

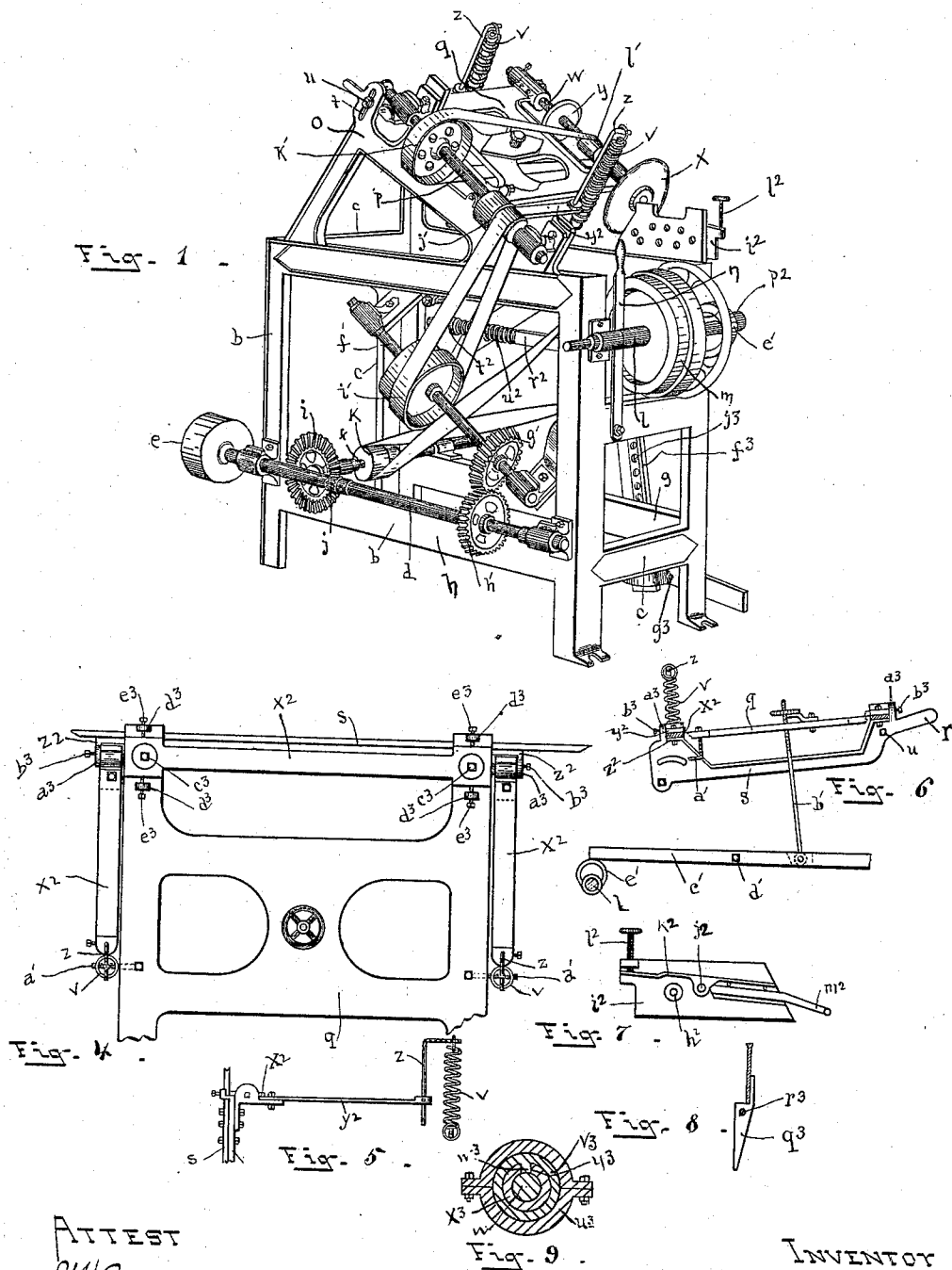
(No Model.)

2 Sheets—Sheet 1.

J. R. HALL.
SAW SHARPENING MACHINE.

No. 535,496.

Patented Mar. 12, 1895.



ATTEST
W. H. Power
C. V. Plummer

INVENTOR
Jerry R. Hall
By *Geo. P. Thomas*
Atty.

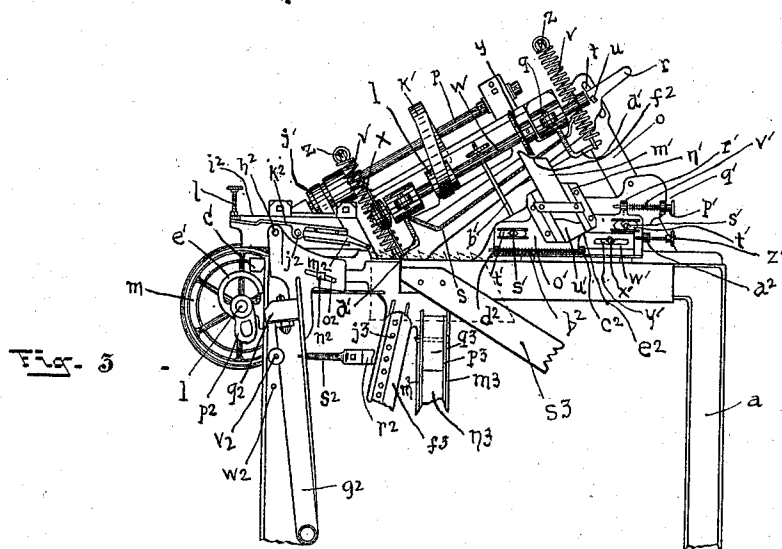
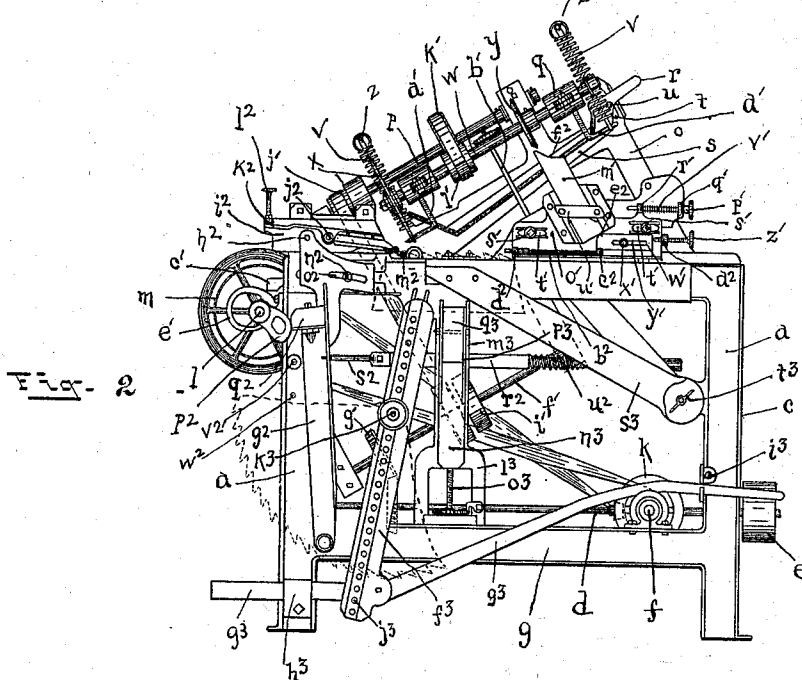
(No Model.)

2 Sheets—Sheet 2.

J. R. HALL.
SAW SHARPENING MACHINE.

No. 535,496.

Patented Mar. 12, 1895.



ATTEST
W. H. Power
C. V. Plummer.

INVENTOR
Jerry R. Hall
By Geo. P. Thomas
Atty.

UNITED STATES PATENT OFFICE.

JERRY R. HALL, OF BAY CITY, MICHIGAN.

SAW-SHARPENING MACHINE.

SPECIFICATION forming part of Letters Patent No. 535,496, dated March 12, 1895.

Application filed April 5, 1894. Serial No. 506,460. (No model.)

To all whom it may concern:

Be it known that I, JERRY R. HALL, a citizen of the United States, residing at Bay City, in the county of Bay and State of Michigan, have invented certain new and useful Improvements in Saw-Sharpener Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to improvements in machines for sharpening the teeth of saws, and consists in the combination, arrangement and operation of the several contrivances and devices which are assembled in the construction of the machine which will be hereinafter fully described in detail, and which will also be specifically pointed out in the claims of this specification.

The object of this invention is to provide a machine for automatically sharpening saws by means of an emery wheel on an arbor journaled to a swinging frame having a reciprocating motion, and which may be adjusted so as to sharpen the teeth of saws in the desired form, and making each tooth of a uniform shape and dimension.

Another object of the invention is to provide a means for automatically displacing the tooth of the saw after it is sharpened, and placing the next tooth in position for engagement with the emery wheel.

I attain these objects by means of the devices illustrated in the accompanying drawings, in which the same letters of reference will be found indicating the same parts throughout the several views, and in which—

Figure 1 is a view in perspective, looking from the rear side of the machine. Fig. 2 is a front side elevation of the same showing swinging frame raised. Fig. 3 is the same showing the swinging frame lowered and the emery wheel in engagement with the teeth of the saw. Fig. 4 is a detail plan view of a section of the swinging frame showing the means of adjusting same. Fig. 5 is a side view of same. Fig. 6 is a sectional view of the front of the swinging frame showing the walking beam for operating same. Fig. 7 is a view in detail of the sliding portion carrying the finger for actuating the saw. Fig. 8 is a side view of the piece for supporting the band saw.

Fig. 9 is a sectional end view of the box for carrying the arbor on the swinging frame.

a, is the front side, *b*, is the rear, and *c*, *c*, the ends of the frame, while *d*, is a shaft secured by suitable boxes to the rear side *b*, of the frame, and provided on its outer end with a suitable pulley *e*.

f, is a shaft with one end journaled in a suitable box secured to the cross-piece *g*, on the front side *a*, of the frame, and having its opposite end journaled in a box secured to the cross-piece *h*, on the rear side *b*, of the frame, and provided on its outer end with a beveled gear wheel *i*, intermeshing with a beveled pinion *j*, secured to the shaft *d*, while *k*, is a pulley secured to the shaft *f*, centrally between the pieces *g*, and *h*, for imparting motion by means of a crossed belt to a loose pulley *m*, on a shaft *l*, running transversely across and journaled in boxes secured to either side of one of the ends *c*, of the frame, and this shaft is provided with a gland to which is coupled by the operating lever *n*, the loose pulley *m*, having studs on its inner face for engaging the gland.

Extending upwardly from the main body of the frame is the portion *o*, with its upper surface on a line diagonal with the main body of the frame, and to the rear side of this portion is journaled in boxes secured thereto the shaft *p*.

s, is a lever pivoted at its lower end to the frame portion *o*, and provided on its opposite end with a suitable handle *r*; and *u*, is a bolt passed through said lever and through a slot *t*, in the frame *o*, and provided on its outer end with a large washer and a jam-nut, the washer being of a greater lateral dimension than the slot, so that by means of the handle the lever *s*, may be adjusted at the desired angle, and then on the jam-nut being tightened the lever will be held firmly in position.

*x*², is a cross-piece journaled by trunnions to forwardly projecting arms *y*², which arms are bolted to the outwardly extending portions *z*², on the lever *s*, and *a*³, are bosses extending upwardly from the portions *z*², and through these bosses are passed adjusting screws *b*³, for adjusting the trunnions in their bearings.

To the under side of the cross piece *x*², is

secured the swinging frame q , by the bolts c^3 , which are passed through the cross piece and through suitable slotted openings (not herein shown) in the swinging frame and provided
 5 on their threaded ends with jam-nuts, while d^3 , d^3 , are bosses on the swinging frame on each side of both ends of the cross piece, and through which is passed the set screws e^3 , e^3 , with their inner faces resting against the sides
 10 of the cross piece, so that by loosening the jam-nuts on the bolts c^3 , the swinging frame may be adjusted laterally by means of the set-screws e^3 , and then on tightening the jam-nuts again the swinging frame is firmly held
 15 suspended in the desired position.

In alignment with the shaft p , is an arbor w , having a reciprocating end movement, and loosely journaled in boxes u^3 , which are attached to the front of the swinging frame, and
 20 on the lower end of this arbor is hung the emery wheel x , and near its opposite end a beveled face disk y .

As shown in Fig. 9, the boxes u^3 , are formed to receive a lining of Babbitt metal v^3 , which
 25 is provided with a lug w^3 , while x^3 , is a cylindrical portion formed of vulcanized fiber, leather or other similar material placed within the lining v^3 , and is held against oscillation by the lug w^3 , resting in a slot y^3 , in said cylindrical portion, and through this cylindrical
 30 portion is passed the arbor w . The cylindrical portion x^3 , being formed preferably of vulcanized fiber affords a smooth hard surface for the arbor w , to wear upon.

35 v , v , are coiled springs suspended by their upper ends to the upwardly extending arms z , z , which are attached by their lower ends to the arms y^2 , while the opposite ends of the springs are attached to the arms a' , a' , secured to the swinging frame q , the springs v ,
 40 v , serving to support the swinging frame q , in position, and b' , is a rod passed through a hole located at or near the center of the frame q , and said rod is provided on its upper end
 45 with a screw thread onto which is screwed a small hand-wheel with its inner face resting on the frame q , for adjusting the length of the rod b' , the opposite end of which is pivoted to the inner end of a walking beam c' .
 50 This beam is pivoted by the shaft d' , at about one third of its length from its inner end, and with its outer end resting on the periphery of a cam e' , attached to the shaft l , and as the said shaft revolves the cam e' , raises the outer
 55 end of the walking beam c' , which swinging on the shaft d' , pulls the swinging frame q , downwardly by means of the rod b' , thus bringing the emery wheel x , in contact with the teeth of the saw.

60 o' , is a movable portion provided with a slide-way n' , for carrying a vertically sliding portion u' , and which rests on the upper part of the front side a , of the frame, and which is held in position by the bolts s' , s' , passed
 65 through the slots t' , t' , in the said portion, and tapped into the frame on which it is allowed to move on slides horizontally for ad-

justment by means of an adjusting screw p' , passed through a boss q' , on the frame, and with the opposite threaded end of the screw
 70 passed through a threaded opening in a boss r' , on the portion o' , and a spring v' , is coiled around the screw p' , with one end resting against the boss q' , and with its opposite end resting against the boss r' , for the purpose
 75 of holding the portion o' , away from the boss q' , as far as the screw p' , will permit.

w' , is a horizontal sliding piece secured to the bottom of the portion o' , by means of the bolt x' , passed through the slot y' , in the
 80 piece w' , and tapped into the portion o' , and z' , is an adjusting screw passed through a threaded opening in a boss a^2 , on the portion o' , and against the inner end of the screw the sliding piece w' , is held by the spring b^2 , coiled
 85 around a rod or bolt firmly secured by one end to a boss c^2 , on the piece w' , and with its opposite end sliding through an opening in the boss d^2 , on the portion o' , so that by means of the screw z' , the piece w' , may be moved
 90 forward or back, thereby raising or lowering the portion u' , which rests on the upper corner e^2 , of the piece w' .

To the portion u' , resting in the slide-way n' , of the portion o' , is secured a forming
 95 block m' , having its upper face f^2 , formed to describe the line of movement desired of the periphery of the emery wheel x , in shaping the back of the tooth, and as the swinging frame q , is lowered by the cam e' , and walking
 100 beam c' , the beveled-face disk y , comes in contact with the face f^2 , of the forming block m' , and following the line described thereon, imparts a longitudinal movement to the arbor w , and causes the periphery of the
 105 emery wheel to follow a diagonally vertical and horizontal line similar to shape of forming block, which line represents the back and gullet of the tooth operated on, and of course is governed in its shape by the shape
 110 of the forming block.

g^2 , is a lever pivoted at its lower end to the front side a , of the frame and at its upper end by a bolt n^2 , to a sliding portion i^2 , resting on the upper plain surface of the front
 115 a , of the frame; and to this sliding portion is pivotally secured by a bolt j^2 , a lever k^2 , with its outer end resting against a set screw l^2 , which is passed downwardly through a threaded opening in a boss on the sliding portion
 120 i^2 ; and m^2 , is a finger secured, to the opposite or inner end of the lever k^2 , and projecting inwardly for engaging with the teeth of the saw.

n^2 , is a bolt passed through the slot o^2 , in the lever g^2 , and tapped into the front side
 125 a , of the frame, and is provided with a large washer which extends laterally beyond the edges of said slot, and which serves as a guide to retain the lever and sliding portion against
 130 a lateral movement.

n^2 , is an arm with its small end s^2 , passed through an opening in the side of the lever g^2 , and provided with a shoulder of a greater

lateral dimension than the said opening, resting against the inner side of the said lever g^2 , and with its opposite end passed through an eye l^2 , on the rear side of the front a , of the frame; and u^2 , is a spring coiled around said arm with one end resting against the eye l^2 , and its opposite end resting against a shoulder on the said arm, serving to retain the lever g^2 , against the set screw v^2 , which is screwed into one of the threaded holes w^2 , in the front a , of the frame.

p^2 , is a cam on the inner end of the shaft l , with its outer face engaging with a block q^2 , on the lever g^2 , so that as the shaft l , revolves, the outer face of the said cam comes in contact with the block q^2 , forcing the lever inwardly and sliding the portion i^2 , inwardly on the planed upper surface of the front a , of the frame, which by means of the finger m^2 , resting in the gullet of the tooth, as shown in Fig. 2, moves the saw the distance of one tooth thereby displacing the tooth which has been sharpened and bringing the next tooth in position for engagement with the emery wheel, and as the face of the cam leaves the block q^2 , the parts are returned to their normal position by means of the spring u^2 , and the rod r^2 .

Suspended at its upper end by a bolt passed through a vertical slotted opening in the front side a , of the frame is the vertical bar f^3 , and pivoted by its lower end to a lever g^3 , which runs transversely across the lower portion of the front of the frame and with its lower end riding in a hooked support h^3 , on one of the legs on the front side a , of the frame and with its opposite or upper end resting in a hook on an adjusting clamp i^3 , secured to the opposite leg on the front side a , of the frame by a suitable set screw.

j^3, j^3 , are a series of holes in the vertical bar f^3 , at a short distance from each other to receive the pin of a saw support k^3 , by means of which a circular saw is hung to the vertical piece as shown dotted in Fig. 2, and by loosening the set screw in the clamp i^3 , the vertical bar being suspended in a vertical slotted opening in the frame, may be raised or lowered a distance equal to the distance between the openings j^3, j^3 , and its lower end swung at a desired angle by the lever g^3 , so as to bring the saw into the exact position of height and hook of saw teeth for engagement with the emery wheel.

l^3 , is a standard on the frame with its lower end forming an arch and resting on the cross piece g , and m^3 , are lips on the lateral edges of this standard forming a guide way for the piece n^3 , secured therein by a bolt passed through a vertical slotted opening in the standard from the back and tapped into the said piece n^3 , the lower end of which is provided with a threaded opening for receiving the upper end of an adjusting screw o^3 , in the arch in the lower end of the standard l^3 .

p^3, p^3 , are projections on the piece n^3 , between which rests a wedge shaped piece q^3 ,

(shown in detail in Fig. 8.) held therein by a bolt r^3 , passed through its center and through the said projections, and having a space between it and the projections to receive the back of saw, which rests on a piece of hard steel secured to said wedge piece, the saw being held in an upright position by a clamp bar s^3 , secured to the frame by a set screw t^3 , the piece q^3 , being raised or lowered according to the width of the saw by means of the adjusting screw c^3 , which acts on the piece n^3 , carrying the said piece q^3 .

The saw being adjusted on the vertical bar f^3 , or held by the clamp bar s^3 , in the piece q^3 , as described, the swinging frame is adjusted at an angle corresponding to the pitch of the tooth of the saw by the lever s and laterally by the set screws e^3 , engaging with the sides of the cross piece x^2 , and the forming block m' , adjusted to the line of movement desired of the periphery of the emery wheel by the means hereinbefore described, power is applied to the pulley e , from some suitable source to revolve the shaft d , which by means of the beveled gear wheels g' , and h' , revolves the shaft f' , and the pulley i' , which in turn revolves the shaft p , and the pulley k' , by means of the belt connected to the pulley j' , and from the pulley k' , by means of a belt to the pulley l' , the arbor w , carrying the emery wheel x , and the disk y , is revolved at a high rate of speed.

By means of the pinion j , on the shaft d , and the beveled gear i , on the shaft f , the pulley k , is revolved, which being connected by a crossed belt revolves the loose pulley m , on the shaft l , in an opposite direction, and on coupling the pulley m , to the shaft l , by operating the lever n , as before described, the shaft l , is revolved. As the shaft l , is revolved the outer face of the cam e' , raises the outer end of the walking beam c' , the opposite end of which actuates the swinging frame q , downwardly by the rod b' , bringing the beveled face disk y , in contact with the upper face f^2 , of the forming block m' , and following the line described thereon imparts a longitudinal movement to the arbor w , and causes the periphery of the emery wheel to pass over the back of one tooth of the saw and into the gullet and over the inner face of the next tooth, and as the periphery of the emery wheel has reached this point on the tooth, the face of the cam e' , has passed over the end of the walking beam c' , and the swinging frame is then actuated upwardly by the coiled springs v, v , to its former position, which raises the emery wheel from engagement with the saw, and allows the arbor w , to slide to its original position by its own weight, and after the face of the cam e' , leaves the end of the walking beam c' , the face of the cam p^2 , comes in contact with the block q^2 , and actuates the lever g^2 , which slides the portion i^2 , on the upper planed surface of the frame, and the finger m^2 , resting in the gullet of the tooth moves the saw the distance of one tooth, displacing the

tooth sharpened, and bringing the next tooth into position for engagement with the emery wheel, and as the face of the cam p^2 , disengages with the block q^2 , the spring u^2 , on the rod r^2 , moves the lever back against the screw v^2 , and slides the portion i^2 , back to its former position, and the finger riding over the back of the next tooth drops into the gullet of same and is in position for the next operation of the parts.

It will be noticed that by the use of the rotary disk on the arbor in contact with the forming block the entire dressing of the tooth is performed while the saw is at rest, so that the lines of lateral and vertical movement of the grinding wheel are the same on each succeeding tooth which causes the series of teeth in a saw to be entirely uniform and of the same shape and dimension, so that the extreme points or cutting portions of the series when the saw is in operation, will move in precisely the same line and each tooth will do its proper share of the cutting, and remove the same amount of material as the tooth preceding, thus securing a degree of accuracy and speed in cutting which is not attainable when the saw is moved forward while the tooth is being ground; and it will also be observed that the contact face of the forming block may be of any suitable contour to produce the particular form of tooth desired, so that by having several blocks of different forms, several saws having different forms of teeth, especially adapted to different kinds of work may be dressed upon the same machine by introducing the forming block having the desired form, which is a very great advantage, as several forms of saw teeth are usually required to be used to properly manufacture lumber from several varieties of timber.

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

1. The combination in a saw sharpening machine, of the frame, a support for carrying the saw, an arbor adjustably mounted on said frame and carrying a grinding wheel and capable of an endwise movement, with a circular disk mounted on said arbor, a stationary forming block below the disk having an inclined face for contact with the periphery of said disk, means for imparting a rotary motion to the arbor and mechanism for imparting a vertically reciprocating motion to said arbor, substantially as described.

2. The combination in a saw sharpening machine of the stationary frame, a support for carrying the saw, with a swinging frame pivotally secured by one end upon said stationary frame and carrying an arbor supported upon its movable end, a grinding wheel and a rotary disk mounted upon said arbor, a stationary forming block having a face arranged for contact with the periphery of said disk, means for imparting a rotary motion to said arbor, and mechanism for depressing the movable end of said pivoted frame, for mov-

ing the periphery of said disk over the face of the forming block, substantially as and for the purpose set forth.

3. In a saw sharpening machine, the combination of the stationary frame carrying a saw support, a movable frame adjustably secured upon said stationary frame and carrying an arbor with a grinding wheel and a rotary guide disk mounted thereon, and means for imparting a rotary motion to the arbor, with a forming block secured to said stationary frame and provided with a face for contact with the periphery of said rotary disk, and adjusting screws for moving said forming block laterally and vertically for the purpose set forth substantially as described.

4. In a saw sharpening machine the combination of the frame carrying a support for the saw, and having on one side an upwardly extending portion o , with a lever s , pivoted by its lower end to the body of the frame and having its upper end adjustably secured to the upper end portion o , and provided on its front side with forwardly projecting arms y^2 , having on their outer ends the upwardly extending portions z , the swinging frame q , pivotally secured by its rear end to said lever s , and carrying on its forward end an arbor having a grinding wheel and a rotary disk mounted thereon, the forming block having a face for contact with the lower edge of said rotary disk, the springs secured to said arm portion z , for carrying the forward end of the frame q , and mechanism as the beam c' , and cam e' , for moving the forward end of said frame q , downwardly, substantially as and for the purpose set forth.

5. In a saw sharpening machine the combination of the stationary supporting frame, a support for carrying the saw, a swinging frame pivotally supported by its rear end upon said stationary frame, an arbor mounted upon the forward end of said frame and carrying a grinding wheel and a rotary disk and provided with means for revolving the arbor, a forming block having a face for contact with the periphery of said disk, and mechanism for imparting a vertically reciprocating movement to the forward end of said swinging frame, with the lever g^2 , pivoted by its lower end to the supporting frame, a sliding portion i^2 , resting on the supporting frame and pivoted to the upper end of the lever g^2 , a lever k^2 , pivotally secured to the portion i^2 , and provided on its projecting end with a finger for engaging the saw tooth, a cam p^2 , for operating said lever g^2 , inwardly, a spring for moving the lever g^2 , outwardly and means for revolving the cam substantially as and for the purpose set forth.

In testimony whereof I affix my signature in the presence of two witnesses.

JERRY R. HALL.

Witnesses:

GEO. P. THOMAS,
W. H. POWER.