

No. 729,051.

PATENTED MAY 26, 1903.

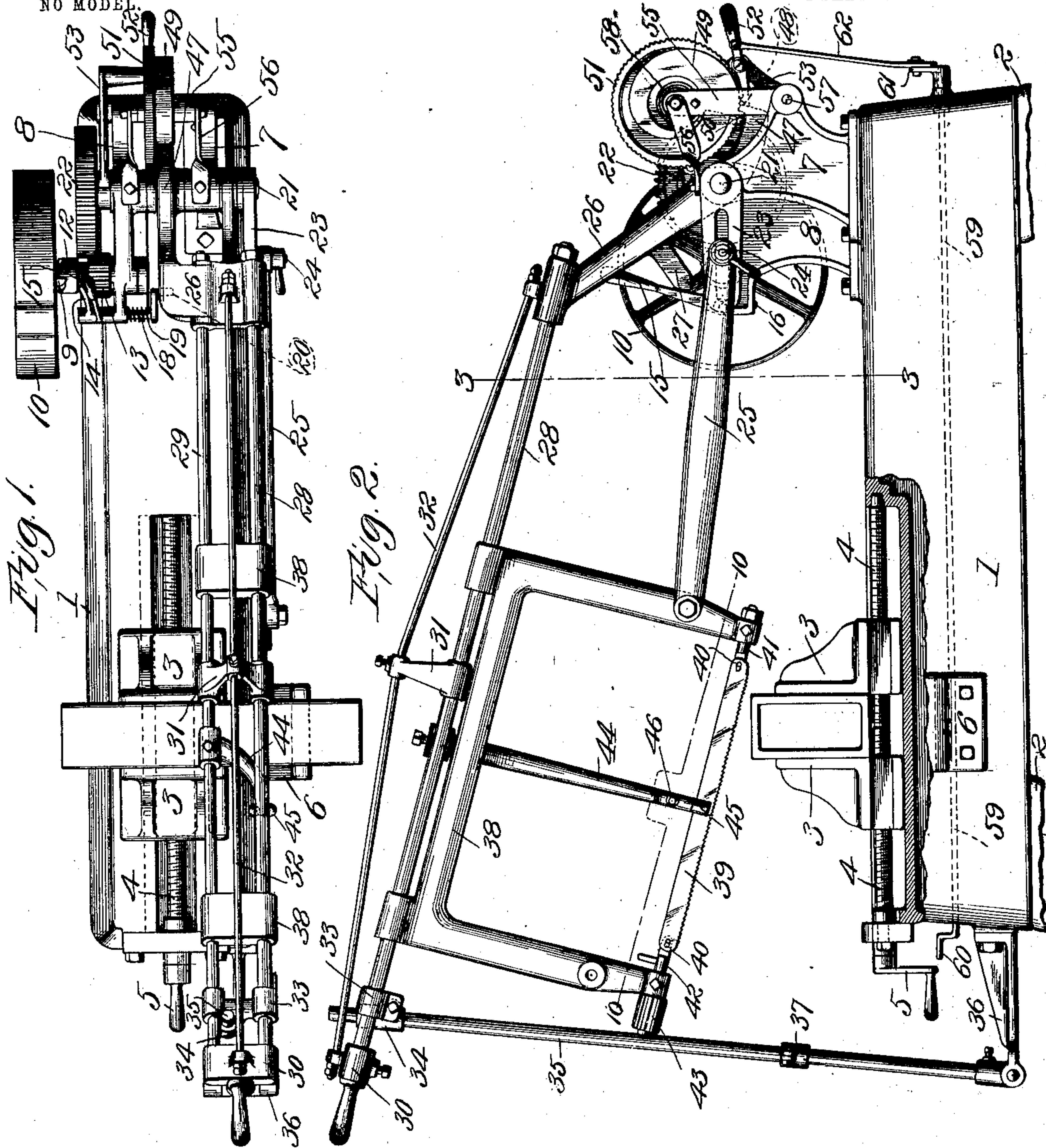
S. FIELD.

DRAW CUT SAWING MACHINE.

APPLICATION FILED AUG. 2, 1902.

4 SHEETS—SHEET 1.

NO MODEL.



Witnesses:

Wm. H. Scott
Ralph L. Lisk

Inventor:

Sjonne Field,
by Bakerwell & Cornwall
attys.

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4 SHEETS—SHEET 3.

Fig. 6.

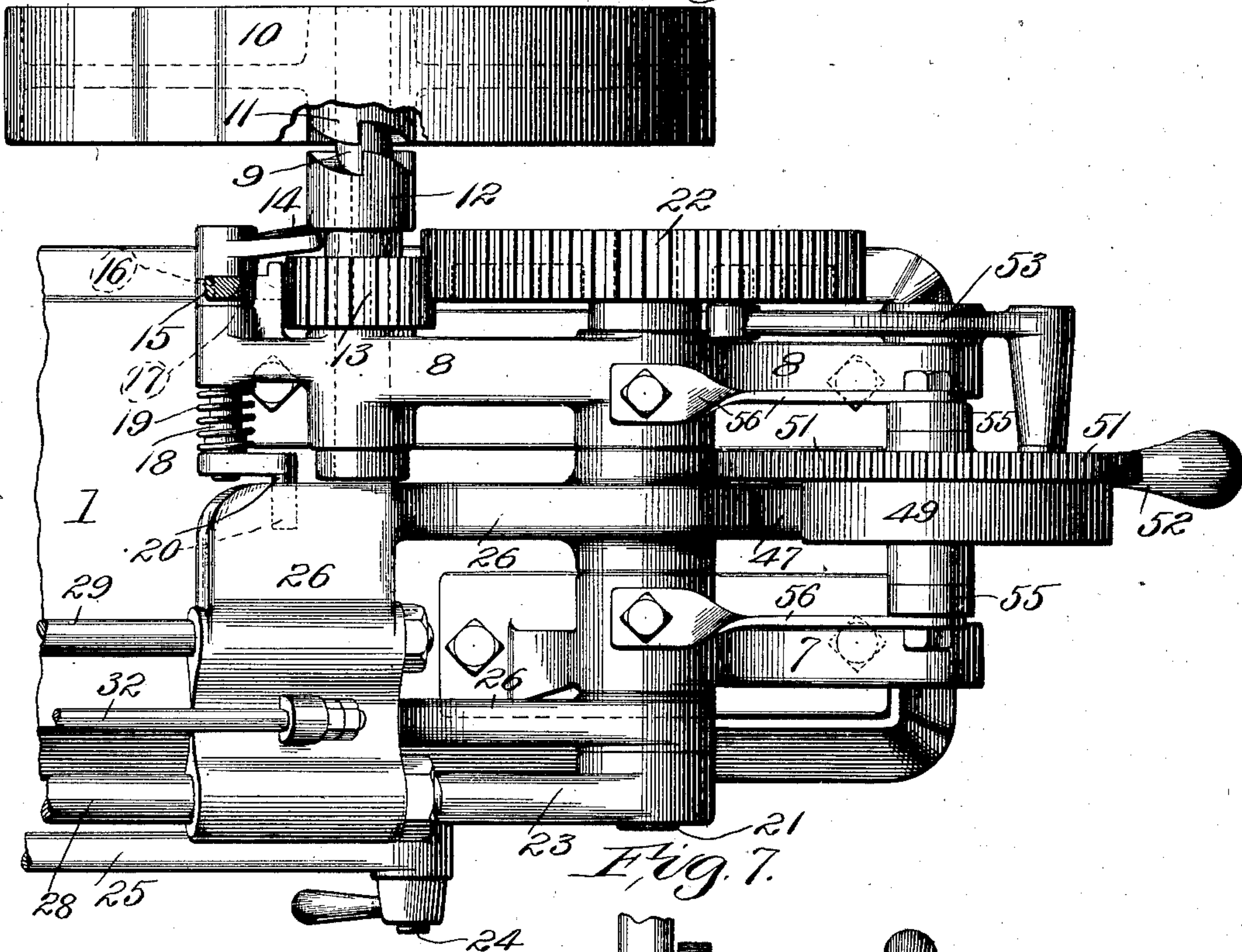
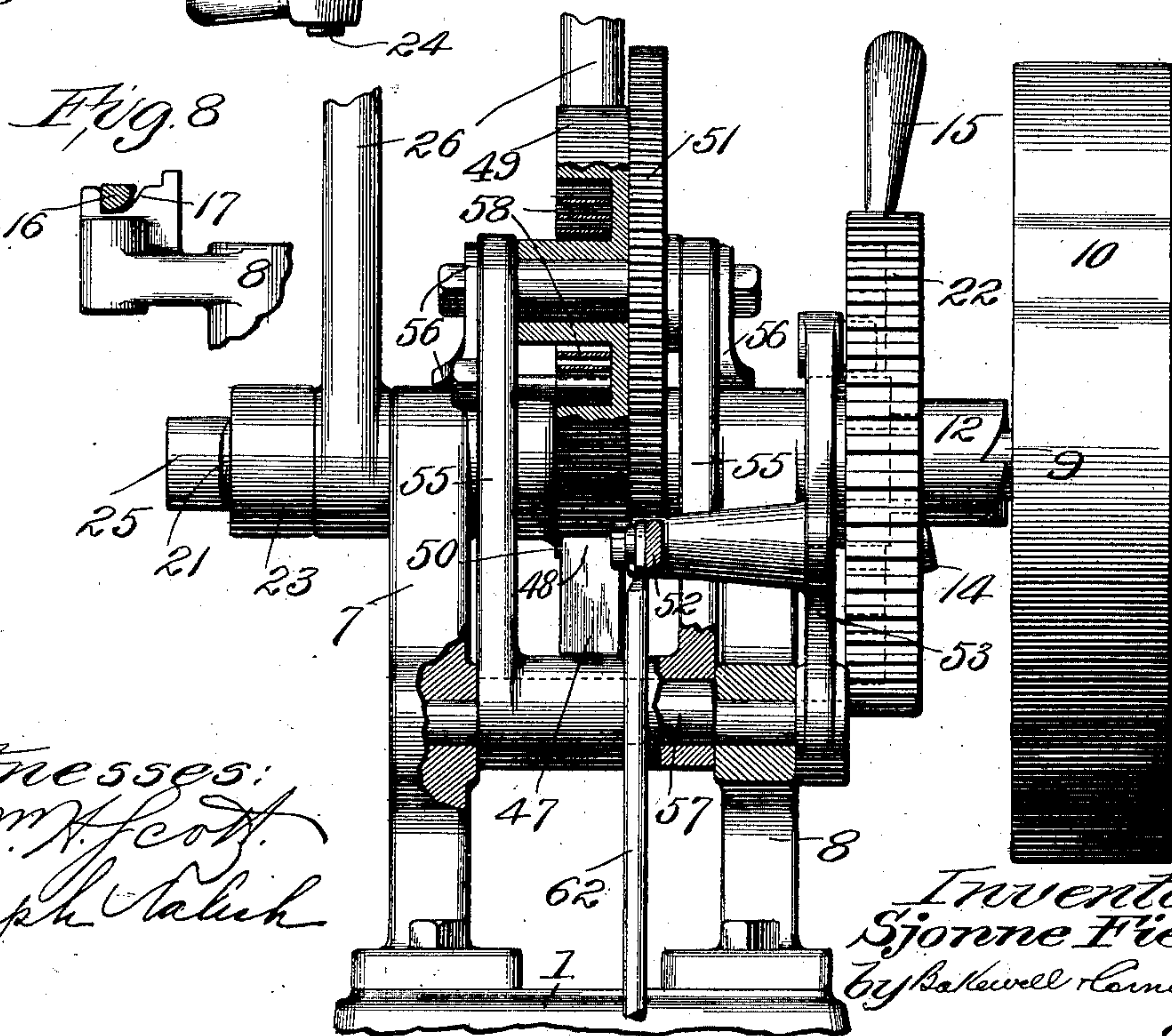


Fig. 7.



Witnesses:
Wm. H. Scott
Ralph Talbot

Inventor:
Sjonne Field,
By Bakewell Cornwall
attys.

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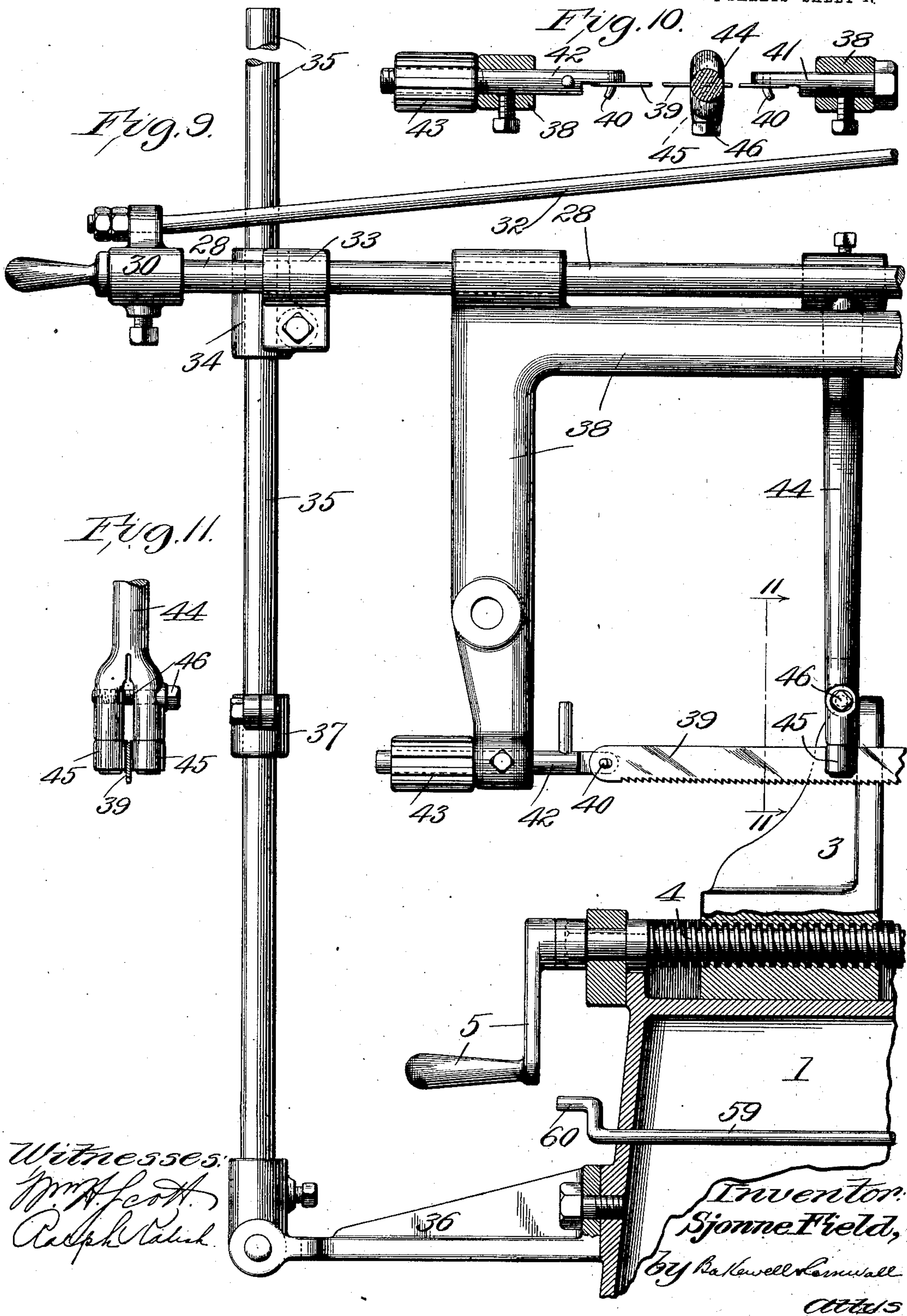
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NO MODEL.

4 SHEETS—SHEET 4.



Witnesses:
Wm. H. Scott
Ralph W. Smith

Inventor:
Sjonne Field,
by R. H. Lowell & Son
Attys

UNITED STATES PATENT OFFICE.

SJONNE FIELD, OF CHICAGO, ILLINOIS, ASSIGNOR TO HARRY T. STORY, OF CHICAGO, ILLINOIS.

DRAW-CUT SAWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 729,051, dated May 26, 1903.

Application filed August 2, 1902. Serial No. 118,081. (No model.)

To all whom it may concern:

Be it known that I, SJONNE FIELD, a citizen of the United States, residing at the city of Chicago, county of Cook, State of Illinois, have invented a certain new and useful Improvement in Draw-Cut Sawing-Machines, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a top plan view of my improved machine. Fig. 2 is a side elevational view, partly in vertical section. Fig. 3 is an enlarged cross-sectional view on line 3 3, Fig. 2. Fig. 4 is an enlarged side elevational view of the rear portion of the machine. Fig. 5 is a detail view of one of the cams. Fig. 6 is an enlarged top plan view of the rear portion of the machine. Fig. 7 is an enlarged rear elevational view, partly in vertical section. Fig. 8 is a detail plan view of the forward portion of one of the brackets, the finger carried by the operating-handle being shown in section in connection therewith. Fig. 9 is an enlarged elevational view of the front portion of the machine, partly in section. Fig. 10 is a horizontal sectional view on line 10 10, Fig. 2, the saw-blade being broken away; and Fig. 11 is a sectional view on line 11 11, Fig. 9.

This invention relates to new and useful improvements in draw-cut sawing-machines, the object being to simplify the construction of machines of this character and so arrange the parts that the saw will be automatically fed toward the stock and at the outward stroke will be elevated, so as to clear the stock.

The present invention consists in the details of construction, arrangement, and combination of the several parts, all as will hereinafter be described and afterward pointed out in the claims.

In the drawings, 1 indicates the bed-plate, preferably in the form of a casting of inverted-U shape in cross-section, which bed-plate may for convenience be supported upon legs 2. (See Fig. 2.) This bed-plate is formed with a groove in the upper face of its front end, in which are slidably mounted clamping or vise jaws 3, which are designed to

hold the stock in position for being operated upon. These vise-jaws 3 are operated by a right and left hand screw-threaded rod 4, provided with an operating-handle 5 at its forward end, as is well understood. In order to widen the supporting-base for the stock being operated upon, I preferably arrange an angle 6 on the bed-plate, as shown in Figs. 1 and 2.

7 and 8 indicate brackets extending upwardly from the rear end of the bed-plate 1 and affording bearings for the several shafts of the operating mechanism.

9 indicates a stud-shaft mounted in the bracket 8, upon which is arranged a pulley 10, having a clutch-face 11.

12 indicates a clutch member slidably mounted on the shaft 9 and designed to cooperate with the clutch member 11. This clutch member 12 is conjoined to a pinion 13 and is provided with an annular groove in which is received a web or fin 14 of an operating-handle 15. This operating-handle preferably extends upwardly and is designed to be manipulated by hand.

16 indicates a finger extending downwardly from the hub of the operating-handle and cooperating with a cam-face 17, formed on the bracket 8. (See Fig. 8.) When the operating-handle is pulled forward, the finger 16 rides up on its cooperating cam-face and the clutch member 12 is thrown into engagement with its companion 11, which latter, being the driving clutch member, will drive the machine through the medium of clutch member 12. When the handle is moved rearwardly, the clutch member 12 is disengaged from its companion and the machine is thrown out of gear. In order to draw the clutch member 12 out of engagement with its companion, I extend the shaft 18, upon which the handle 15 is mounted, inwardly past the bracket 8, as shown in Figs. 3 and 6, and arrange a spring 19 thereon, the energies of which are directed toward moving the clutch member 12 away from its companion. The inner end of shaft 18 has a projection 20 arranged thereon, which projection lies in the path of the saw-frame, as will hereinafter be described, and when said saw-frame approaches its lowest limit it will engage the projection 20

and move the finger 16 onto the lower part of its cam to automatically throw the machine out of gear.

21 indicates what I will term the "main shaft" of the machine, upon which is arranged a driving-gear 22 in mesh with the pinion 13. This shaft 21 has mounted upon its other end a slotted crank-arm 23, in whose slot is arranged an adjustable crank-pin 24, upon which is pivoted a pitman 25. The purpose of this adjustment is to regulate the throw of the saw, it being desirable that the saw shall have an excess throw only of such length as will enable it to clear itself at the end of the draw cut.

26 indicates a frame loosely mounted upon the shaft 21 and provided with a finger or projection 27 for cooperating with the finger 20, as hereinbefore described. This frame 26 is provided with sockets at its upper end, in which are arranged guide-rods 28 and 29, there being preferably two of these rods. The forward ends of these rods are received in a socket-casting 30, (see Fig. 9,) where they are held immovably by means of appropriate set-screws.

31 indicates a strut or saddle strung on the guide-rods of the frame, which strut cooperates with a tension or truss rod 32, having its ends secured in lugs on the frame 26 and socket-casting 30. By this construction the overhanging frame, of which the guide-rods are members, is made rigid and of such strength as to properly support the moving saw-frame. In order to guide this overhanging guide-frame in its vertical movement, I slidably mount blocks 33 on the guide-rods, between which blocks is swung a guiding-collar 34, embracing a rod 35, pivotally mounted in a bracket 36, secured to the front end of the bed-plate. Rod 35 is provided with an adjustable collar 37 for cooperating with the sleeve 34 to limit and arrest the downward movement of the guide-frame.

38 indicates a saw-frame provided with perforated lugs or ears in its upper end, which slidably receive the guide-rods 28 and 29. This saw-frame has one of its legs pivotally connected with the pitman 25 and in the operation of the machine is reciprocated by said pitman, said frame sliding backward and forward along the guide-rods from which it is suspended.

39 indicates the saw-blade mounted in the saw-frame, being arranged upon studs 40, extending laterally from bolts 41 and 42. Bolt 41 is preferably a fixed bolt and is held in position by a set-screw, while bolt 42 is provided with a nut 43, whereby the saw-blade may be placed under tension or stretched, said bolt 42 being held in its adjusted positions by means of a set-screw, as shown in Fig. 10.

44 indicates a saw-guide, which is in the nature of an arm fixed upon and depending from one of the guide-rods. This arm is adjustable along the guide-rod for well-known reasons and is locked in its adjusted positions

by means of an appropriate set-screw. The lower end of the arm is bifurcated and provided with rollers 45. (See Fig. 11.) A clamping-screw 46 is employed for moving the rollers toward each other in order that the saw-blade may be held firmly against lateral vibration, but at the same time move freely between the rollers.

I will now describe the manner in which the guide-frame and its carried reciprocating saw are fed downwardly.

47 indicates a rearward extension of the guide-frame 26. (See Fig. 4.) This extension is provided with a finger 48, bearing upon the periphery of a cam 49. This cam is provided with a stop-shoulder 50 at its highest point to cooperate with the finger 48 for the purpose of arresting the cam in a position where the guide-frame is ready for operation—that is, a position in which the guide-frame is held in its highest position. Cam 49 has conjoined to it a feed-wheel 51, whose periphery is preferably formed with shallow corrugations, as shown.

52 indicates a feed-pawl which cooperates with the feed-wheel, which pawl is preferably weighted at its outward end. Pawl 52 is carried by an arm 53, said arm having a cam-roller mounted upon its inner or free end for cooperating with a cam-groove 54, preferably formed in the inner side face of the gear 22. This cam-groove is so shaped that during approximately one-half of a revolution of gear 22 the arm 53 is held stationary, say, from points *a* to *b* in Fig. 5. From points *b* to *c* arm 53 and its carried cam move slightly inwardly to enable the pawl to firmly engage the feed-wheel. From points *c* to *d* the feed-wheel is driven by the inward movement of the pawl, and from points *d* to *a* the pawl is recovered. The position of the cam shown in Fig. 5 corresponds to the position of the parts shown in Fig. 4, in which the crank-arm 23 will be seen to be located at the forward extremity of its stroke and in readiness to draw the saw-blade inwardly. The operating or active cutting stroke of the saw-blade is the inward stroke, in order to effect the draw cut, which stroke is effected while the crank is moving through the lower arc of its half-circle. It is during this time that the feeding mechanism is held stationary by reason of the roller occupying a concentric portion of cam-slot 54 between the points *a* and *b*. As the crank-arm reaches the extremity of its inner throw or stroke and starts to make the upper arc of its path of movement the roller will enter the shallow portion of the cam-slot, or between points *b* and *c*, to move the pawl into positive engagement with the feed-wheel. As the saw-frame travels outwardly or forwardly the roller enters the deepest portion of the cam-groove 54 and effects the feed of wheel 51 just before the crank-arm completes the upper arc of its path of movement. Thus when the crank-arm starts on its downward and inward stroke to

draw the saw inwardly the feed has been effected and the saw will make its cut, due to the weight of the guide-frame and saw-frame, until the teeth clear themselves.

5 It is desirable that the crank-pin upon which the pitman is mounted be adjustable along the slot in the crank-arm, so as to impart such a throw or stroke to the saw-frame as will enable the saw-teeth to clear themselves at
10 or near the extremity of the inner stroke, so that the saw will upon the completion of its draw cut run free and clear of the stock for a short distance. This will insure a free and uninterrupted return of the saw on its out-
15 ward or idle stroke.

As the guide-frame is pivotally mounted upon the shaft 21, it will be obvious that the preponderance of weight is on the side opposite the bearing-finger 48, and this finger will
20 thus be held in close contact with the periphery of cam 49.

At each operation of the saw through the feeding devices just above described the cam 49 will be advanced slightly by a step-by-step
25 movement, presenting successively a lower cam-face to the finger 48. Thus at the beginning of the cutting stroke of the saw the finger 48 might not rest upon the periphery of cam 49, but before the cutting stroke was
30 completed the finger would come in contact with the cam 49 and hold the saw away from the stock by arresting its downward movement, and thus produce the slight clearance at the extremity of the cutting stroke before
35 described. As the saw moves out on its idle stroke the finger 48 holds it clear until the cam 49 is again advanced to present a lower face to the finger 48, when the saw would drop onto the stock, and at the beginning of its
40 cutting stroke and extending throughout the greater portion thereof the saw would cut the stock and in so cutting its way would gradually drop until arrested by the finger 48 coming in contact with the periphery of the
45 cam to effect a clearance at the extremity of its stroke, as before described.

From the above it is obvious that the parts of the machine will work satisfactorily if the stock operated upon is of uniform cross-section throughout and the teeth of the saw and
50 other conditions are equal at all times, so as to enable one adjustment or setting of the machine to answer for all times. However, as the machine is designed to handle all kinds
55 of material and sizes up to certain limits it is evident that it is of advantage and desirable to insure at least the clearance of the saw on its idle stroke and also to provide means whereby the feed of the saw will not
60 operate in advance of the cutting capacity of the saw. To accomplish this, I mount the cam 49 and its conjoined feed-wheel in a U-shaped frame 55, which frame is held in its vertical position by means of straps 56
65 bolted to the brackets 7 and 8 and to the axle upon which the cam and feed-wheel are mounted. These straps are not bolted firmly

home, the bolts and connections being loose, so as to permit a slight vertical movement of the U-shaped frame and its carried cam and
70 feed-wheel.

57 indicates a cam-shaft mounted in the brackets 7 and 8 and upon which the frame 55 is carried. This cam-shaft 57 has the
75 pawl-carrying arm 53 fixed thereto, so that at every operation of said pawl-carrying arm to effect the feed of the cam 49 the frame 55 is dropped temporarily, which results in elevating the saw on its outstroke. In other
80 words, on the cutting stroke of the saw the pawl-carrying arm is held stationary and the frame 55 is held in an elevated position, so that the saw-teeth can bite into the stock being operated upon. However, on the out or
85 idle stroke of the saw when the arm 53 is operated the frame 55 and its carried parts are dropped slightly, which results in elevating the saw, so that in such outstroke clearance of the saw from the stock is insured.

To prevent the feeding devices from oper-
90 ating in advance of the cutting capacity of the saw, which would destroy the beneficial effects of clearing the saw on its idle stroke, I arrange a spring 58 to cooperate with the feed cam and wheels 49 and 51, respectively.
95 The energy of this spring is exerted at all times to restore the cam 49 to its starting position or that wherein the highest point is presented above the finger 48. It will thus be seen that the efforts of the feeding-pawl
100 52 are directed to turning the feed-cam 49 against the tension of this spring, and if the finger 48 is held away from the periphery of the cam by the saw riding upon the stock the vibration of pawl 52 will be idle and no
105 feed will be effected. It is therefore necessary that the finger 48 shall cooperate with the cam 49 to hold the same against return movement before the feed-pawl 52 can take
110 a new bite.

From the above it will be observed that if the feed is too fast for the capacity of the saw the feed-pawl will make an idle vibration or
vibrations until the saw cuts its way down through the stock, so as to place the finger
115 48 against the periphery of cam 49 for the purpose of holding said cam relatively stationary while the feed-pawl takes a new bite. If the new bite of the feed-pawl advances the cam too far for the finger 48 to engage there-
120 with on the next succeeding stroke, the next vibration of the feed-pawl will be idle, as before described, these idle vibrations continuing until the saw cuts its way down to a point where the finger 48 engages and holds the
125 cam 49.

The above remarks apply more especially to instances where the stock to be operated upon is too heavy to be handled by a machine
130 of given stroke. However, in practice it is desirable to make machines of different sizes to take stock up to a certain limit, and the foregoing description has been given for the purpose of explaining the action of the ma-

chine in operating upon stock which is too heavy for the machine to handle conveniently and in most efficient manner, and these remarks are not out of place here, because frequently a cross-section of stock being operated upon is irregular, and while at some point or points it is well within the capacity of a particular machine at another point or points it might be of such increased size as to slightly exceed the scope or capacity of the machine, so far as the feeding mechanism is concerned.

In resetting the machine—that is, placing the saw-frame at its highest point after stock has been operated upon—it is only necessary to lift the guide-frame and its carried saw, which will depress the finger 48 away from the cam, and in disengaging the pawl from the feed-wheel the spring 58 will immediately restore the feed cam and wheel to starting position, which is determined by the shoulder 50 coming in contact with the finger 48. In small machines this can be done conveniently, as the operator can lift the guide-frame with one hand and manipulate the feed-pawl with the other. However, in larger machines, where this contemporaneous manipulation of these two parts will be inconvenient, I provide means for operating the feed-pawl from the front of the machine. This means consists of a rod 59, mounted in the bed-plate of the machine and provided with a crank-handle 60 at its forward end. The rear end of rod 59 has a rock-arm 61 connected by a link 62 to the feed-pawl 52. After the stock has been operated upon if it is desired to reset the machine the guide-frame and its carried saw-frame are raised by the operator, and upon manipulating the crank-handle 60 the feed-pawl is thrown out of engagement with the feed-wheel, and the spring 58 immediately restores the cam 49 to its starting position.

I am aware that many minor changes in the construction, arrangement, and combination of the several parts of my machine can be made and substituted for those herein shown and described without in the least departing from the nature and principle of my invention.

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

1. In a machine of the character described, the combination with a pivoted overhanging guide-frame, of a saw-carrying frame slidingly mounted thereon, means for guiding the free end of said overhanging frame comprising a pivotally-supported rod, and a collar in which said rod is longitudinally movable; substantially as described.

2. In a machine of the character described, the combination with a pivoted overhanging guide-frame, of a truss-rod cooperating therewith, a saw-frame slidingly mounted on said guide-frame, means for guiding the free end of said overhanging frame comprising a piv-

otally-supported rod, and a collar in which said rod is longitudinally movable; substantially as described.

3. In a machine of the character described, the combination with a pivoted frame 26, of guide-rods mounted therein, a socket-casting cooperating with the outer ends of said guide-rods, a truss-rod engaging at its ends with the frame 26 and said socket-casting, a saw-frame slidingly mounted on the guide-rods, and means for reciprocating said saw-frame; substantially as described.

4. In a machine of the character described, the combination with an overhanging pivoted guide-frame, of blocks 33 slidingly mounted thereon, a sleeve 34 pivotally mounted between said blocks, a pivotally-mounted guide-rod passing through said sleeve, and an adjustable stop-collar arranged on said guide-rod; substantially as described.

5. In a machine of the character described, the combination with a pivoted guide-frame, of a saw-frame slidingly mounted thereon, driving mechanism for said saw-frame, said driving mechanism including a clutch, a lever for operating said clutch, said lever being provided with a finger, a cam with which said finger cooperates, a spring-pressed rod on which said lever is mounted, and a finger 20 on the spring-pressed rod and in the path of the guide-frame; substantially as described.

6. In a machine of the character described, the combination with a saw-frame and its means of operation, of a feed-controlling mechanism therefor, comprising a cam and means for rotating said cam step by step and a rigid projecting portion on said frame cooperating with said cam; substantially as described.

7. In a machine of the character described, the combination with a saw-frame and its driving mechanism, of a feed-controlling mechanism therefor comprising a cam, and means operated by the driving mechanism for advancing the cam step by step and a rigid projecting portion on said frame cooperating with said cam; substantially as described.

8. In a machine of the character described, the combination with a pivoted frame, of a saw-frame slidingly mounted thereon, driving mechanism for said saw-frame, a cam for holding the pivoted frame in an elevated position, means for operating said cam step by step to permit the pivoted frame to drop in the feeding of the saw and a rearwardly-extending portion of said frame cooperating with said cam; substantially as described.

9. In a machine of the character described, the combination with a pivoted frame, of a saw-frame slidingly mounted thereon, a crank-arm connected to said saw-frame for reciprocating the same, a driving-gear for the crank-shaft, a cam cooperating with the pivoted frame to hold the same in an elevated position, a feed-pawl for advancing said cam step by step, means on the driving-gear for

operating the feed-pawl and a rearwardly-extending portion of said frame cooperating with said cam; substantially as described.

10. In a machine of the character described, the combination of a reciprocating saw-frame, of feed-controlling means, comprising a spring-actuated cam, a corrugated wheel connected therewith, a pawl cooperating with said wheel, means for releasing the wheel, and means for operating the pawl; substantially as described.

11. In a machine of the character described, the combination with a reciprocating saw-frame, of a feed-controlling mechanism cooperating therewith comprising a finger 48, cam 49, a feed-wheel 51, and a pawl 52, an arm 53 upon which the pawl is mounted, and a cam 54 cooperating with said arm; substantially as described.

12. In a machine of the character described, the combination with a reciprocating saw-frame and its means of operation, of a cam for controlling the feed thereof, a pawl for advancing the cam step by step, a weighted lever normally holding said pawl in engagement, releasing means therefor, a frame in which said cam is mounted, and means for bodily moving said frame and its carried cam; substantially as described.

13. In a machine of the character described, the combination with a saw-frame and its feed-controlling mechanism comprising a spring-controlled cam and a feed-wheel cooperating therewith, of a frame in which said cam and feed-wheel are mounted, a pawl cooperating with the feed-wheel, an arm upon which said pawl is mounted, means for vibrating said arm, and a cam-shaft upon which said arm is fixed, said cam-shaft also providing a support for the frame which carries the cam and the feed-wheel; substantially as described.

14. In a draw-cut sawing-machine, the combination with a reciprocating saw-frame and its feed-controlling mechanism, including a spring-actuated cam, a feed-wheel and a pawl 52 cooperating therewith, of a rod 59 having a rock-arm connected by a link to said pawl, said rod extending to the front end of the machine and provided with a crank-handle, whereby said pawl may be disengaged from its feed-wheel and the cam automatically restored to its starting position; substantially as described.

15. In a machine of the character described, the combination with a pivoted guide-frame, of a saw-frame slidingly mounted thereon, means for reciprocating said saw-frame, a rear-

ward extension on the guide-frame provided with a finger 48, a spring-controlled cam 49 provided with a stop-shoulder for cooperating with finger 48, a corrugated wheel joined with the cam, a pawl cooperating with said wheel, and means for operating said pawl; substantially as described.

16. In a machine of the character described, the combination with a reciprocating saw-frame, a saw carried thereby, of means for lowering the same to contact with the material operated upon, thereby controlling the feed, and means for rendering the said feed-controlling mechanism inoperative when the saw contacts with said material at or before the limit of its cutting stroke; substantially as described.

17. In a machine of the character described, the combination with a reciprocating saw-frame, of means for elevating the saw on its idle stroke, means for regulating the feed of the saw during said idle stroke, whereby, in its cutting stroke, a draw cut will be effected, and means for preventing the operation of the feed-regulating mechanism in the event that the saw contacts with the material operated upon during its idle stroke; substantially as described.

18. In a machine of the character described, the combination with a reciprocating saw-frame, of means for elevating the saw during the idle stroke thereof, and means for regulating the feed of the saw while it is clear of the stock being operated upon, said means comprising a cam and finger 48 for sustaining the saw-frame above the stock, a spring cooperating with said cam tending to rotate the cam backwardly, and a positive means for advancing the cam step by step in advance and in opposition to the energy of said spring; substantially as described.

19. In a sawing-machine, a pivoted frame, saw-holding means at one side of the pivotal point of said frame, an oppositely-extending rigid projection on said frame, a cam adapted to bear on said projection, actuating means for moving said cam to cause different portions thereof to oppose said projection, and means for releasing said actuating means; substantially as described.

In testimony whereof I hereunto affix my signature, in the presence of two witnesses, this 25th day of July, 1902.

SJONNE FIELD.

Witnesses:

OSCAR NICOLAI,
GEO. B. KINZIE.