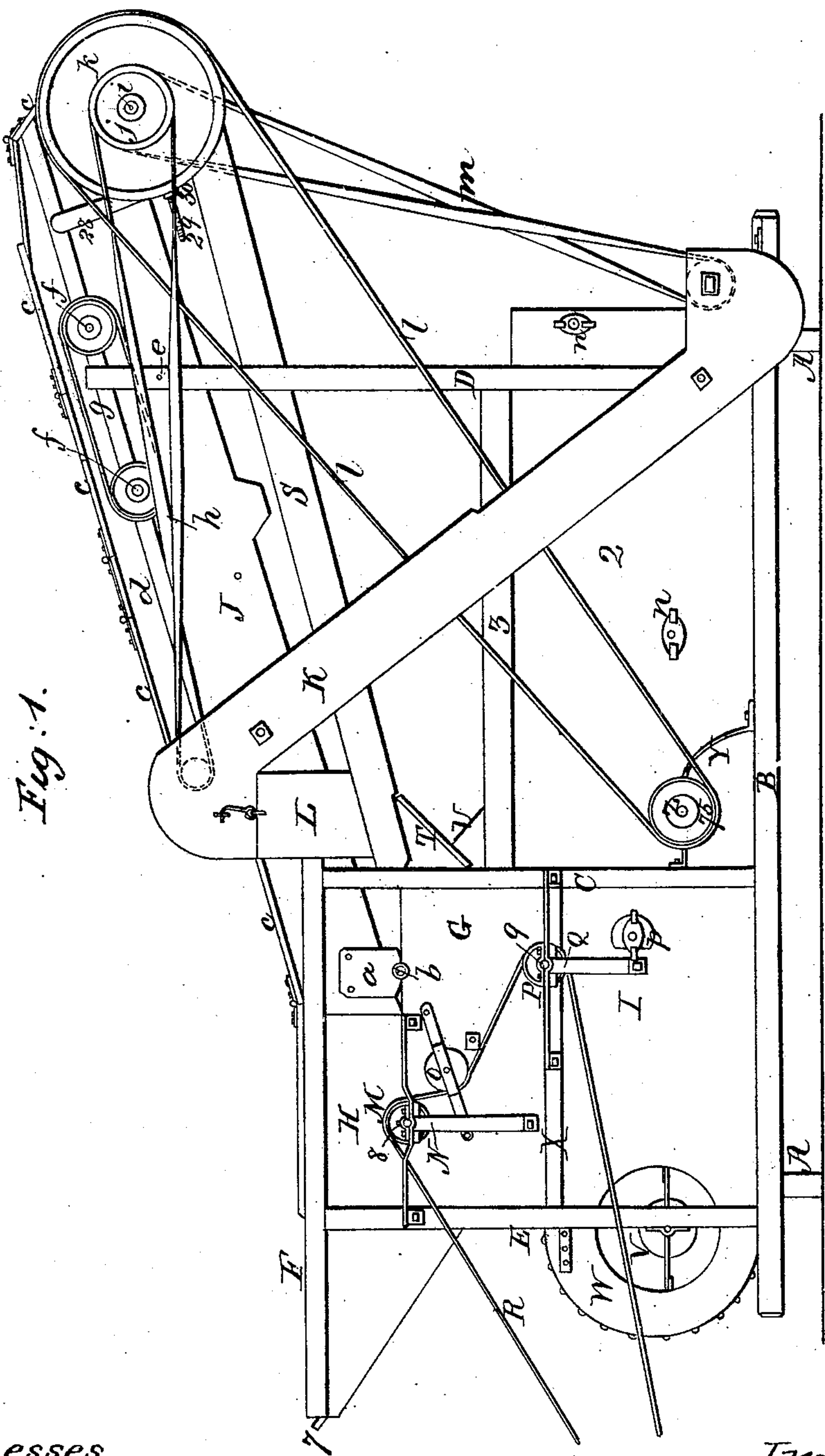


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Clover Huller.

No. 103,806.

Patented May 31, 1870.



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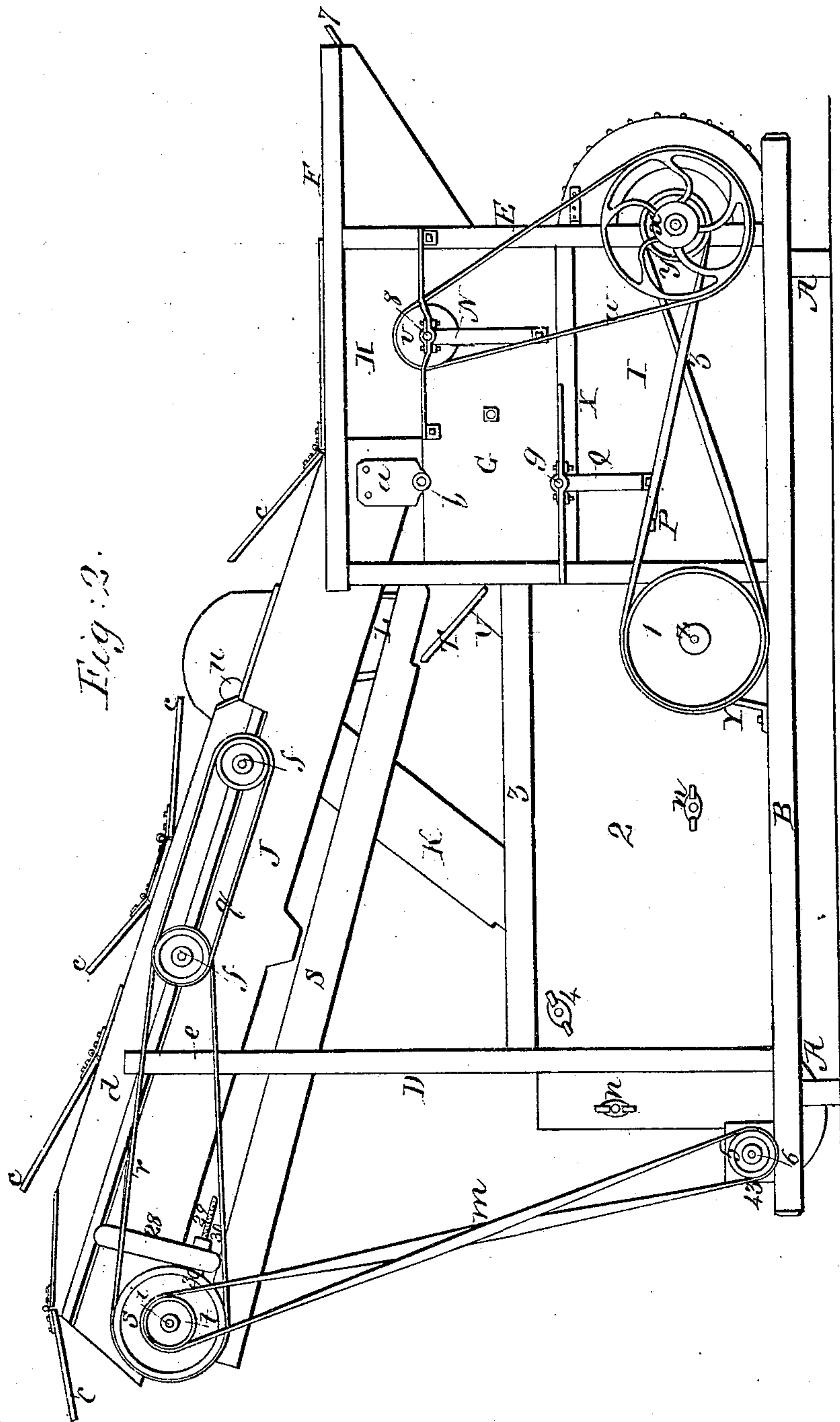


Fig. 2.

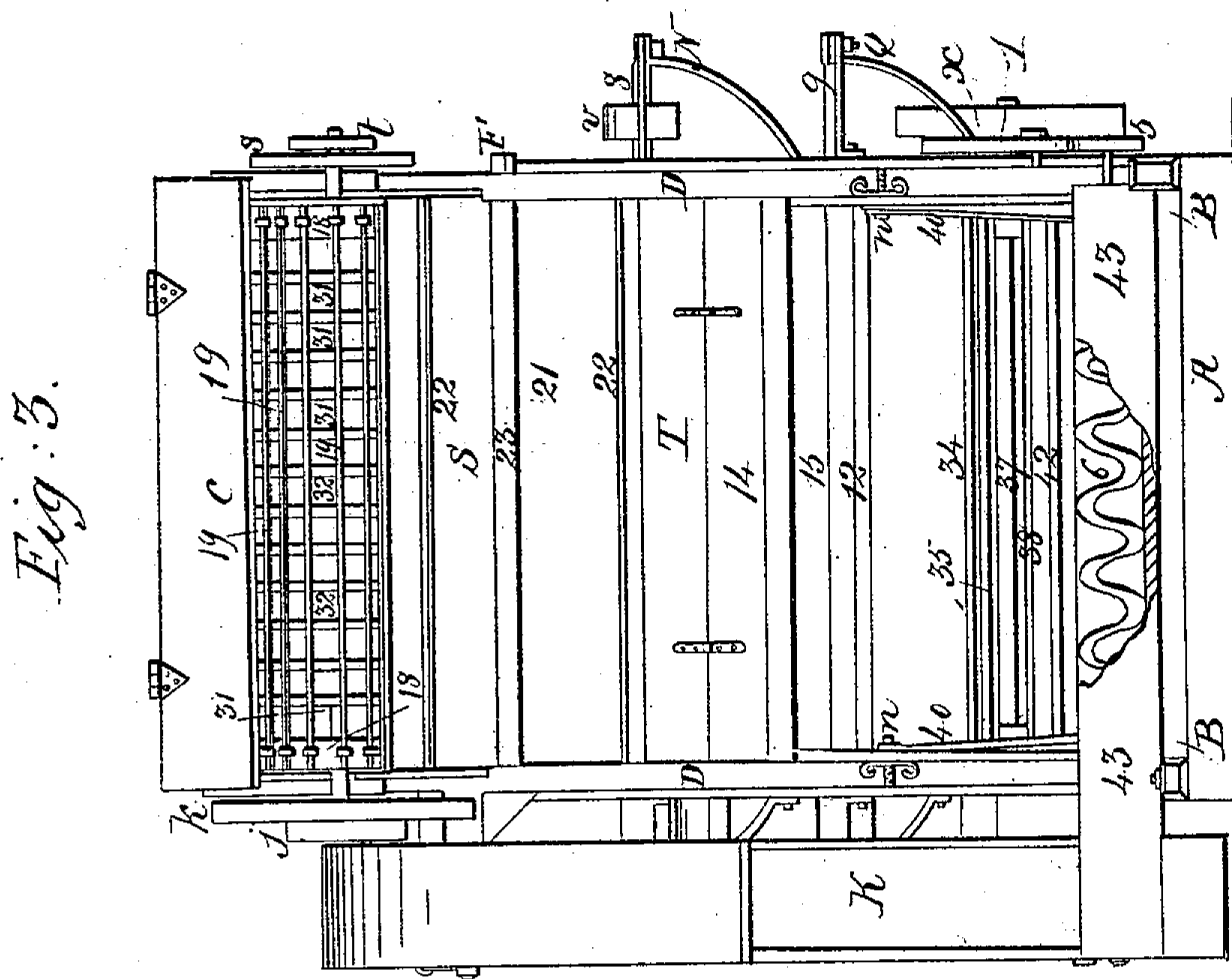
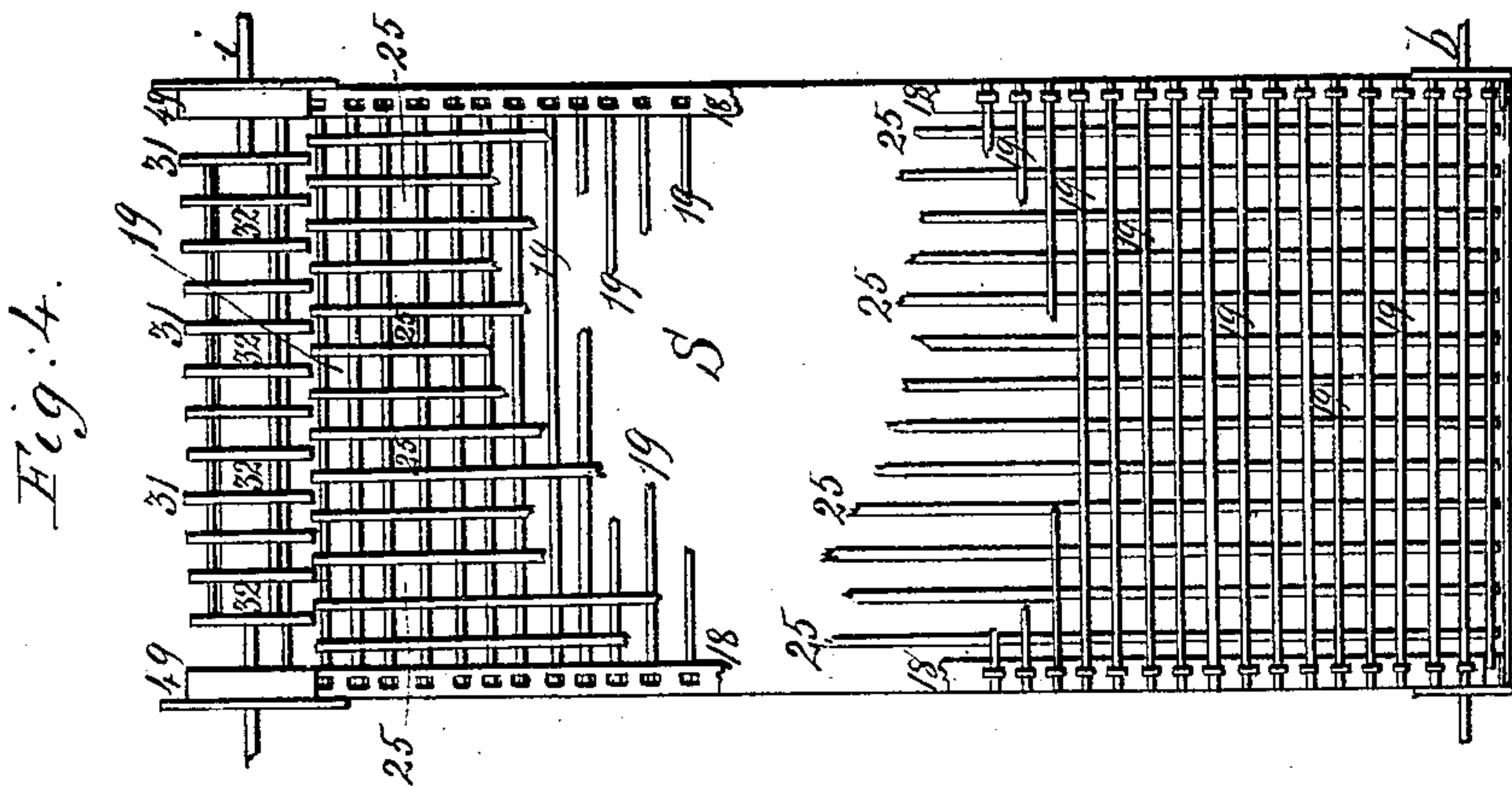
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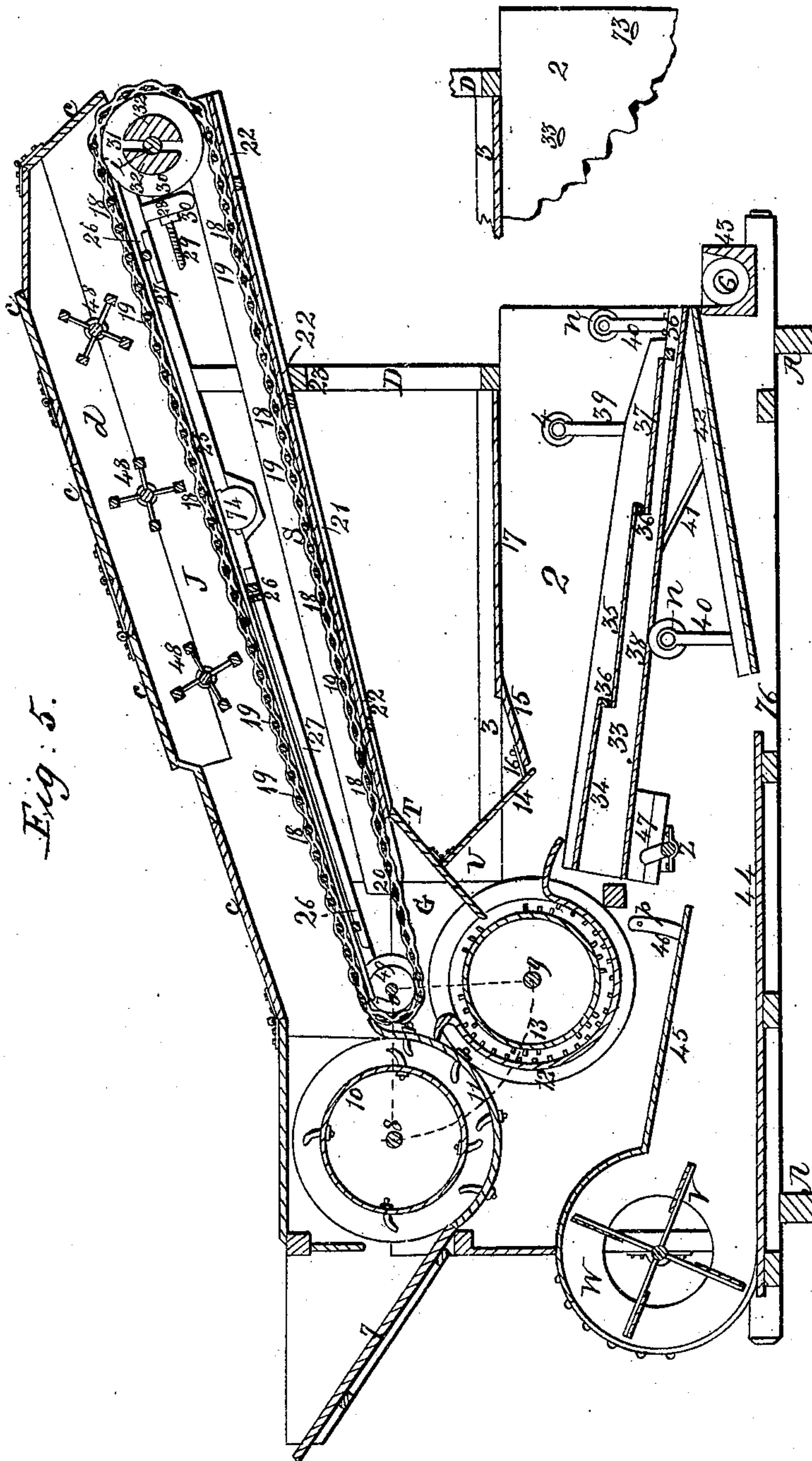


Fig. 5.

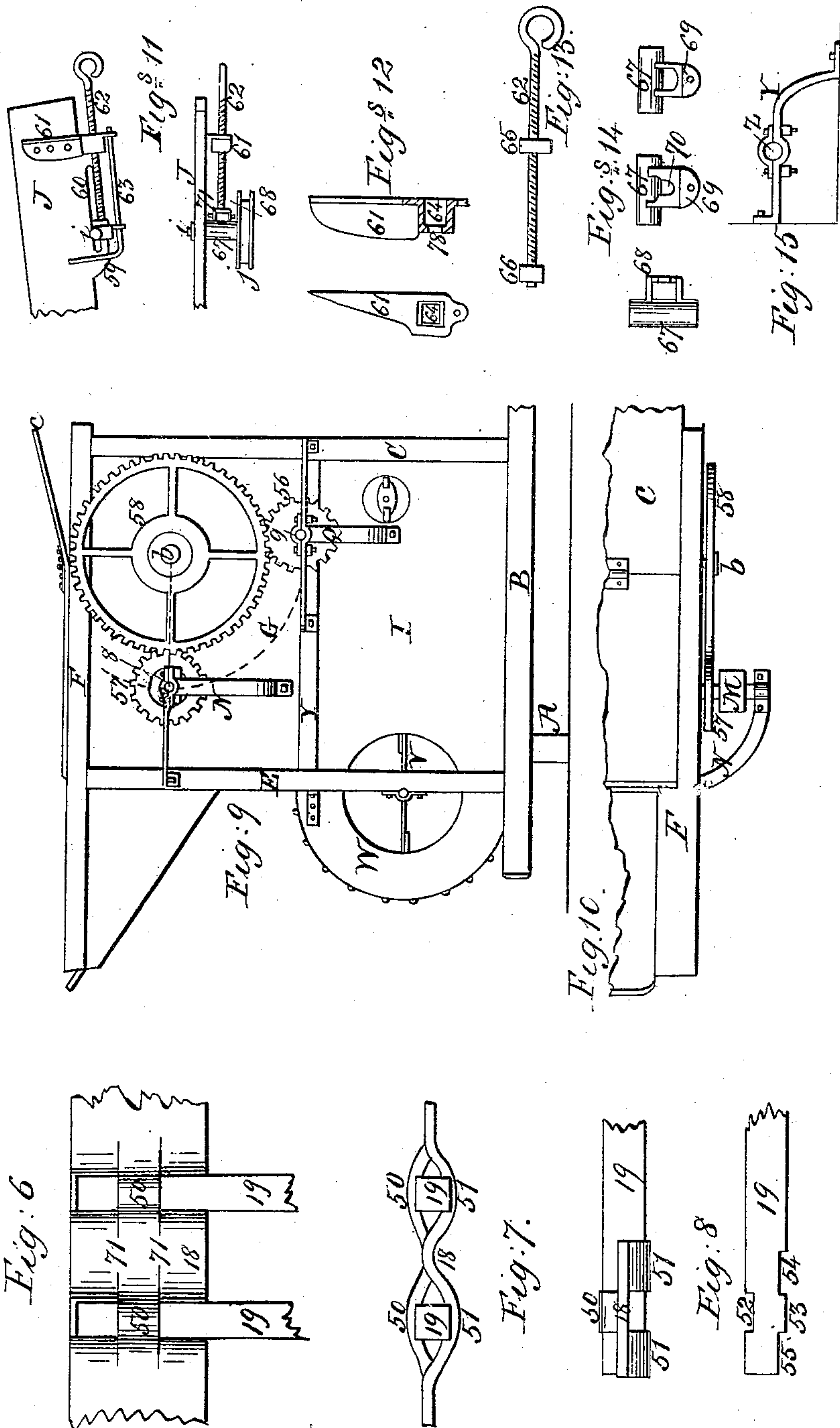
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# UNITED STATES PATENT OFFICE.

DAVID WHITING, OF ASHLAND, OHIO.

## IMPROVEMENT IN CLOVER-MACHINES.

Specification forming part of Letters Patent No. **103,806**, dated May 31, 1870.

*To all whom it may concern:*

Be it known that I, DAVID WHITING, of Ashland, Ashland county, Ohio, have invented certain new and useful Improvements in Clover-Machines; and I do hereby declare that the following is a full, clear, and exact description of my invention, reference being had to the accompanying drawing, forming a part of this specification, and to the letters of reference marked thereon, of which drawing—

Figures 1 and 2 are elevations, showing the two sides of my machine. Fig. 3 is a rear-end view of the same. Fig. 4 is a detail plan of the separating mechanism. Fig. 5 is a longitudinal section of the machine. Fig. 6 is a plan, showing the manner of securing the slats in the separating-apron belts. Figs. 7 are side and end views of the portion shown in plan in Fig. 6. Fig. 8 is a side view of one of the separating-apron slats, showing mode of notching the same. Fig. 9 is a side view of the front end of the machine, showing the mode of gearing together the thrashing and hulling cylinders. Fig. 10 is a partial plan of the same. Figs. 11 are side view and plan, showing the mechanism for drawing up the upper apron-roller. Figs. 12 are front and sectional side views of the main bracket for the tightening mechanism for the apron-roller. Fig. 13 is an elevation of the tightening-screw, with nut and end block. Figs. 14 are plan, front, and rear views of the sliding journal-box for the shaft of the upper apron-roller. Fig. 15 is an elevation of the bracket for the shaker-shaft.

My invention relates to certain improvements in the construction and arrangement of machinery for thrashing, hulling, and cleaning clover-seed, and in the construction of machinery for separating clover heads or grain from the straw after it has been passed through the thrashing mechanism; and it consists in the combination of a thrashing-cylinder with a slatted separating-apron and slatted separating-platform, and in the combination of a thrashing-cylinder and a hulling-cylinder with a slatted separating-apron and slatted separating-platform, said separating-platform extending under the whole of the separating-apron, and the lower roller of said apron being arranged immediately in the rear of the thrashing-cylinder, and the said thrash-

ing-cylinder being arranged immediately above and in front of the hulling-cylinder, whereby the two cylinders are brought within a frame of moderate height and length, and the separating-apron is brought up to the concave of the thrashing-cylinder at a point directly above the hulling-cylinder, so that the process of separation of the heads from the straw and of the delivery of the heads to the action of the hulling-cylinder is commenced as soon as the straw is delivered from the thrashing-cylinder, thus making the machine more compact in construction and greatly facilitating its operation.

My invention also consists in extending the belt from the horse-power, or other mechanism furnishing power to the machine, over both the pulley on the shaft of the thrashing-cylinder and the pulley on the shaft of the hulling-cylinder, so that the same belt which communicates power to the machine drives both the thrashing and the hulling cylinders, whereby these two cylinders are made to act as regulators or balances to each other and to the power, so that if one of them be choked and clogged by over-feeding, or by wet tangled straw or heads, the other will still continue its rotation, and will thus keep up the power until the clogged cylinder is again started, thus avoiding the difficulty which is experienced with a short belt uniting the two cylinders, which is very liable to run off in case anything clogs the rotation of the cylinder driven by said belt, and which causes the application of the whole power to the driving-cylinder, and is liable to impart a dangerous velocity to said cylinder before the machine can be checked.

My invention also consists in the combination of a slatted separating-apron and a slatted separating-platform, constructed and arranged as before described, with a plane conveying-platform, laid lengthwise under the under side of the separating-apron, the several parts being so arranged that the heads or grain which are separated from the straw fall through the separating-apron and platform onto the conveying-platform, and are drawn down to the hulling-cylinder or cleaning mechanism by the slatted separating-apron, whereby the separating-apron also acts as the motor for conveying the heads or grain to the hulling or cleaning mechanism, thus facilitating



the movement of the heads or grain without the expense of an additional conveyer-apron, and simplifying the construction of the machine.

My invention also consists in the novel mode of securing the slats of the separating-apron in the endless belts composing the sides of said apron, whereby I avoid the use of any screws or rivets in forming said connection, or the weakening of the belts by diminishing their cross-section, and at the same time lessen the labor and cost of construction, and make the apron much easier to repair in case the slats are injured.

My invention also consists in the combination of a slatted separating-apron and a slatted separating-platform, constructed and arranged as before described, with an upper apron-roller, constructed with drums for the apron-belts, and with circular disks of about the same diameter as the apron-belt drums, arranged between the slats of the separating-platform, whereby the lateral adjustment of the upper apron-roller, which is required to keep the apron-belts properly stretched, may be effected without affecting the continuity of the separating-platform, as the slats of the separating-platform and the disks on the apron-roller practically act together to form a slatted separating-platform to the extreme end of the apron.

My invention also consists in the improved construction of mechanism for drawing up the upper apron-roller, for the purpose of tightening the separating-apron, whereby I obtain a mechanism which is much more convenient in its operation, and of a more solid and stable construction, than any of the old form of tighteners.

My invention also consists in the novel construction and arrangement of the hopper-frame, by which the heads are transferred from the conveying-platform to the hulling-cylinder, said frame being so arranged as to be easily removed, so as to afford ready access to the hulling-cylinder, and the back board of said frame being made adjustable, so as to act as a valve, regulating the passage of the seed to the sieves for a second cleaning, when found desirable.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

In the annexed drawing, B B are the main sills of my machine, which rest on the cross-sills A A, and into which are mortised the uprights E C D.

The cross-pieces X X are secured between the uprights E C, and the side-boards I G H are secured against said uprights, and the cap-piece F is secured by bolts to the tops of of said uprights.

The fan-box W extends back behind the uprights E, and the side-boards 2 of the sieve-box are secured to the inner sides of the uprights C D, as shown.

The brackets Q are bolted to the frame-

pieces C X and the side-boards I, and on them are journaled the shaft 9 of the hulling-cylinder, said shaft being extended through the side-boards G, and having secured on it the pulley P, as shown in Fig. 1, or the pinion 56, as shown in Fig. 9, depending on whether the thrashing and hulling cylinders are to be bolted or geared together.

Immediately above and in front of the hulling-cylinder 13 is arranged the thrashing-cylinder 10, the concaves 12 and 11 of said cylinders being placed nearly in contact with each other, as shown in Fig. 5, or they may be placed in contact with each other, or the one concave may be merged into the other for a short distance, so that the back of a portion of one concave should serve as a portion of the face of the other concave; but the construction shown is preferred.

The shaft 8 of the thrashing-cylinder 10 is extended through the side-boards G H, and is journaled on the brackets N, which are secured to the frame-pieces E and side-boards G.

The pulley M is secured on the shaft 8 of the thrashing-cylinder, and where the cylinders are to be geared together the pinion 57 is also secured on said shaft, as shown in Fig. 9.

The shafts 8 and 9 of the thrashing and hulling cylinders are both arranged in the circumference of a circle having its center at the shaft *b* of the lower apron-roller, as indicated in Figs. 5 and 9, from which it is seen that said cylinders may be readily geared together by journaling the spur-wheel 58 on the lower apron-roller shaft, *b*, which can be easily extended for this purpose, as shown in Figs. 9 and 10, the only change in the construction consisting in omitting one of the arms of the bracket N, as shown.

The cylinders, when geared together as shown, may be driven by a belt over a pulley, M, on the shaft of one of the cylinders; or a driving-shaft (laid either in the line of the cylinder-shafts and connected with one shaft by a universal joint, or laid at right angles with the cylinder-shaft and connected with it through bevel-gears and a universal joint, if desired) may be used to communicate the power to the machine.

Where both cylinders are to be driven by a belt, I extend the main driving-belt R (see Fig. 1) over the pulley M on the thrashing-cylinder shaft 8; thence under a tightening-pulley, O, secured in a bracket on the side-board G; thence over the pulley P on the hulling-cylinder shaft 9, so that the main belt R drives both cylinders, with the advantages before stated.

The tightening-pulley O may be made adjustable in position, so as to tighten up the belt R when desired; or, if the belt R has a sufficient bearing-surface on the pulleys M and P to prevent slipping, the pulley O could be dispensed with.

The frame-pieces J J of the separating mechanism are continuous from one end of the apron to the other, and are attached by pivot-bolts *e* to the rear uprights, D D, while their ends



rest between the uprights C C and the top pieces, F F, on the side-boards G G, and abut against the side-boards H H, as shown in Figs. 1 and 2.

The lower apron-roller, *b*, is journaled in plates *a a*, secured on the frame-pieces J J, and the upper apron-roller, *i* 31 32, is journaled in the front ends of the tightening-screws 29 29, (shown in Figs. 1, 2, and 5,) said screws passing through the standards 28 28 on the frame-pieces J J, and being adjusted by the jam-nuts 30 30, in a manner readily seen.

The separating-apron 18 19 consists of the two endless belts 18 18, which pass around drums 49 49 (see Figs. 4 and 5) on the apron-rollers, and between which are secured the slats 19 19, as shown. These endless belts 18 18 are conveniently made of leather and the slats 19 of wood, and the ends of said slats are secured in or to the belts by cutting two longitudinal slits, 71 71, in the belt, and by cutting the notches 52 54 55 in the sides of the slat. The central part, 50, of the belt is then raised up, and the end of the slat is put in between the parts 51 50 51 of the belt, where it is secured in position by giving the slat a quarter-turn, which brings the part 50 of the belt into the notch 52 of the slat, and the part 53 on the slat between the parts 51 51 of the belt.

Various other materials could be used for the belts and slats than those herein described, and other modes of uniting the slats to the belts might be devised; but the construction described is preferred.

The beaters 48 48 48 are of an ordinary construction, and are arranged in the frame-pieces J J, as shown, the side pieces *d d* being secured to the frame-pieces J J, in order to raise the cover of the separating mechanism up above the beaters, and the hinged covers *c c* being arranged at suitable intervals, as shown in Fig. 2, in order to allow of easy access to the apron in case it becomes choked.

The knockers 24 24 are secured on the under side of the frame-pieces J J, as shown in Fig. 5, and serve to shake the separating-apron as it passes over them, in the same manner as the knockers under the Pitt apron.

The separating-platform 25 25 consists of a series of separate slats, 25 25, which are laid lengthwise under the slats 19 19 of the separating-apron, where they are supported by cross-pieces 26 26, which rest on cleats 27 27 on the frame-pieces J J, as shown in Fig. 5.

Upon the shaft *i* of the upper apron-roller are secured the circular disks 31 31, which are arranged between the slats 25 25 of the separating-apron, and are held together and in position by the blocks 32 32, as shown in Figs. 4 and 5.

The conveying-platform S consists of a plane bottom, 21, strengthened by cross-cleats 22 22, and provided with side pieces, as shown, which is placed directly under the under side of the separating-apron 18 19, where it is supported by the cross-pieces 23 between the rear uprights D D, and by the support received by

the ends 20 of the side pieces on the side-boards G G.

From the foregoing description it is readily seen that in case it becomes necessary to remove the hulling-cylinder 13, the top pieces, F F, can be taken off and the side-boards H H be lifted out, when, by sliding back the conveying-platform S, the whole separating-frame J J, with its inclosed mechanism, can be turned up around the pivot-bolts *e e*, so as to be out of the way in getting at the hulling-cylinder.

The hopper-frame T U consists of the inclined board T, which is secured on the triangular blocks U U, which rest on the side-boards 2 2 and against the uprights C C, and support the board T in the proper position to bring its upper edge just under the conveying-platform S and its lower edge over the hulling-cylinder 13.

The swing-board 14 is hinged to the back of the inclined board T, and can be swung between the blocks U U, it being held in any desired position by a hasp, 16, provided with suitable holes, and shutting over a pin in the inclined board 15, which board, with the board 17, forms the top of the sieve-box.

When it is desired to examine the hulling-cylinder 13, the operator slides back the conveying-platform S and raises up the swing-board 14, when the hopper-frame may be slid back along on the side-boards 2 2 and between the side pieces 33, thus giving access to the hulling-cylinder, as desired.

The sieve-frame consists of the side pieces 33 33, which are united by the cross-pieces 36 36, and between which are secured the sieves 34 35 37. These sieve-sections are arranged as shown in Fig. 5, each section being arranged just in front of and below the preceding section, and a small space being left between each cross-piece 36 and the section below it, so that the upper surface of the sieves presents a series of offsets or steps, as shown.

A large sieve, 38, of a mesh somewhat finer than the meshes of the sieves 34 35 37, is stretched under the whole of the sieve-frame, and serves to catch any chaff that might pass through the upper sieves.

The rear end of the sieve-frame is supported by boxes 47 on the journals of the cranks formed in the shaker-shaft Z, which shaft is journaled in brackets Y, of the form shown in Fig. 15, which are secured to the sills B and uprights C, as shown in Figs. 1 and 2.

The front end of the sieve-frame is supported by swinging arms 39 39, which are pivoted to the side pieces 33, and are attached to the bolts 4, which pass through the longitudinal slats 33 in the side-boards 2 2, (shown in detached view in Fig. 5,) and are secured by thumb-nuts on the outside of the frame, as shown in Fig. 2.

The swinging chute-board 42 consists of a broad plane bottom with raised side pieces, and is hung, at a small angle, directly under the sieve-frame by means of the swinging arms 40 40, which are pivoted to the sides of the



chute-board and to the bolts *n n*, which extend through horizontal slots 73 73 in the side-boards 2 2, (shown in detached view in Fig. 5,) and are secured by thumb-nuts on the outside of the frame, as shown in Figs. 1 and 2.

The swinging motion is imparted to the chute-board 42 by means of a connecting-rod, 41, pivoted to the side of said board and to the side piece 33 of the sieve-frame, as indicated in Fig. 5.

The blast for blowing the chaff from the seed is produced by the fan V revolving in the fan-box W, and is conducted to the sieves by the bottom board, 44, and the board 45, said board 45 being pivoted at its rear end, and being supported at its other end by the links 46 46, which are attached to bolts *p*, passing through vertical slots in the side-boards I I, and secured by thumb-nuts on the outside of the frame, as shown in Figs. 1 and 2, so that by moving the bolts *p p* up or down the position of the board 45 may be varied to regulate the amount of blast to suit the condition of the seed on the sieves.

The elevator-screw 6 is arranged in a box, 43, at the lower end of the sieves, and serves to draw the tailings from the sieves out to the elevator-box K, where they are carried up by an endless elevator-belt of an ordinary construction, and are discharged into the trough I, which discharges them between the upper and lower sides of the separating-apron 18 19 onto the conveying-platform S, from whence they pass down over the hopper-board T to the hulling-cylinder 13.

The pulley *v* is secured on the thrashing-cylinder-shaft 8, (see Fig. 2,) and a belt, *w*, passes around it and the large pulley *x* on the shaft of the fan V. A small pulley, *y*, is also secured on the fan-shaft, and a crossed belt, *z*, passes around it and the pulley 1 on the shaker-shaft Z. The pulley 75 is secured to the other end of the shaker-shaft, and the belt *l* passes around it and the large pulley *k* on the upper apron-roller shaft, *i*. The pulley *j* is secured on the apron-shaft *i*, (see Fig. 1,) and a crossed belt, *h*, passes around it and the pulley *u* (see Fig. 2) on the shaft of the driving-pulley for the elevator-belt. The pulleys *s* and *t* are secured on the other end of the apron-shaft *i*, and a crossed belt, *m*, passes around the pulley *t* and the pulley 5 on the elevator-screw, while a belt, *r*, is passed around the pulley *s* and a pulley on the shaft of the middle beater, 48, as shown in Fig. 2. The lower beater, 48, is driven by a belt, *g*, passing over a pulley on its shaft and a second pulley on the shaft of the middle beater, 48, as shown in Fig. 2, and the upper beater, 48, is driven by a belt, *g*, passing over a pulley on its shaft and a pulley on the other end of the shaft of the middle beater, 48, as shown in Fig. 1.

The ordinary form of tightener for the upper roller of the separating-apron (shown in Figs. 1, 2, and 5) is not convenient to operate, as the jam-nuts 30 30 are not easily accessible,

and it is also liable to become loose and shaky, as the bearings of the shaft are thrown so far away from the support of the standard 28 when the belts of the apron are drawn out, to remedy which defects I use the improved construction of tightener shown in Figs. 11 to 14. In this construction the pieces 59 are secured to the under edges of the frame-pieces J, and the slots 60 are cut in said pieces to pass the upper apron-roller shaft, *i*.

The main bracket 61 has a nut-cavity, 64, formed at its base, as shown in Fig. 12, and is secured to the frame-piece J, as shown in Fig. 11; and the guide-rod 63 is fastened at one end to the lower end of the bracket 61, and at the other end to the frame-piece J.

The journal-box 67, for the apron-roller shaft *i*, has the square box 68 formed at its side, and the front of said box is notched down into the curved form 70, to admit the tightening-screw 62; and a flange with hole 69 is formed on the lower side of said box, through which is passed the guide-rod 63, which acts to steady the journal-box.

The end of the tightening-screw 62 is secured in the end block 66, in such a manner that it can revolve in but cannot draw out of said block, and the nut 65 is arranged on said screw, as shown.

To unite the parts, the apron-roller shaft *i* is passed through the journal-box 67, and the end block 66 is passed through the hole 64, in the bracket 61, and is dropped into the box 68 on the journal-box 67, where it is secured by a pin, 71, passing through the sides of the box 68, above the block 66, as shown in plan in Fig. 11.

The nut 65 is of such a size as to come to a bearing on the flange 73 around the rear end of the hole 64 in the bracket 61, from which it is seen that, by turning up the screw 62 by a wrench or lever inserted in the eye formed at its end, the apron can be tightened up as desired.

Having thus fully described the construction of my machine, its operation will be readily seen.

The straw is fed in over the feed-board 7 to the thrashing-cylinder 10, which, with its concave, is armed with coarse spikes, and acts to thrash the heads from the straw, and to throw the heads and straw up onto the separating-apron 18 19 and platform 25.

From an examination of the separating-apron and platform in plan, as shown in Fig. 4, it is seen that they form, when combined, a coarse sieve, the upper part of which (the apron) is constantly shaking, so as to separate the heads from the straw, and that, as the heads become separated from the straw, they fall through the apron and platform either directly onto the hulling-cylinder 8 or onto the conveying-platform S, where they are dragged along to the inclined board T by the slots of the separating-apron, which drag on the platform S.

The hulling-cylinder 13 is armed with short fine teeth, (as is also its concave 12,) and it



acts to hull the seeds from the heads and to throw both out onto the sieve 34.

As the seeds and chaff are worked down the sieves 34 35 37 by the motion of the sieve-frame, the seeds pass through the sieves 34 35 and lower sieve, 38, onto the chute-board 42, and it is readily seen that, as these seeds and chaff pass over the offsets of the sections of the upper sieves, they are subjected to a full blast of air coming out between the cross-pieces 36 and the sections just below them, the effect of which is to blow the light chaff away from the heavier seed, and to allow the seeds to pass down through the sieves, thus facilitating the cleaning of the seeds.

The seed is shot by the board 42 into a long box placed under the machine, at the end 76 of the chute-board. (Not shown in drawing.)

When it is desired to run the seed through the cleaning mechanism a second time the seed is thrown up onto the top 17 of the sieve-box, and the swing-board 14 is set so as to leave a proper space between it and the inclined board 15, to allow of the passage of the seed at the proper rate, when it will pass down onto the sieves in a manner readily seen.

The operation of the beaters, elevator-screw, and elevator and blast-pan will be fully understood by persons skilled in the art of thrashing and separating from the foregoing description of the construction of the machine.

Having thus fully described my improved machine, what I claim therein as new and of my invention, and what I desire to secure by Letters Patent, is—

1. The combination of the thrashing-cylinder 10, slatted separating-apron 19 18 19, slatted separating-platform 25 25, and the lower apron-roller, *b* 49, said apron-roller being arranged immediately in the rear of the thrashing-cylinder, and said slatted separating-platform extending up to the lower inner end of the separating-apron, substantially as and for the purpose herein specified.

2. The combination of the slatted separating-platform 25 25, slatted separating-apron 19 18 19, lower apron-roller, *b* 49, thrashing-cylinder 10, and hulling-cylinder 13, said thrashing-cylinder being arranged immediately above and in front of the hulling-cylinder, and said apron-roller being arranged immediately behind the thrashing-cylinder *H* and directly above the hulling-cylinder, and the said slatted separating-platform extending up to the lower inner end of the separating-apron, substantially as is herein specified.

3. Extending the main driving-belt *R* over both the pulley *M* on the thrashing-cylinder

shaft 8 and the pulley *P* on the hulling-cylinder shaft 9, so that said belt serves as the means for driving both cylinders as well as for communicating the power to the machine, as is herein specified.

4. The combination of thrashing-cylinder 10, hulling-cylinder 13, the slatted separating-apron 18 19, slatted separating-platform 25, and plane conveying-platform *S*, the several parts being arranged and operating substantially as and for the purpose specified.

5. The slat 19, provided with the notch 52 and with or without the notches 54, 55, when used in combination with the apron-belt 18, provided with the loop 50, substantially in the manner and for the purpose specified.

6. The combination of the slatted separating-apron 18 19, slatted separating-platform 25, and adjustable apron-roller *i* 31 32, provided with the apron-belt drums 49 49 and the circular disks 31 31, arranged between the slots 25 25 of the separating-apron, as is hereinbefore specified.

7. The conveying-platform *S*, when so constructed and arranged as to be readily slid back from its ordinary position under the separating-apron 18 19, to allow of the turning up of the separating mechanism, as is hereinbefore specified.

8. The combination of the main bracket 61, provided with nut-cavity 64, with inner flange 78, tightening-screw 62, with nut 65 and end block 66, and journal-box 67, with side box 68, the several parts being constructed and arranged as and for the purpose specified.

9. As a means of steadying the journal-box 67, in the combination specified in preceding clause, the guide-rod 63, extending from the frame-piece *J* through the hole 69 in the lower flange of the journal-box 67 to the main bracket 61, as and for the purpose specified.

10. The combination of the hopper-board *T* and triangular blocks *U U*, said board and blocks being so arranged as to be slid back on the side-boards 2 2, to give access to the hulling-cylinder 13, as is hereinbefore specified.

11. The swing-board 14, hinged to the back of the hopper-board *T*, and swinging between the blocks *U U*, and forming, with the inclined board 15, a hopper for delivering the seed to the sieves for a second cleaning, as hereinbefore specified.

As evidence that I claim the foregoing I have hereunto set my hand this 21st day of March, 1870.

DAVID WHITING.

Witnesses:

M. G. GROSSCUP,  
M. C. GOUCHER.