages with the teeth of a corresponding wheel, n^1 , made fast on a vertical rotating shaft, n^2 . Below the wheel n^1 stop-arms W, circular ratchets $y' y$, and a bevel-wheel, g^3 , are applied to shaft n^2 . The arms W are fast to the ratchet y' , and with this ratchet can move up and down on their shaft, but cannot rotate around it on account of a key-tenon, l . (See Fig. 8.) The lower ratchet-teeth y are formed on the hub of wheel g^3 , and with this wheel can rotate loosely around the shaft n^2 , but cannot move up and down. The wheel g^3 engages with a spur-wheel, g , which is fast on the shaft C; consequently, the lower ratchet y and its wheel g^3 will be rotated when the machine is moving forward. The eccentric b on shaft C communicates an endwise movement to a pawl-rod, b^1 , the rear end of which slides upon a fixed stud, b^2 , on frame A, and to this rod a pawl, b^3 , is pivoted, which engages with the teeth of a ratchet-wheel, b^4 , which turns loosely around shaft C, and which is held in check by a friction-spring, s^2 , extending from stud b^2 and bearing against the teeth of this ratchet-wheel. From the ratchet-wheel extends an arm, e , and to this arm a stud is fixed, which, at every revolution of the ratchet-wheel b^4 , strikes an adjustable portion of arm f of a yoke-lever, X, and depresses the same, together with the ratchet y' and its arms W. When the stud on arm e releases the yoke-lever X a spring, v , raises it, together with ratchet y' and arms W. The yoke-lever is pivoted to

post S, and its yoked end embraces an annularly-grooved portion above the ratchet-teeth y' , as shown in Fig 8. The portion f of the yoke-arm is made adjustable to compensate for wear. When the ratchet y' is depressed, as above described, it is engaged with the rotating ratchet y , which causes the shaft n^2 to turn and give a semi-rotary movement to the reel-board N, which latter will thus discharge a gathered load from the gavel-receptacle. Immediately after this takes place the arm e releases the yoke X and spring v raises and disengages the ratchet y' from the revolving ratchet y , which leaves the reel-board in proper position for gathering another load. The reel-board is held fast in this last-named position by one of the arms W striking against a stop, W' , on post S. When the ratchet y' is depressed the arms W will be moved below the stop W' , and can consequently turn with the shaft n^2 .

It will thus be seen that intermittent semi-rotary movements will be given to the discharging-reel N automatically and at proper intervals; also, that the said reel-board will be held fast by one of the arms W' during the act of gathering a sufficient quantity of flax to form a gavel. In addition to these automatic movements of the reel-board I employ a very simple means whereby the attendant riding upon the machine can effect the discharge of the gavels at will. This is done by attaching a rope or chain, z , (see plate 4,) to an eye-piece, b^x , on pawl b^3 . The attendant thereby can raise the pawl from ratchet-wheel b^4 or engage it therewith at pleasure.

I have represented on plate 5 another form of device for automatically giving an intermittent motion to the reel-board N. A represents a portion of the draft-frame; C, the horizontal transverse shaft, which carries on its ends the clutch-boxes c and pinions c^1 ; and N' represents the shaft of the reel-board N. On the shaft C is applied fast a worm-wheel, 1, which engages with the teeth of a perimeter gear, 2, and gives a slow rotary motion to this wheel. The shaft of wheel 2 is applied to a post, S, and on one side of this wheel is a stud, 3, which at every revolution of its wheel will strike the lower arm of a lever, 5. This lever 5 has its fulcrum on the post S, and is connected to a pinion-pulley on the hub of a large pulley, 15, by means of a cord, 6, which passes once or more around its pulley. The pulley 15 and its pulley-hub, together with ratchet-teeth 12, which are also formed on the hub of pulley 15, are applied loosely on the shaft N', but are engaged with this shaft N by means of a pawl, 14, which is acted upon by a spring, 13, that also bears on the ratchet-teeth 12. The spring-pawl 14 is pivoted to one of two arms, 10, which are secured fast to shaft N' and extend out therefrom equal distances and diametrically opposite each other. In front of the lever 5 and in the same vertical plane therewith is another lever, 4, to which is applied a catch, 8, which is acted on by a spring, 7, from post S, and which is constructed with its upper hooking portion beveled, as shown by the figure on plate 5. 17 represents a bow-spring which is secured at one end to post S, and which is connected, by a cord, 16, to the

periphery of large pulley 15. The upper end of the lever 4 is prevented from being pressed too far forward by a stop which is indicated by dotted lines behind a bearing-bracket, Z. The stop-arms 10, which correspond to and perform the same office as the stop-arms W of Fig. 8, are, one at a time, caught and held between the upper end of lever 4 and the yielding-catch 8, thus preventing the reel N from turning while gathering flax to form a bundle. At every revolution of the wheel 2 stud 3 is brought around in contact with the lower end of lever 5, and by its action on this lever the pulley 15 winds up cord 16 and puts spring 17 under strong tension. The pulley 15 in this operation turns freely around the reel-shaft N. As the wheel 2 continues to revolve, and the lower end of lever 5 is passed still further forward, this lever (or the stud 3) strikes lever 4 and releases the engaged arm 10, which, being acted upon by spring 17 through the medium of ratchet 12 and pawl 14, allows shaft N to make a half-revolution, when the other one of the arms 10 is arrested by the catch 8 and lever 4. This operation is repeated during every revolution of the wheel 2 for discharging the gathered product from the gavel-receptacle. It will be seen that the spring 7 operates both on the lever 4 and the catch 8, thus causing the latter to positively assume its arresting position when released from the stud 3 on wheel 2.

By constructing and operating a reel as I have described a sudden cut off of the flax flowing into the gavel-receptacle is effected, and at the same time the flax which has been gathered into said receptacle is forcibly discharged and delivered upon the ground.

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

1. The fingers G G, in combination with the backwardly-extending swords G' G', arranged and operating substantially as and for the purpose described.
2. The swords G' G', extending back, above, and beyond the pulling-belts O O' for the purpose of supporting the flax-stalks laterally after they are pulled out of the ground and until they are delivered to the carrying-belts, substantially as described.
3. The frame D³, constructed with standards d d' and a rear stirrup-bearing, substantially as described.
4. The open side guards D², constructed substantially as and for the purposes described.
5. The sliding bearings m^2 , adjusting-screws m , and inclined pulley-frame D², combined substantially as described.
6. The combination of pulling-belts O O', carrying-belts I I, and a gavel-receptacle, substantially as described.
7. The carrying-belts I I, applied around the pulleys F F¹ of the inner shaft of the rear pulling-belt pulleys, substantially as described.
8. The clearers s s upon the carrying-belts I, substantially as described.
9. The mechanism herein described, applied between the power-shaft C and the reel-shaft N'

for the purpose of giving the reel of the gavel-receptacle an intermittent motion, for the purpose set forth.

10. The evener-head K', in combination with the carrying-belts I and the gavel-receptacle, substantially as described.

11. The stop-arms W and stop or catch W', in combination with the revolving reel-shaft N' and a releasing device for said arms W, substantially as described.

12. A revolving tripping-arm or stud, e, applied on shaft C, the described clutching device and the described stopping device, in combination with the revolving shaft N' of the discharging-reel N, substantially as described.

13. The apron T, arranged between the pulling-belts O O' and the gavel-receptacle, in combina-

tion with carrying-belts I, substantially as described.

14. The combination of the gavel-receptacle and the carrying and pulling-belts, arranged in relation to the two-wheeled side-draft frame, substantially in the manner and for the purpose described.

15. Carrying-belts I I, and pulling-belts O O', and keepers J J, arranged in the manner substantially as described, so that the flax is securely held from the point at which it is pulled from the ground until it is conveyed to the point for effecting its discharge, substantially as described.

SAMUEL W. TYLER.

Witnesses:

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