United States Patent [19]

Zagray

[11] **3,858,868**

[45] **Jan. 7, 1975**

[54] **SELF-CENTERING SAWMILL DOG**

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[73] Assignees: **William Zagray; Harry Zagray; Stanley Zagray,** all of Colchester, Conn.

[22] Filed: **Dec. 10, 1973**

[21] Appl. No.: **423,003**

[52] **U.S. Cl.** **269/54.2,** 83/721, 269/164, 269/182

[51] **Int. Cl.** **B23q 1/08**

[58] **Field of Search** ..... 214/1.1–1.5, 214/1 R, 1 F; 83/409, 721; 269/215, 173, 174, 177, 74, 76, 54.1, 54.2, 54.4, 54.5

[56] **References Cited**

UNITED STATES PATENTS

50,223	10/1865	Conant	83/721
163,309	5/1875	Ely	83/721
1,866,937	7/1932	Langill	269/54.2
R25,104	12/1961	Elworthy	83/721

Primary Examiner—Frank E. Werner
Attorney, Agent, or Firm—Steward & Steward

[57] **ABSTRACT**

A sawmill dog assembly has both top and bottom gripping teeth which are made self-centering by mounting them on a slide member which can move vertically on the frame of the assembly, so that when the top tooth is in engagement with the log, the bottom tooth moves upward as a screw-spindle is rotated, and when both teeth engage the log, they bite into it with equal force when the screw-spindle is tightened, thereby gripping the log securely without shifting or twisting it. The gripping teeth are mounted on a sleeve member so that they pivot in unison to a retracted position when not in use.

10 Claims, 7 Drawing Figures

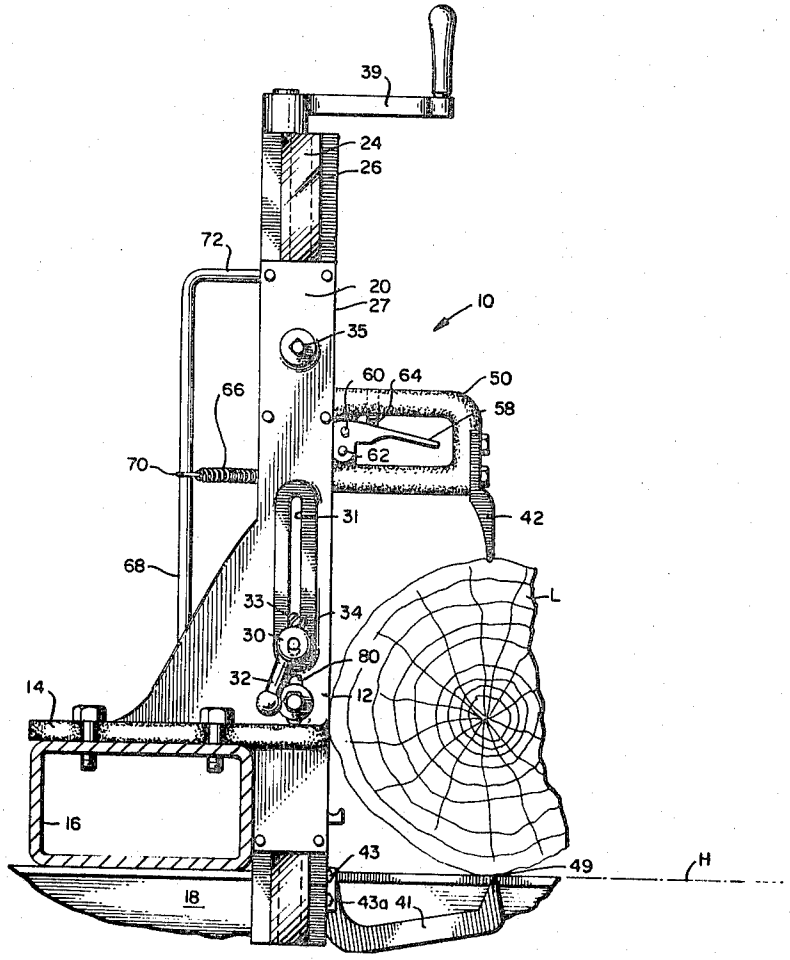


FIG. 1

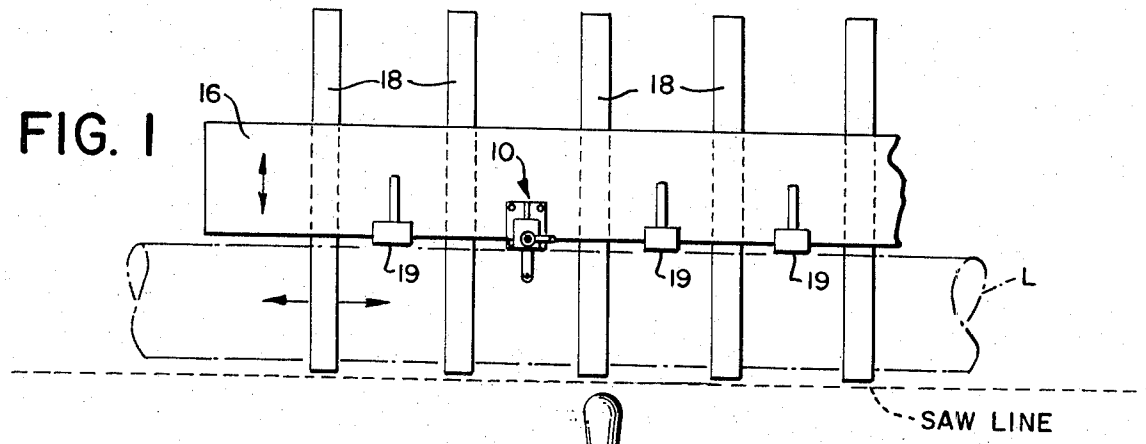
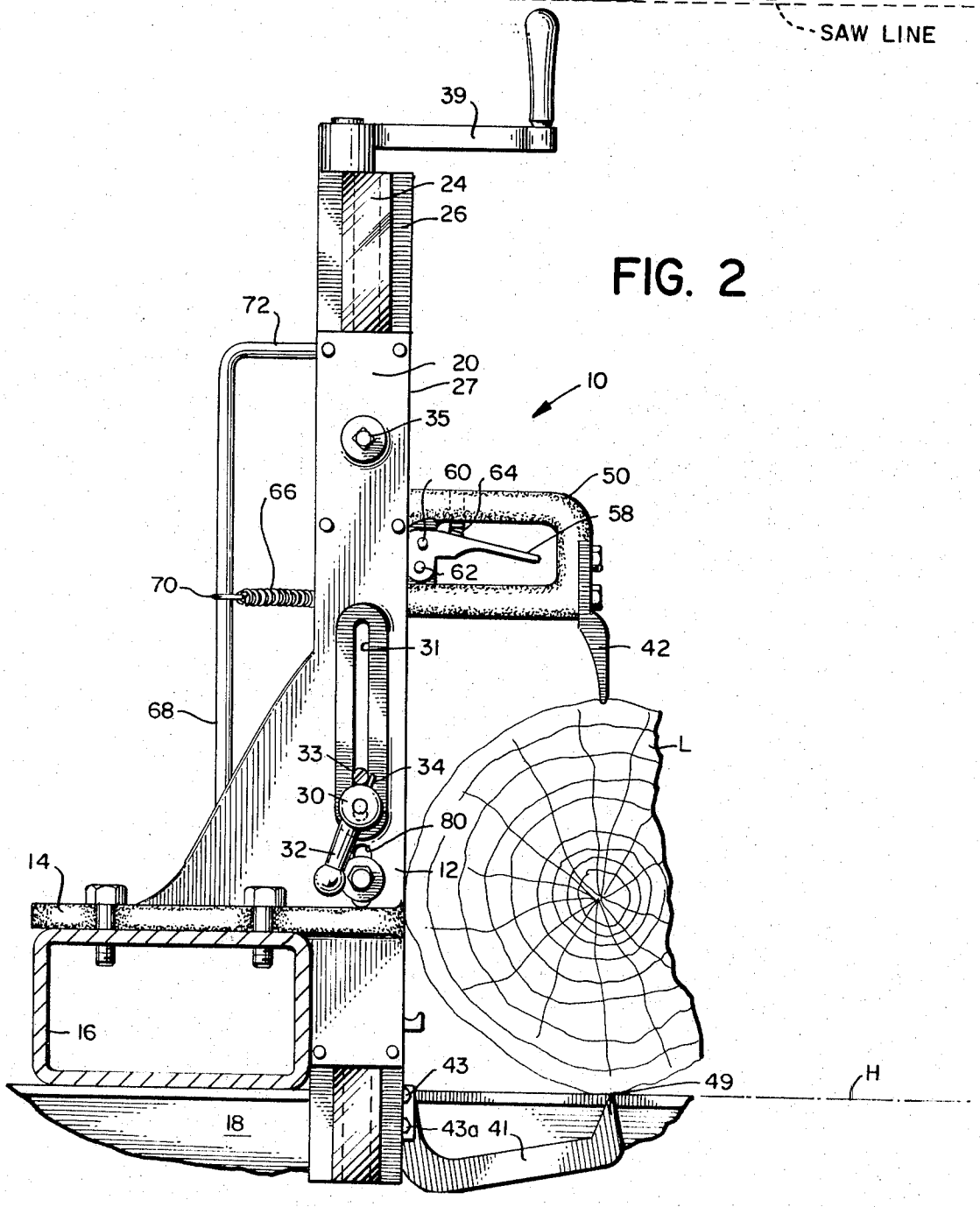

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SAW LINE

FIG. 2


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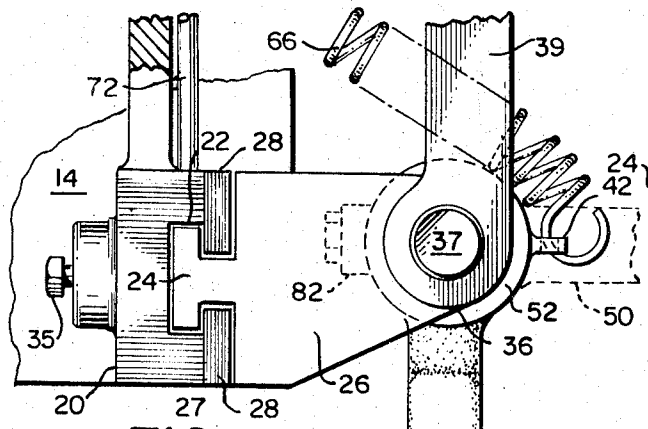


FIG. 4

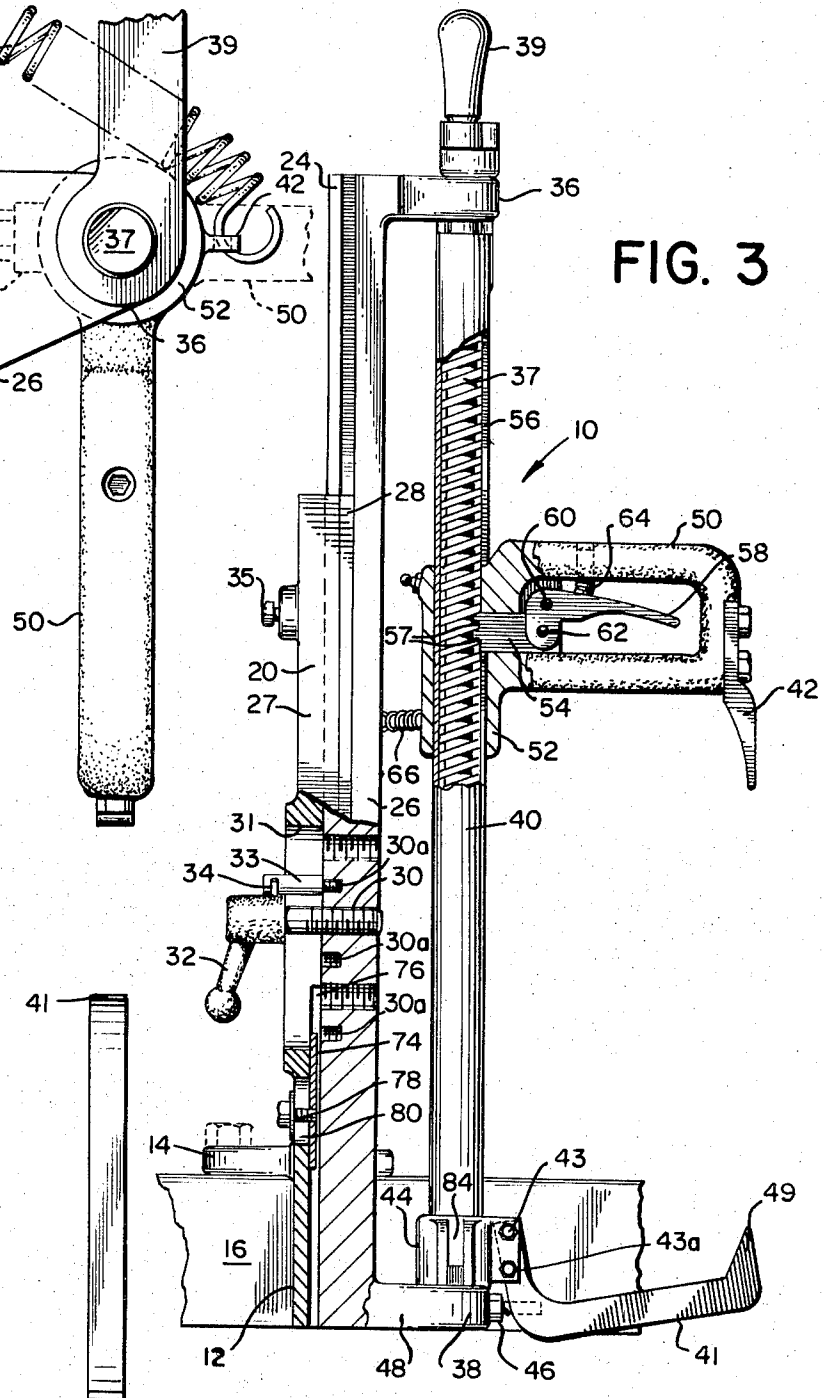


FIG. 3

FIG. 5

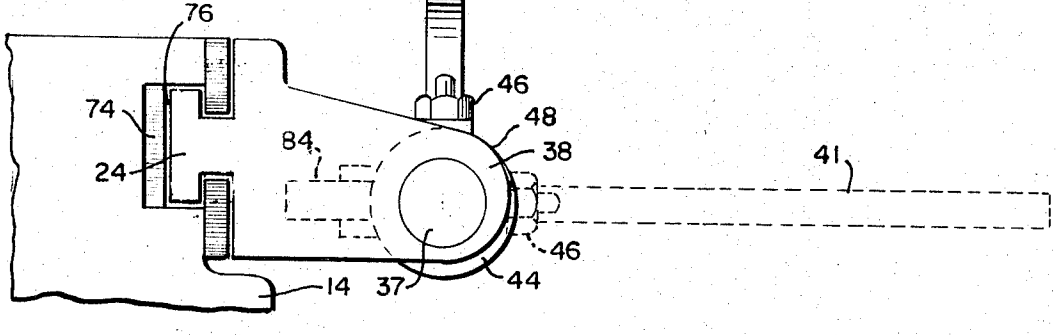


FIG. 7

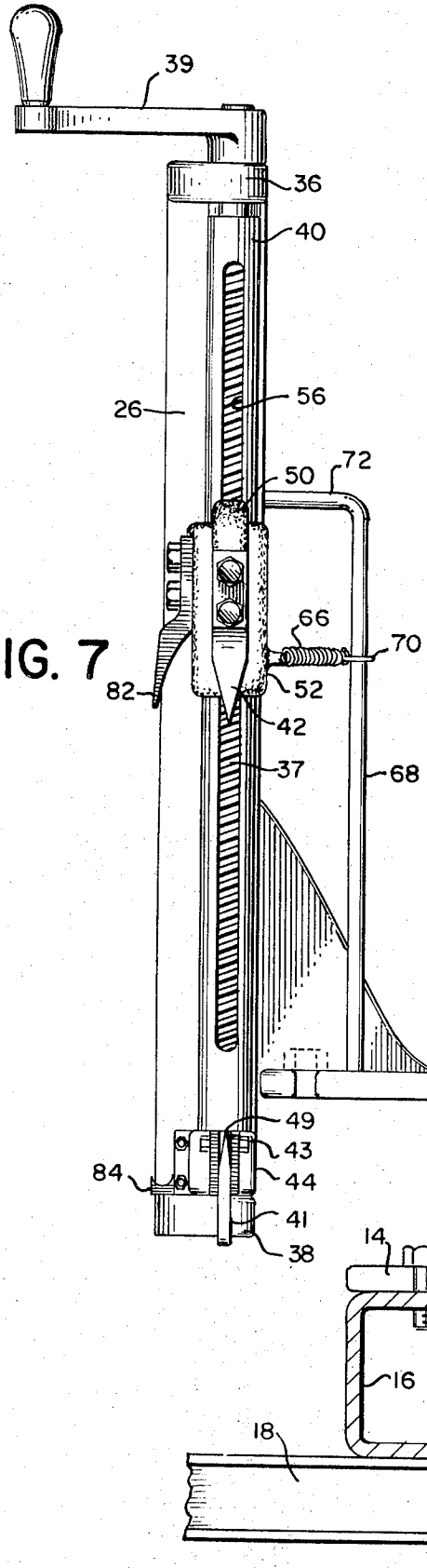

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FIG. 6

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SELF-CENTERING SAWMILL DOG

BACKGROUND OF THE INVENTION

The present invention relates to sawmill dogs, and it relates more particularly to sawmill dogs which have both top and bottom teeth or tongs for gripping a log as it is being sawed into boards.

Sawmills, especially portable ones, are usually provided with several dogs or gripping devices along the length of the feed carriage, onto which logs are rolled one by one. Such gripping devices are intended to securely hold each log on the headblocks of the carriage, so that the log can be fed longitudinally into engagement with the blade of the saw without twisting or shifting. Each of these dogs has either one or two teeth for rigidly gripping the log on the feed carriage. In those dogs having a single tooth, the tooth is disposed above the log and is driven into engagement with the upper side of the log, clamping it against the headblocks. The disadvantage of such dogs is that with large-diameter logs the tooth may not reach far enough across the log so that it can engage the log at a point diametrically opposite the place on the underside against which it rests on the headblocks. Consequently, in many cases single-tooth dogs have a tendency to roll or twist the log.

On the other hand, while sawmill dogs which have two clamping teeth, one tooth disposed above the log and one below, are capable of gripping a log more securely and with greater accuracy than those with one tooth, this type of dog has generally been considered to be dangerous because the operator may inadvertently move the set-works of the carriage so close to the saw that the teeth on the dogs may become aligned with the saw and carried into contact with it when the feed carriage is operated. Accidents of this nature frequently occur at the beginning of the return stroke after the final cut. While this danger also exists in connection with dogs having only an upper tooth, it is substantially increased in the case of dogs having both top and bottom teeth because the operator is less likely to notice that the bottom dog is in the way after the last cut is made. Obviously, if the metal teeth or tongs of the dog hit the rotating blade of the saw, not only is severe damage done to the equipment, but the operator and any one else in the vicinity of the saw can be seriously or fatally injured.

Another disadvantage of prior sawmill dogs having both top and bottom teeth, is the difficulty in getting both teeth to grip the log tightly without at the same time lifting it off the headblocks. This is due to the fact that in most cases the teeth are not self-centering with the log. In other words, each of the teeth acts independently of the other, so that if they do not engage the log simultaneously, the position of the log may be shifted on the headblocks as the dog grips the log, or one tooth may bite into the log with greater force than the other, causing the log to move slightly either during a cut or between cuts with the result that the boards cut therefrom are irregular in thickness and/or twisted.

The object of the present invention is to provide an improved sawmill dog having self-centering top and bottom gripping teeth or tongs, which is capable of handling logs with a wide range of diameters, is economical to manufacture and is provided with means for ensuring that the gripping teeth do not contact the saw blade under any circumstances.

The patent to Langill U.S. Pat. No. 1,866,937 shows a dual-tooth sawmill dog which is self-centering, but its construction is not practical from a cost standpoint for the so-called portable sawmills, not only because it is power driven, but also because the self-centering arrangement is complicated and expensive to manufacture. Furthermore, the self-centering arrangement employed by Langill prevents the clamping teeth from being quickly moved out of the way when the log is released after the last cut. Consequently, it is possible for the dogs to be carried into engagement with the saw blade when the carriage is returned in order to receive another log. An early patent to Ely U.S. Pat. No. 163,309 shows a sawmill dog assembly in which both the top and bottom gripping teeth are swung out of the way of the saw when not in use, but the manner in which the teeth are mounted limits the use of this dog to a relatively small range of log sizes. Other patents of which I am aware that attempt to solve problems to which the present invention is directed are Conant U.S. Pat. No. 50,223 and Brown U.S. Pat. No. 106,655, but these likewise do not provide the advantages of my improved sawmill dog.

SUMMARY OF THE INVENTION

In general, the invention resides in mounting both of the gripping tongs or teeth on a slide member which is slidably supported on a stationary frame adapted to be rigidly fastened to a log-positioning structure of the sawmill, such as the set-beam. The slide member is movable on the stationary frame, along a path perpendicular to the longitudinal axis of a log on the carriage, and a screw-spindle for moving the gripping teeth toward and away from each other is supported on the slide member for rotation on an axis parallel to the path of the slide member.

In order to move the teeth toward each other for gripping the log, one of them is fixed to an elongated, hollow, sleeve member carried by the slide member with the screw-spindle extending co-axially through it. The other tooth is mounted on the sleeve member for movement longitudinally thereof. A screw-engaging element on the second tooth extends through an elongated access slot in the sleeve into operative engagement with the screw-spindle, so that when the screw-spindle is rotated in one direction the second tooth is driven lengthwise of the sleeve member until it engages the log. Continued rotation of the screw-spindle will then draw the first tooth toward the other one until both bite into the log with equal force.

More specifically the invention resides in mounting the sleeve member so that it can pivot on the slide member through a limited angle relative thereto, thereby allowing both teeth to swing in unison with the sleeve member between an operative position in which the teeth are in position to grip the log on the headblocks and an inoperative position where they are out of the way of the saw.

DESCRIPTION OF PREFERRED EMBODIMENT

The invention, as well as specific features and advantages, will become more apparent from the detailed description hereinafter of one embodiment, which is illustrated in the accompanying drawings, wherein

FIG. 1 is a schematic view of a portion of a sawmill, showing in plan the set-beam on which the gripping devices are mounted for positioning the log, as well as the

headblocks on which the log is supported as it is fed to the saw;

FIG. 2 is an elevational view of a sawmill dog embodying the invention as viewed from left to right in FIG. 1, and showing it gripping a log of small diameter;

FIG. 3 is another elevational view of the sawmill dog shown in FIG. 2, but looking from the right side as viewed therein, with the log removed and showing the gripping teeth in their retracted position, portions thereof being broken away in order to expose internal parts;

FIGS. 4 and 5 are top and bottom plan views, respectively, of the dog assembly as illustrated in FIG. 2, but on a larger scale;

FIG. 6 is a view similar to FIG. 2, but illustrating how it grips a log of large diameter; and

FIG. 7 is an elevational view of the right side of the dog assembly as seen in FIG. 3.

The dog assembly shown schematically in FIG. 1 at 10 is provided with a stationary frame member 12 (FIG. 2) having a horizontal base 14, by which it is rigidly bolted to a portion of the feed carriage for a sawmill, such as a set-beam 16. As illustrated in FIG. 1, a log L to be sawed into boards is rolled onto the headblocks 18 of the feed carriage and positioned against two or more vertical posts 19 on set-beam 16, which are spaced from each other in a straight line along the length of the log to form a fence, against which the log comes to rest. Several gripping dogs may be mounted intermediate the fence posts for locking the log in position to be sawed. One or more of the dog assemblies 10 of the present invention may be employed for this purpose.

The stationary frame member 12 of each dog assembly 10 is provided with an upright portion 20, in one side of which is provided a vertical T-slot 22 (FIG. 4) that opens at both the upper and lower ends of upright 20 and slideably receives a T-shaped rail 24 on an elongated slide member 26. Rail 24 is formed integrally on one side of member 26 and extends longitudinally thereof within the T-slot 22 of the upright 20. As will be seen in FIGS. 4 and 5, T-slot 22 in upright 20 is in this instance formed by a rectangular groove located intermediate its two shorter sides, one of which (designated by the reference numeral 27) faces the log L for abutment therewith. A pair of flat plates 28, 28 are rigidly fixed to upright 20 on opposite sides of the groove such that their inner edges project partly across the groove, but in spaced relation to each other in order to receive the neck portion of the rail 24 on slide 26.

In order to limit the distance which slide member 26 can move on upright 20 and at the same time to provide means for binding it thereto while the log is being cut, a binding screw 30 is threaded into the slide member 26 and extends through a vertical slot 31 in upright 20. The head of binding screw 30 engages the sides of slot 31, so that when the screw is tightened by means of its handle 32, the slide member 26 and upright portion 20 of the frame 12 are bound together, preventing the slide from moving until the screw 30 is loosened. After the binding screw 30 has been tightened the first time, a stop lug 33 may be threaded into a tapped hole in slide 26 adjacent the binding screw where a pin 34 on screw 30 will engage it, thereby permitting screw 30 to be loosened a limited amount while preventing it from backing out too far. Additional rigidity can be obtained between the slide 26 and the upright 20 by tightening a bolt 35 near the top of the upright. Bolt 35 is simply threaded into an enlarged portion of the upright so that its end abuts the rail 24 of slide 26.

Slide member 26 is provided at its upper end on the side opposite rail 24 with a laterally projecting trunnion 36, in which the upper end of a vertical screw-spindle 37 is journaled. The opposite end of spindle 37 is journaled in another trunnion 38 on slide 26 corresponding to the upper trunnion 36. The upper end of spindle 37 projects through upper trunnion 36 and is provided with a crank 39, by which it can be rotated. Surrounding screw-spindle and freely pivoted thereon between trunnions 36 and 38, is an elongated pivot-sleeve 40, which supports both a bottom dog or gripping tooth 41 and a top dog or gripping tooth 42 for holding the log in position on the headblocks 18.

The bottom tooth 41 is mounted for limited pivotal movement about a bolt 43 on a collar 44 adjacent the lower trunnion 38. A pin 43*a* rigidly fastened to and extending transversely through tooth 41 just below bolt 43 extends through enlarged holes in collar 44, thereby permitting tooth 41 to pivot only a small amount on the bolt 43. Collar 44 is rigidly connected to, and concentric with, the pivot-sleeve 40 for pivotal movement therewith in a horizontal direction about spindle 37. An abutment screw 46 is treaded through the heal of tooth 41 so that one end (in this case, the head) abuts the edge of trunnion 38. As viewed in FIG. 5, the surface 48 on the edge of trunnion 38 facing the log is eccentric to the pivot axis of sleeve 40, so that as the tooth 41 is pivoted from right to left, the abutment screw 46 is cammed outward, forcing the pointed end 49 of tooth 41 upward. Consequently, when the feed carriage 15 is suddenly reversed in direction from feed to return movement, thereby tending to make the log lunge forward on the carriage, any slight shift of the log in this direction will cause the bottom tooth 41 to bite into the log with still greater force and prevent such movement.

The top tooth 42 is mounted at the outer end of a quick-operating arm 50, which extends outwardly from pivot-sleeve 40 and positions tooth 42 vertically above the point 49 of bottom tooth 41. The arm 50 is a D-shaped member having a cylindrical mounting-portion 52 at its inner end through which pivot-sleeve 40 freely extends, so that the arm 50 and tooth 42 can be raised and lowered into and out of engagement with the log. Arm 50 is provided with a spindle-engaging block 54, which is slideably mounted within the inner portion of the arm and extends through an elongated slot 56 in, and extending lengthwise of, pivot-sleeve 40 into meshing engagement with screw-spindle 37.

The inner end of engagement block 54 is provided with teeth 57 (FIG. 3) corresponding to the threads of screw-spindle 40 for meshing engagement therewith. A release lever 58 is pivoted to arm 50 at 60 and to engagement block 54 by a pin 62, so that when lever 58 is lifted, block 54 is withdrawn from engagement with screw-spindle 37, permitting the arm 50 and tooth 42 carried thereon to be raised and lowered by manually sliding it up or down on the pivot-sleeve 40. A compression spring 64 constantly urges lever 58 downward, so that when it is released, engagement block 54 is automatically moved back into mesh with the spindle. Since engagement block 54 passes through slot 56 in pivot-sleeve 40, arm 50 is prevented from pivoting relative to the pivot-sleeve, thereby maintaining vertical

alignment of the top tooth **41** with the bottom tooth **42** at all times.

It will be apparent from the foregoing that when block **54** is engaged, rotation of screw-spindle **37** in the proper direction by means of crank **39** lowers the arm **50** and drives the top tooth **42** into the log, in order to hold it rigidly in place during one or more cuts. When the desired number of cuts have been made, the top tooth **42** is released from the log by an operator, who grasps the arm **50** and lifts the release lever **58** with his fingers, thereby freeing the log so that it can be turned on the headblocks in order to expose another side of the log toward the saw. When the last board has been cut from the log, the arm **50** is disengaged from the screw-spindle **37** and raised to an elevated position on pivot-sleeve **40** where it is again engaged with the screw-spindle in order to completely disengage the top tooth **42** from the remaining part of the log, which is then removed from the headblocks **18** by operation of a push-out mechanism (not shown) of the mill.

It is at this point during the operation of this type of sawmill that there is usually greatest danger of the gripping teeth being carried into engagement with the blade of the saw during the return pass of the carriage. In the present sawmill dog, however, the top and bottom gripping teeth both immediately swing out of the way when the log is pushed off the headblocks. To this end, as will be seen in FIG. **4**, a tension spring **66** is stretched between the arm **50** and a bracket **68** for retracting the gripping teeth from their operative position as indicated in the full-line position of the arm **50** in FIG. **4** to its inoperative position illustrated in broken lines. In this instance bracket **68** consists of a rod attached at its upper end to upright **20** and at its lower end to the base **14.** Bracket **68** is conveniently formed from a length of heavy rod, which extends vertically upward from base **14** in back of upright **10** and has a right-angle bend near its upper end **72** where it is rigidly attached to the frame in any suitable manner.

One end of spring **66** is connected to the mounting-portion **52** of arm **50,** and the other end to a ring **70** which is free to slide vertically on bracket **68,** so that it follows the arm **50** as the latter is raised and lowered into and out of engagement with each log. Consequently, when the teeth **41** and **42** are withdrawn from engagement with the log in order to releae it, they are simultaneously swung back by spring **66** to their inoperative position shown in broken lines in FIGS. **4** and **5,** so that they are completely out of the way of the saw when the operator returns the carriage to its feeding and loading position.

In use, the lower gripping tooth **41** of the dog assembly **10** is normally disposed just below the level H of the headblocks **18,** so that it can swing under the log L to its operative position when the arm **50** and top tooth **42** are swung out over the log in order to clamp it in place. After the log is completely sawed into boards, the remaining portion is released and pushed off the carriage, and the carriage is returned to its loading position. Another log is then rolled onto the headblocks against the fence posts **19** and surface **27** of the dog assembly **10.** When the log is in the desired position on the headblocks an operator grasps the arm **50** for the top tooth **42** and swings it from its retracted position against the pull of spring **66** to its operative position over the log. Since pivot-sleeve **40** is thereby pivoted a corresponding amount, the bottom tooth **41** is likewise simultaneously swung out to its operative position.

The operator then releases the arm **50** from engagement with screw-spindle **37** and lets it slide down the pivot-sleeve **40** so that the top tooth **42** digs into the upper side of the log, releasing the lever **58** so that arm re-engages the spindle **37.** By rotating the hand-crank **39** of screw-spindle **37** in the proper direction, the bottom tooth **41** is drawn upward into engagement with the under surface of the log. It will be noted that since the top tooth **42** is substantially fixed in place as soon as it engages the log, rotation of screw-spindle **37** causes the slide member **26** to move upward drawing the bottom tooth up until its point **49** engages the log with the same force as the top tooth. Continued rotation of screw-spindle **37** in the same direction results in both the top and bottom teeth being driven into the log with equal force and centering themselves relative to the log.

As will be noted in FIG. **2,** with logs of smaller diameter, the teeth **41** and **42** reach nearly half way across the width of the log and therefore grip it at almost diametrically opposite points. Consequently, except for the very tip of its point **49** the bottom tooth **41** remains below the plane H of the headblocks **18.** With larger size logs, however, the teeth engage the log in back of its center as illustrated in FIG. **6.** The bottom dog must, therefore, be moved upward above the plane H in order to engage the log. In this case the slide member **26** is simply drawn upward by means of screw-spindle **37** until the bottom tooth **41** engages the log L on a sloping portion of its more or less cylindrical surface. The teeth then grip the log from both top and bottom with equal force and there is therefore, no tendency for the dog to rotate or twist the log on the headblocks, as in the case of a dog having only one tooth which can not reach to the center of the log. Furthermore, the log is not lifted off the headblocks as in the case of the dogs which have two independent gripping teeth.

Once the teeth of the dog are set, the slide member **26** may be clamped in place by means of the binding screw **30,** in order to prevent the log from being tilted upward. In most cases, however, it is unnecessary to tighten the binding screw, so that when the top gripping tooth **42** is released by disengaging it from screw-spindle **37,** the slide member **26** is simultaneously released and drops under its own weight to its lower-most position where screw **30** engages an adjustable stop-plate **74** at the lower end of slot **31.**

As will be seen in FIGS. **3** and **5,** a lower portion **76** of slot **22** is formed deeper than the rest of the T-slot, in order to receive stop-plate **74.** A set-screw **78** passes through an elongated vertical slot **80** in upright **20** into threaded engagement with stop-plate **74** for rigidly fixing said plate in its adjusted position so that the bottom tooth **41** is located just below the line H of the headblocks. Such adjustment is provided so that the dog assembly can be used on different sawmills, each of which may vary in height between the headblocks and the set beam. It will also be noted that a coarse adjustment for setting the lower-most position of the bottom gripping dog **41** is provided by selecting one of a series of threaded holes **30***a* in slide member **26** for the binding screw **30.** Holes **30***a* are arranged vertically, so that by removing screw **30** and threading it into another hole the limits of movement of slide member **26** relative to upright **20** can be changed up or down.

It will also be noted that the present sawmill do assembly is also equipped with a pair of so-called board-dogs **82** and **84** mounted on the gripping assembly for clamping the very edge of the last portion of the log, so that as many boards as possible can be obtained from it. Board-dogs **82** and **84** are mounted on the sides of the arm **50** and collar **44**, respectively, on which the top and bottom teeth **42** and **41** are mounted. The board-dogs **82** and **84** are, therefore, in position to be used when the log-gripping teeth **41, 42** have been pivoted by spring **66** to their retracted position.

What is claimed is:

1. A self-centering sawmill dog assembly having a frame rigidly mountable on a log-positioning structure for feeding a log to the saw along a fixed rectilinear path and comprising

a slide member mounted on said frame for movement relative thereto in a direction perpendicular to the path of said positioning structure,

a screw-spindle rotatably supported on said slide member for rotation about its longitudinal axis and mounted against longitudinal movement relative to said slide member, the longitudinal axis of said screwspindle being disposed parallel to the direction of movement of said slide member,

a sleeve member mounted on said slide member with said screw-spindle extending co-axially through it, said sleeve member having an elongated slot extending parallel with said screw-spindle for access thereto,

first gripping tooth-means mounted on said slide member for movement therewith,

second gripping tooth-means supported on said sleeve member for movement longitudinally thereof and having a screw-engaging element extending through said access slot into meshing engagement with said screw-spindle, such that rotation of said screw-spindle moves said second gripping tooth-means longitudinally of said sleeve member toward and away from said first gripping tooth-means, and

means for rotating said screw-spindle such that upon rotation thereof in one direction when said second gripping tooth-means is in engagement with a log said slide member is moved on said frame in the direction of said first gripping tooth-means, whereupon continued rotation of said screw-spindle in the same direction causes said gripping tooth-means to bite with equal force in opposite directions into clamping engagement with the log.

2. A self-centering sawmill dog assembly as defined in claim **1**, in which said sleeve member is pivotally mounted on said slide member, whereby said gripping tooth-means are pivotable in unison with said sleeve member between an inoperative position in which said gripping tooth-means are disposed substantially parallel with the log and an operative position in which they are substantially perpendicular thereto.

3. A self-centering sawmill dog assembly as defined in claim **2**, which further includes means for resiliently urging said gripping tooth-means toward their inoperative position.

4. A self-centering sawmill dog assembly as defined in claim **3**, wherein said screw-engaging element of said second gripping tooth-means is retractably mounted and is provided with means for urging it into meshing engagement with said screw-spindle and means for withdrawing it from such engagement, so that said second tooth-means can be disengaged from said screw-spindle and rapidly moved lengthwise of said sleeve member into or out of engagement with a log.

5. A self-centering sawmill dog assembly as defined in claim **4**, wherein said first gripping tooth-means comprises an elongated member pivoted at one end to a portion fixed to said sleeve member for moving the opposite end of said elongated tooth-member in the direction of said second gripping tooth-means, and which further includes an abutment member disposed adjacent said one end of said elongated tooth-member, as well as a cam-surface on said slide member disposed for engagement by said abutment member such that when said gripping tooth-means are pivoted toward their operative position said cam-surface pivots said elongated tooth-member toward said second gripping tooth-means.

6. A self-centering sawmill dog assembly as defined in claim **1**, wherein said screw-engaging element of said second gripping tooth-means is retractably mounted and is provided with means for urging it into meshing engagement with said screw-spindle and means for withdrawing it from such engagement, so that said second tooth-means can be disengaged from said screw-spindle and rapidly moved lengthwise of said sleeve member into or out of engagement with a log.

7. A self-centering sawmill dog assembly as defined in claim **1**, which further includes means for limiting the movement of said slide member relative to said frame, said limiting means comprising a slot in a portion of said frame elongated in a direction parallel to the direction of movement of said slide member and a pin mounted on said slide member extending through said slot.

8. A self-centering sawmill dog assembly as defined in claim **7**, wherein said slide member is provided with a series of spaced threaded holes disposed along said slot and said pin comprises a screw threadedly engaged with one of said holes and having a head portion engageable with said frame adjacent said slot for binding said slide member in position relative to said frame when said screw is turned up tight.

9. A self-centering sawmill dog assembly as defined in claim **8**, wherein said means for limiting the movement of said slide member further includes an adjustment member movably mounted on said frame adjacent one end of said slot for movement longitudinally thereof into the path of said screw.

10. A self-centering sawmill dog assembly as defined in claim **9**, wherein said adjustment member comprises a stop-plate adjustably mounted within a recess in said frame for movement into said slot and effectively reducing the length thereof, said frame having an opening into said recess elongated in the direction of said slot with a set-screw extending through said opening into threaded engagement with said stop-plate for fixing said stop-plate in an adjusted position.

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