(No Model.) 3 Sheets—Sheet 1.

J. F. PRIBNOW.

SAW SWAGE.

No. 508,118. Patented Nov. 7, 1893.

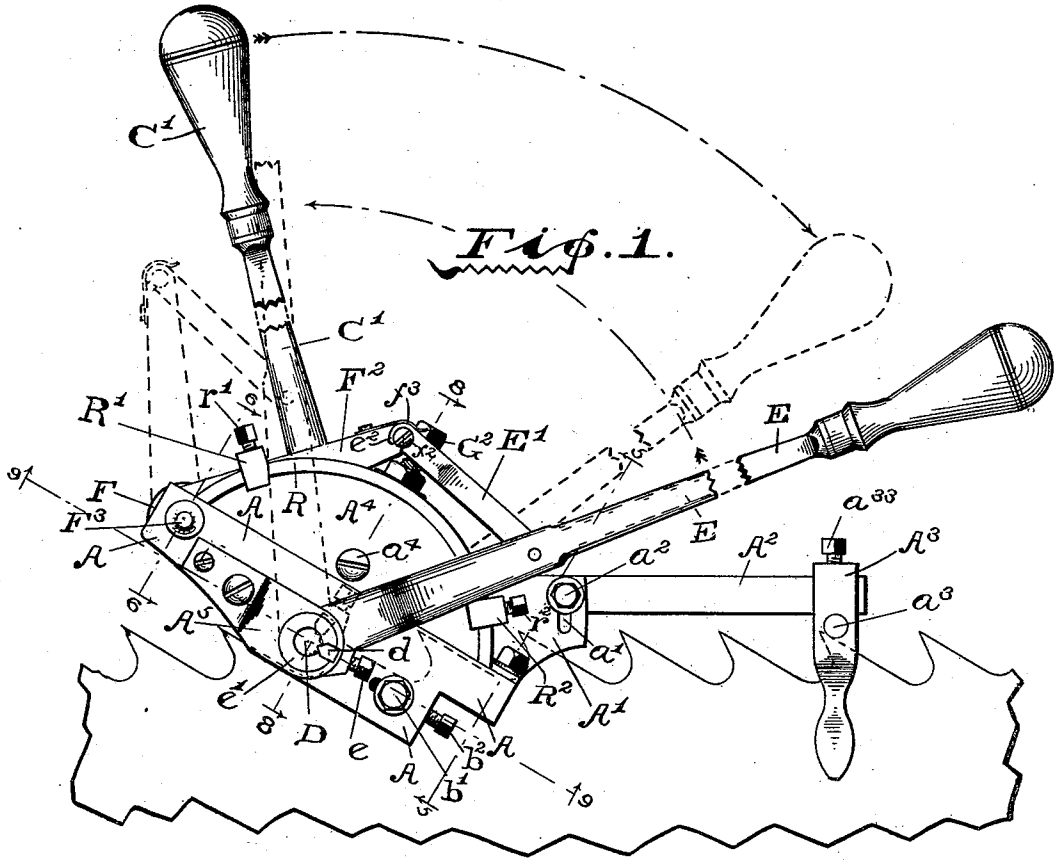

Fig. 1.

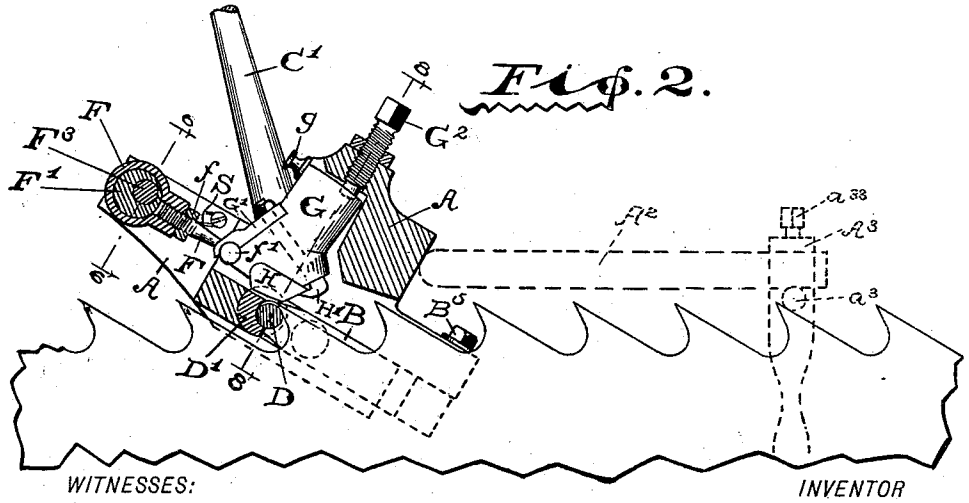

Fig. 2.

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(No Model.) 3 Sheets—Sheet 2.

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Fig. 3.

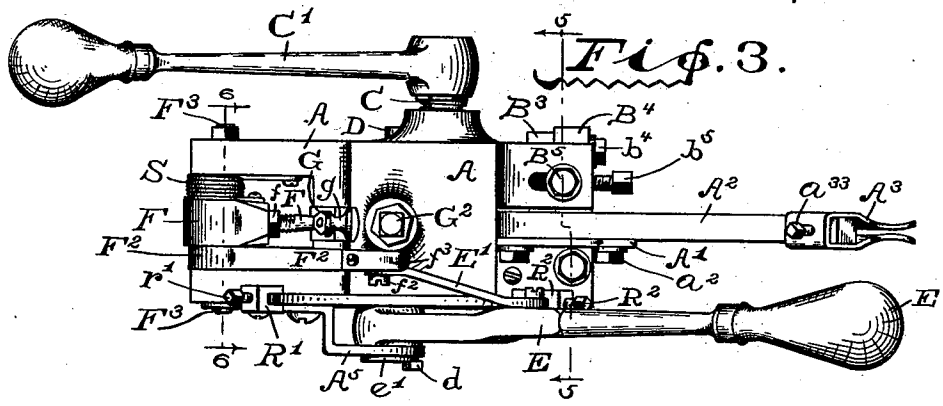

Fig. 4.

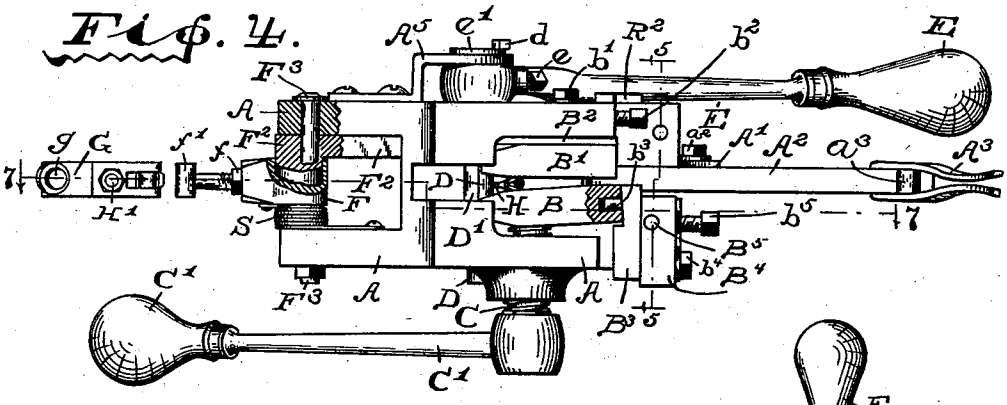

Fig. 5.

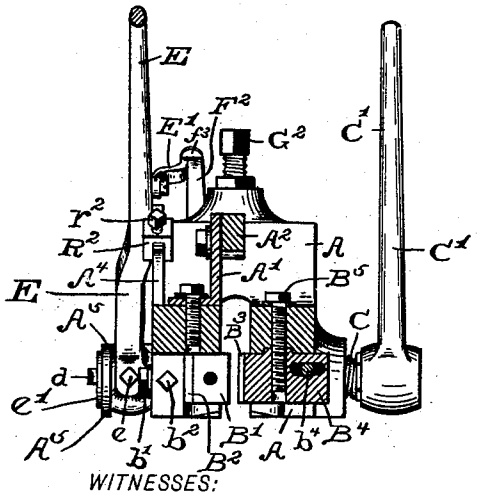

Fig. 6.

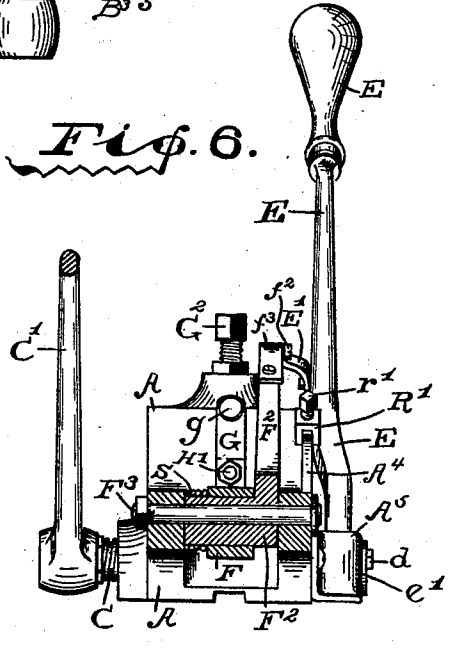

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Fig. 7.

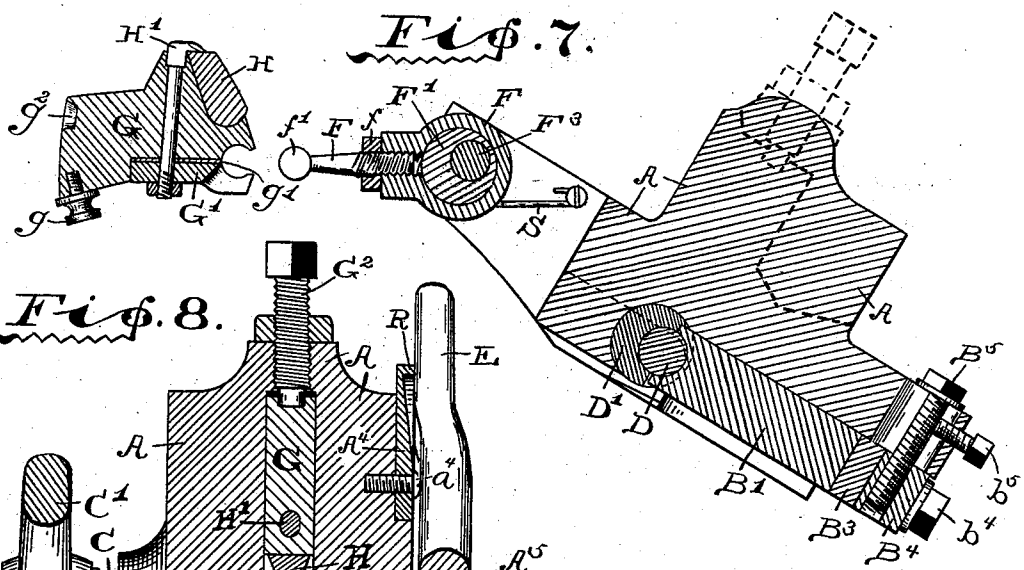


Fig. 8.

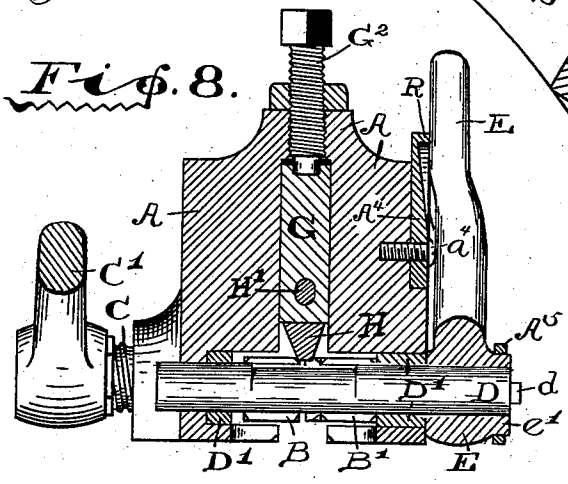


Fig. 10.

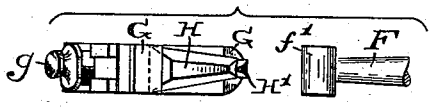


Fig. 9.

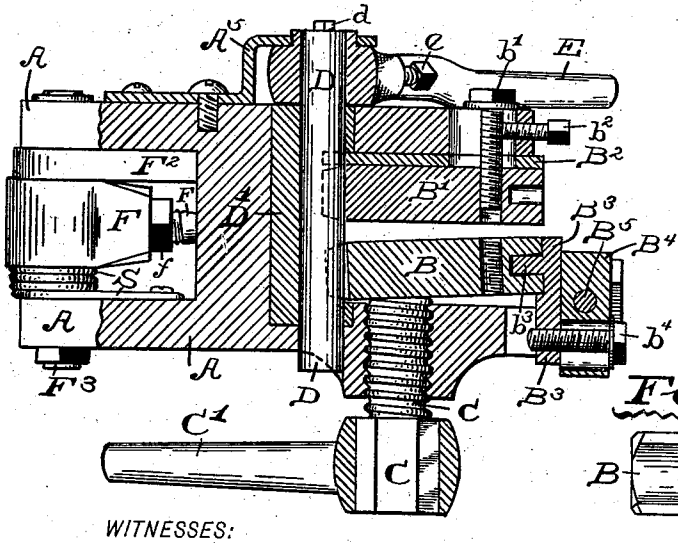


Fig. 11.

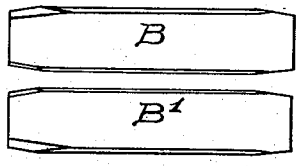


Fig. 12.

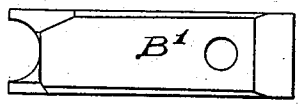


Fig. 13.

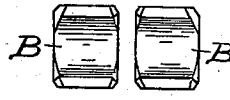
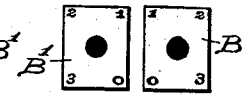


Fig. 14.



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UNITED STATES PATENT OFFICE.

JOHN F. PRIBNOW, OF INDIANAPOLIS, INDIANA.

SAW-SWAGE.

SPECIFICATION forming part of Letters Patent No. 508,118, dated November 7, 1893.

Application filed May 1, 1893. Serial No. 472,524. (No model.)

To all whom it may concern:

Be it known that I, JOHN F. PRIBNOW, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented certain new and useful Improvements in Saw-Swages, of which the following is a specification.

The object of my said invention is to produce a machine by which the teeth of saws may be swaged and shaped complete at a single operation. A machine embodying said invention will first be fully described, and the new features then pointed out in the claims.

Referring to the accompanying drawings, which are made a part hereof, and on which similar letters of reference indicate similar parts, Figure 1 is a side elevation of a combined swage and shaper embodying my invention, placed upon a fragment of a saw in position ready for use; Fig. 2 a central vertical sectional view of the same, the anvil or swaging-block therein being shown in side elevation; Fig. 3 a top or plan view thereof; Fig. 4 an under side plan, with the anvil and its pitman thrown out from position; Fig. 5 a transverse sectional view and rear elevation as seen from the dotted line 5 5 in Fig. 1; Fig. 6 a transverse sectional view and front elevation, as seen from the dotted line 6 6 in Fig. 1; Fig. 7 a sectional view on an enlarged scale, on the dotted line 7 7 in Fig. 4, and showing substantially the same arrangement as Fig. 2, except that the anvil and its pitman are swung out and apart from each other; Fig. 8 a transverse sectional view on the dotted line 8 8 in Figs. 1 and 2; Fig. 9 a horizontal sectional view looking upwardly from the dotted line 9 9 in Fig. 1; Fig. 10 an under side plan view of the anvil and adjacent parts; Fig. 11 a top or plan view of the clamping jaws separately, on a somewhat further enlarged scale; Fig. 12 a side view of the same, and Figs. 13 and 14 front and rear elevations thereof.

In said drawings the portions marked A represent the main casting or frame-work of the machine; B B′ the clamping jaws; C a screw by which the jaw B is operated; D the rotary swage; E a lever by which said swage and the anvil operating cam are operated; F a pitman running from said cam to the anvil-block; G the anvil-block, and H the anvil.

The frame-work A is preferably a single casting, of the form shown, and fitted to receive and support the mechanism and operating parts which are attached thereto, by suitable bolts, screws, and other connections, as shown. Connected thereto by an angle-plate A′ is a bar or tail-piece A^2, which extends out rearwardly therefrom, and carries a yoke A^3 which extends down astride of the saw, and a pin a^3 wherein is adapted to rest upon the top of a saw tooth, thus determining the relation of the machine to the saw in use. The angle-plate A′ to which this tail-piece is directly connected, has a slot a', through which one of the bolts a^2, by which said tail-piece is connected thereto, passes, and, by means of this slot and bolt, the machine may be given any angle relative to said tail-piece, which may be desired, within the limit of its adjustment. The machine is thus adapted to operate upon teeth of varying angles. The yoke A^3, by means of a set-screw a^{33}, may be secured at any point desired upon said tail-piece, thus adapting it for use with saws having teeth of various sizes, and, as before stated, it carries the pin a^3 which rests upon the back of a saw-tooth when the machine is in position for use, as shown, and contact with the points of the teeth, which might result in dulling or breaking them, is thus avoided. Upon one side of the frame A, just behind the lever E, is a segmental plate A^4, secured thereto by a screw a^4, and having a projecting rim R, as shown most plainly in Figs. 1 and 8, upon which are stops R′ and R^2, which are adjustably secured to any desired positon by set-screws r' r^2, as shown most plainly in Fig. 1. These stops limit the movement of the lever E, and, consequently, the operation of the swage and anvil. As will be readily understood, said stops can be adjusted to any desired points along said rim. The clamping jaws B and B′ are placed between the two sides of the frame A at the rear, and are adapted to clamp against the sides of the saw being operated upon, thus securing said saw and said machine in fixed relation during the operation of the device. These jaws are formed concave at their forward ends next the swage, and pass over and are supported by said swage. The extreme points are thus brought up above the swage

close to the anvil, and perform an important service in shaping the teeth of the saw. As shown in the drawings, most plainly in Figs. 11, 12 and 13, the corners of these jaws are formed to taper in both directions upwardly and forwardly toward the point of the tooth being operated upon; and thus determine the shape of the sides of said tooth at its extreme point when forced between them by the operation of the swage and the anvil. The sides of the points of the saw teeth, as well as their tops and bottoms, are thus given an exact shape, and, therefore, need no further treatment, in the way of setting or otherwise, after being operated upon by the swage, they not only being spread to a uniform width, but also given a uniform shape and position relatively to each other and to the saw blade. It is sometimes desirable to swage the saw teeth simply, and not dress or shape the sides. In order that this may be done by my machine, I prefer, as shown in Fig. 13, to trim off one corner of each of the clamping jaws more than the others, so that when these corners of said jaws are in position for opration they will not come in contact with the sides of the points of the teeth, thus leaving them room to be spread to the full limit of the operation of the swage. I usually provide my machine with several anvils, one of which has a wide face; and by using the wide-faced anvil and these cut off corners of the clamping-jaws, my machine does swaging of substantially the ordinary sort, but in a superior manner. The other three corners of the front ends of the clamping jaws are usually all alike, but may be varied to operate with teeth of various proportions. These corners are all made in pairs, and numbered, so that by simply turning these jaws over, or shifting them from one side of the machine to the other, any desired adjustment of the four can be had. One of the jaws, B′, in operation, is held fast to the side of the machine A by a machine-screw b', as shown most plainly in Fig. 9. The hole in the frame through which this machine-screw passes is elongated, or in the form of a slot, so that the desired longitudinal adjustment may be secured; and a set-screw b^2 may be driven in against said screw, thus holding it to whatever position is desired. A thin backing plate B^2 is preferably interposed between the jaw B′ and the frame A, and may be removed altogether, or a thicker or thinner one substituted, to properly adjust the space between the jaws according to thickness of the saw to be operated upon. The two jaws are alike in construction, but differently mounted. The jaw B, instead of being held fixedly in place, is movably held by the swage at the front end, and by the pin or projection b^3, extending into a socket in its rear end from a bearing-block B^3 carried by and adjustably secured by means of a bolt b^4, to a second bearing-block B^4, which is secured to the frame A by a bolt B^5. A set-screw b^5 may operate against the bolt B^5 to hold it to adjusted position. The bearing-block B^3 is rendered adjustable by means of a slot in the bearing-block B^4 through which the bolt b^4 passes, as shown in Fig. 9, and the rear end of the jaw B is thus carried nearer to or farther from the jaw B′. The seat in said bearing block B^3 for the jaw B is angular or tapered, so that said jaw in receding, as the screw C is turned back, will also drop away from the swage. This is best shown in Fig. 9 where the jaw B is shown as swung back, its inner corner being in effect a pivot point, and the pin b^3 a guide to keep it in place. The jaw B′ also has a socket for the pin b^3, so that the jaws can be transposed when desired. As shown in Fig. 3, the bolt B^5 also passes through a slot in the frame A, and thus the jaw B, as well as the jaw B′, is rendered adjustable toward or from the swage D. The screw C passes in from the side through a screw-threaded perforation in the frame A, and its inner end bears against the jaw B, and thus said jaw B is moved toward or from the saw being operated upon, and said saw is clamped between the jaws B and B′, or unclamped, by the movement of said screw. Upon the outer end of said screw is secured a lever C′ by which it may be moved back and forth. The various positions of this lever are shown in Fig. 1 by means of full and dotted lines. In the position shown in full lines, the machine has just been placed upon the saw ready to be clamped thereon, and the dotted lines indicate the position it occupies after the clamping has been effected, and just before and during the swaging operation.

The swage or die D is in the form of a round rod, and is mounted in bearings in the frame-work A, and is adapted to rotate therein. The bearing for this swage or die is preferably a hardened sleeve D′ which is inserted in a suitable orifice in said frame A and surrounds said swage or die. The central portion of said swage is cut away somewhat upon one side, as shown in the drawings, most plainly in Figs. 2 and 8, which gives it a cam shape at the operating point. As will be noticed by an examination of Fig. 8, this cam-shaped portion is much longer than the portion of its surface which operates at any one time,—in other words, than the thickness of any saw. This is for the purpose of giving the swage greater durability, as it can be shifted along from point to point as it wears, thus presenting a new surface several times before it is completely worn out. Or different portions of its surface may be given different forms, thus adapting the same swage to different grades of work. This swage is operated by the lever E, as will be presently described. Upon this outer end, whereon said lever is mounted, it is preferably provided with a number of grooves or corrugations, as shown in Fig. 1, and a key d having a face adapted to engage with said grooves or corrugations is inserted in a key way cut in the hub

of said lever, and fits into various ones of these grooves. The swage may thus be adapted for different grades of work, by loosening the set-screw *e* which holds said key, and turning said swage somewhat relatively to the handle, and re-tightening the set-screw and key, which will be engaged with different ones of the grooves or corrugations in its surface, so that, when said swage is rotated, varying portions of its surface may be brought into active use, and thus different degrees of swaging be given the teeth being operated upon. Said swage supports the forward ends of the jaws B and B′ as shown most plainly in Fig. 7. The lever E is mounted on the outer end of the swage D, in the manner which has just been described, and is there fixedly secured by means of a set-screw *e* which impinges upon the key *d*, and forces it firmly against the swage D, and into engagement with the corrugations therein. For the better support of said lever it is provided with a hub *e′* surrounding the swage which rests in a bearing formed therefor in a bracket A^5 provided for that purpose, and secured to the frame A. Said lever is thus also supported when the swage or die is withdrawn. The positions of this lever are shown in Fig. 1. The position shown in full lines is that which it occupies when first placed upon the saw. After the lever C′ is pulled back, however, and the machine thus clamped upon the saw, said lever E is forced forward into the position shown by the dotted lines, which swages the tooth. It not only revolves the swage, but, by means of the link E′ on the arm F^2, operates the anvil, as will be presently described.

The pitman F is driven by a cam F′ from the arm F^2. Said cam is mounted upon a rod F^3 passing through arms upon the forward end of the frame A. The cam F is mounted thereon, and has the arm F^2 formed integrally therewith, or rigidly attached thereto, and extending out and connected, by means of the link E′ to the lever E, as has just been described. The link E′ has a hooked end e^2 which hooks over a pin or bolt f^2 on the arm F^2 forming an easily detachable catch, which is held into engagement by a spring f^3 also attached to said arm. When said lever is moved, it revolves the cam F′ around the shaft F^3, thus moving the pitman back and forth to a limited extent, and with it the anvil-block and anvil. The position of these parts, assembled, is shown most plainly in Fig. 2, and they are shown swung out, and detached, on a larger scale, in Fig. 7. The pitman is shown as formed in two parts, one screw-threaded into the other, and locked in position by a lock-nut *f*, by which means, obviously, its length may be very finely and accurately adjusted.

As will be seen by a reference to the drawings, particularly Fig. 10, the anvil is tapered longitudinally. An adjustment of the pitman therefore varies the width of its operating point. I prefer to proportion the parts so that one turn of the screw will produce a variation equal to one gage in a saw plate, so that the machine may then be adjusted by half gages (half turns of the pitman) to the saws being operated upon. The end of said pitman which engages with the anvil-block is in the form of a cross-head *f′*, which slips into a corresponding recess in the anvil-block G. The anvil-block and cross-head are obviously capable of transverse movement relatively to each other, which enables the anvil to accurately adapt itself to the clamping jaws, as the parts come together. A spring S is coiled around the end of the cam F′, and is attached at one end to the frame A, and at the other end to the pitman F, in such a manner as to keep the anvil-block always raised up in contact with the pivot-bolt or point G^2, over which it oscillates, and thus keeps the anvil up away from the die or swage, except when forcibly brought down toward it by the operation of the mechanism.

The anvil-block G is constructed to hold the anvil H, and is provided with the recesses by which it may be attached to the pitman F. One portion thereof (which may be in the form of a separate piece G′) is bifurcated, and adapted to pass astride the shank of the pitman behind its head *f′* when the parts are assembled together. A thin backing-strip *g′* may be interposed between these parts, which can be removed, and a thinner one substituted (or not) for the purpose of adjusting the device, for taking up wear or otherwise. A knob *g* is usually provided whereby this anvil-block can be conveniently manipulated. A cavity g^2 is formed in its upper surface into which the rounded end of a set-screw G^2 mounted in the frame A enters, and over this rounded end the block pivots as it is moved back and forth by the pitman.

The anvil H is formed to come against the top side of the saw tooth, as the cam surface of the swage enters against the under side. Its lower surface is struck from a center slightly in advance of the point of the pivot-screw G^2, and thus, as it moves rearwardly, in operation, its surface approaches that of the swage D, and two cam surfaces are thus provided which approach each other during the operation, thus bringing the pressure equally from the two sides, and spreading or swaging the tooth uniformly. This is a highly important result, as will be readily understood by those skilled in the art. This anvil is made wedge-shaped in both directions, and is so adjusted and proportioned as to exactly fill the space between the two jaws B and B′ at the completion of the operation of swaging, so that when said operation is completed, the swage and the anvil have approached closely to each other, leaving a sharp edge on the point of the tooth, and at the same time all the space has been filled by the parts upon all sides of the point of the tooth, giving it an exact and perfect shape. A saw thus treated is capable of efficient use without filing or any additional

treatment whatever. As has heretofore been explained, however, if the ordinary swaging is for any purpose desired, instead of the complete combined swaging and dressing described, it can be accomplished by having the jaws turned so that the cut away corners will come into use, and providing an anvil of a wider face than the desired point of the saw tooth. The anvil is held in place on the anvil-block by the bolt H′, which may, and preferably does, also hold the part G′ in place, as shown most plainly in Fig. 7. My improved swage also accomplishes its work in a superior manner in another particular. If the swage proper or die and anvil were moved in the same direction, the result would likely be, especially in saws formed of a somewhat brittle quality of steel, that the points would be drawn upon too hard, and thus broken off. I have arranged that these two parts shall operate oppositely to each other, and thus the whole power of the machine is devoted to swaging or spreading and sharpening the tooth, and does not tend to separate or break it. In other words, while the die or swage proper is drawing up toward the point on the under side of the tooth, the anvil is pushing down on the top of the tooth in the direction of the root of said tooth, which operation is a positive counter-action to the tendency of the swage or die to pull the point of the tooth in or break it off. It may also be said that when any part of this machine is to be taken out for the purpose of repair, interchange, or otherwise, it can be done without dismounting the other parts, or disturbing the adjustments. For instance, the anvil-block and anvil can be disengaged by bearing down and pulling out on the knob *g*, which brings said parts out to the position shown in Figs. 4 and 7. Either of the jaws or the die can also be taken out independently. The tail-piece can be moved without reference to other mechanism; and so of others. This obviously is of advantage in practical operation, as much time would otherwise be required for readjustments.

The operation of my said invention may be briefly recapitulated as follows: The machine is first provided with a swage, anvil, and clamping jaws, adapted to the size of saw and the work desired to be done. It is then in the position shown by the full lines in Fig. 1, placed upon the saw. The lever C′ is then swung from the position shown in full lines to the position shown in dotted lines, which clamps the machine firmly in place upon the saw. The lever E is then swung from the position shown in full lines to the position shown in dotted lines, which operates both the swage and anvil, and swages and dresses the saw tooth to which the machine has been applied, complete, at a single operation. The parts are then reversed, and the machine advanced to the next tooth, when the operation is repeated, and so on, until the saw is completely swaged.

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

1. The combination, in a saw swaging and dressing machine, of the tail-piece A^2 adjustably secured to the frame, and the yoke A^3 provided with a bearing point suitable to rest upon the backs of the teeth of the saw being operated upon below and out of contact with the sharp points thereof, said yoke being longitudinally adjustable upon said tail-piece whereby said point may be adjusted to rest upon the backs of teeth of different sizes, substantially as and for the purposes set forth.

2. The combination, in a saw swaging and dressing machine, of a tail-piece A^2 secured to the frame, and a yoke A^3 secured and longitudinally adjustable upon said tail-piece and provided with a pin a^3 adapted to rest upon the backs of the teeth of the saw being operated upon, just below the sharp points thereof, substantially as shown and described and for the purposes set forth.

3. The combination, in a saw swaging machine, of the frame A, the bracket A^5 thereon, the swage or die, the lever E secured to said swage and mounted in said bracket, whereby the swage can be removed without disturbing the lever, substantially as set forth.

4. The combination, in a saw swaging and dressing machine, of jaws B and B′ each being formed interchangeable and beveled upon all of its four forward or operating corners, and said corners being formed in pairs, whereby a single pair of jaws is rendered equivalent to four separate pairs of jaws, with mechanism for forcing said jaws toward each other, swaging dies, and mechanism for operating said swaging dies, substantially as shown and described.

5. The combination, in a saw swaging and dressing machine, with the operating mechanism, of two clamping jaws B and B′, certain corners of which are formed to fit against and dress the sides of saw teeth at the same time they are being swaged, and certain corners of which are cut away, so that by bringing said corners into use the teeth may be swaged only, substantially as shown and described.

6. The combination in a saw swaging and dressing machine, of two jaws B and B′, said jaw B being fixedly but adjustably secured to one side of the frame work by means of a machine-screw *b′* passing through a slot in said frame-work into said jaw, and the jaw B being pivoted at the rear end on a stud b^3, and a screw whereby the same may be driven toward or from said jaw B′, substantially as shown and described.

7. In a machine for swaging and dressing saws, a pair of clamping jaws, one of which, B, is loosely mounted on a stud or pin b^3, a bearing-block B^3 carrying said stud or pin, and a second bearing-block B^4 carrying the bearing-block B^3, said bearing-block B^4 being mounted upon the frame-work, said several

parts being adjustable one upon another, substantially as set forth.

8. The combination, in a saw swaging machine, of the swage, and the clamping jaws, one of said jaws being movable and supported upon a block at its rear end, these parts being formed with a taper between them where they come together, whereby the jaw is permitted to also drop away from the swage somewhat, as it swings away from its fellow, substantially as set forth.

9. The combination, in a saw swaging machine, of the swage or die, and the clamping jaws B and B′, said clamping jaws being formed concave at their forward ends, and fitted over and partially supported by said swage or die, substantially as set forth.

10. The combination, in a saw swaging machine, of a swage, an anvil, and two jaws the faces whereof are formed to fit the sides of the finished tooth, whereby all four sides of the point of the tooth are swaged and dressed complete at one operation.

11. The combination, in a machine for swaging and dressing saw teeth, of a pair of clamping-jaws, one fixedly but adjustably secured to one side of the frame, and the other pivotally and adjustably mounted on the other side of the frame, a screw C by which said loosely mounted jaw is adapted to be driven toward the other jaw, and a lever C′ whereby the same is operated, said several parts being arranged and operating substantially as set forth.

12. In a machine for swaging and dressing saw teeth, the combination, with a rotatory saw swage D having grooves or serrations in its surface, of a lever mounted thereon provided with a key-way, and a removable key formed to fit in said key-way and into one or more of said grooves or serrations, whereby the relative position of the swage and the lever may be adjusted, substantially as set forth.

13. The combination, in a saw swaging machine, of the anvil-block, the pitman, the cam operating said pitman, the arm F^2 on said cam, the lever E, the link E′ having hook e^2, and the pin f^2 and spring f^3 on said arm F^2, substantially as set forth.

14. The combination, with the swinging anvil block of a swaging machine, of a pitman for operating the same, said pitman being adjustable, as described, whereby the anvil may be adjusted for use on saws of different thicknesses, substantially as set forth.

15. The combination, in a saw swaging machine, of a swage or die, clamping jaws, a movable anvil, and moving mechanism therefor, said anvil being secured to said moving mechanism by a laterally slidable attachment, whereby said anvil is adapted to reach its final position between said jaws with uniform bearing upon both, substantially as set forth.

16. The combination, in a machine for swaging or dressing saws, of a swage having a cam-shaped operating face, and a cam or eccentric anvil, and a lever connected to both, whereby they are simultaneously operated.

17. The combination, in a saw swaging machine, of a rotatory swage D having a cam-operating surface, a lever E secured to and operating said swage, a pivoted or swinging anvil H, a cam whereby it is driven, an arm extending out from said cam, and a link connecting said arm to said lever.

18. The combination, in a saw swaging machine, of a cam operating swage, a cam anvil, and mechanism for operating said swage and said anvil, said mechanism being so connected as to move them in opposite directions one toward the point of the tooth and the other from the point of the tooth toward the root thereof in operation.

19. The combination, in a saw swaging machine, of a swage, an anvil, mechanism for operating the same, and a spring whereby the anvil is held against its pivot or oscillating point, substantially as shown and described.

20. The combination, in a saw swaging machine, of the cam-shaped anvil H, the anvil-block working over a pivotal point, as the point of the set screw G^2, a pitman connected to said anvil-block, and a cam operating said pitman, substantially as set forth.

21. The combination, in a saw swaging machine, of an anvil, an anvil-block, and an adjustable screw G^2 having a pivot point engaging with said anvil-block, and over which said anvil-block pivots in operation, substantially as set forth.

22. The combination, in a saw-swaging machine, of a cam-shaped anvil, an anvil-block carrying the same, a pivot over which said anvil-block operates, a pitman for operating said anvil-block having a cross-head, and a bifurcated part G′ engaging with said cross-head, substantially as set forth.

23. The combination, in a saw swaging machine, of a cam-shaped anvil, an anvil-block, a pitman for operating the same, said pitman being formed of two parts, and adjustable one upon the other, whereby the motion is accurately adjusted and determined, substantially as set forth.

In witness whereof I have hereunto set my hand and seal, at Indianapolis, Indiana, this 27th day of April, A. D. 1893.

JOHN F. PRIBNOW. [L. S.]

Witnesses:
CHESTER BRADFORD,
ROWLAND EVANS.