July 4, 1939. W. F. OCENASEK 2,165,002

TENSIONING MEANS FOR RUNNING JIGSAWS

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FIG. 1

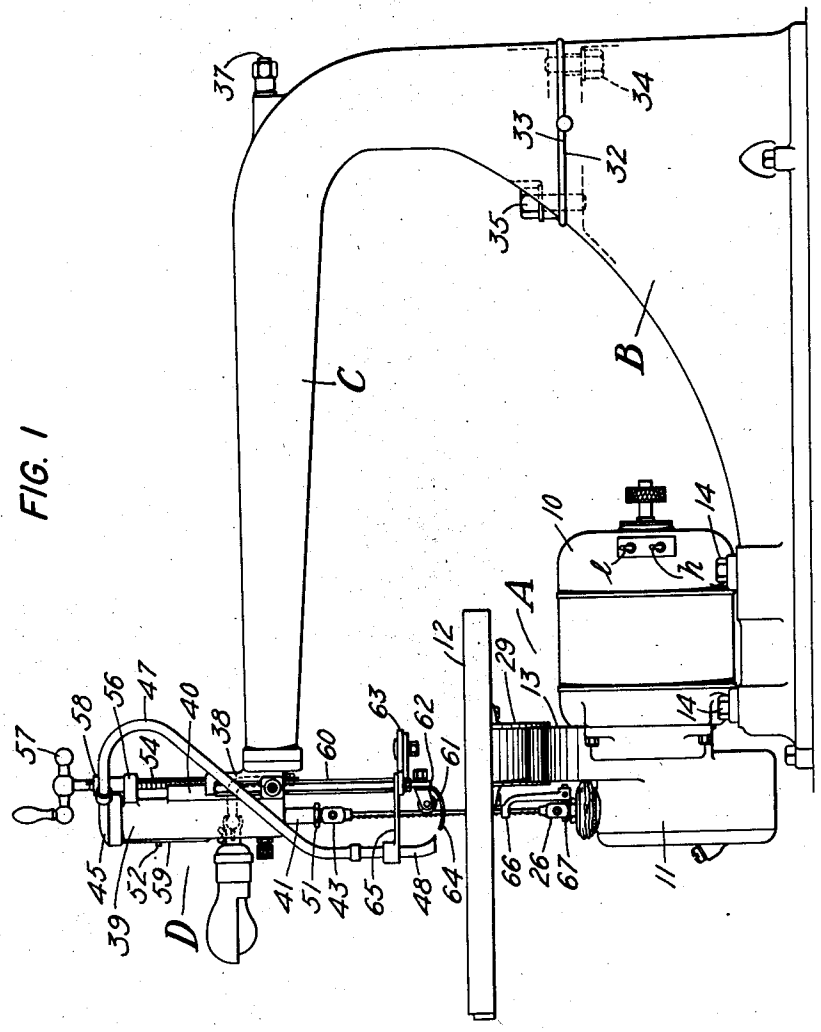
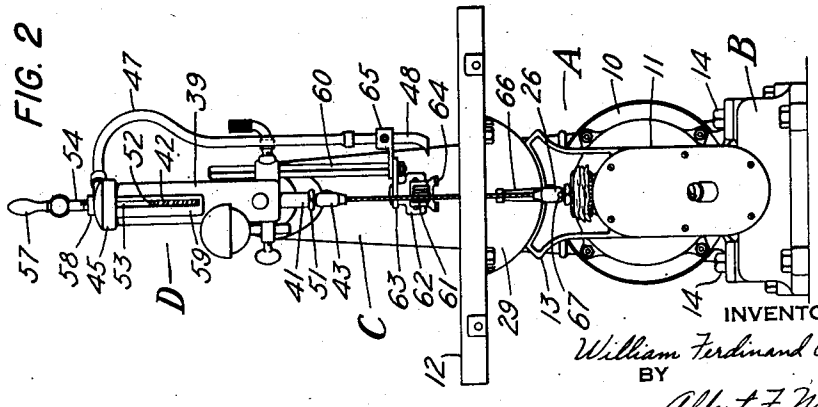


FIG. 2



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FIG. 3

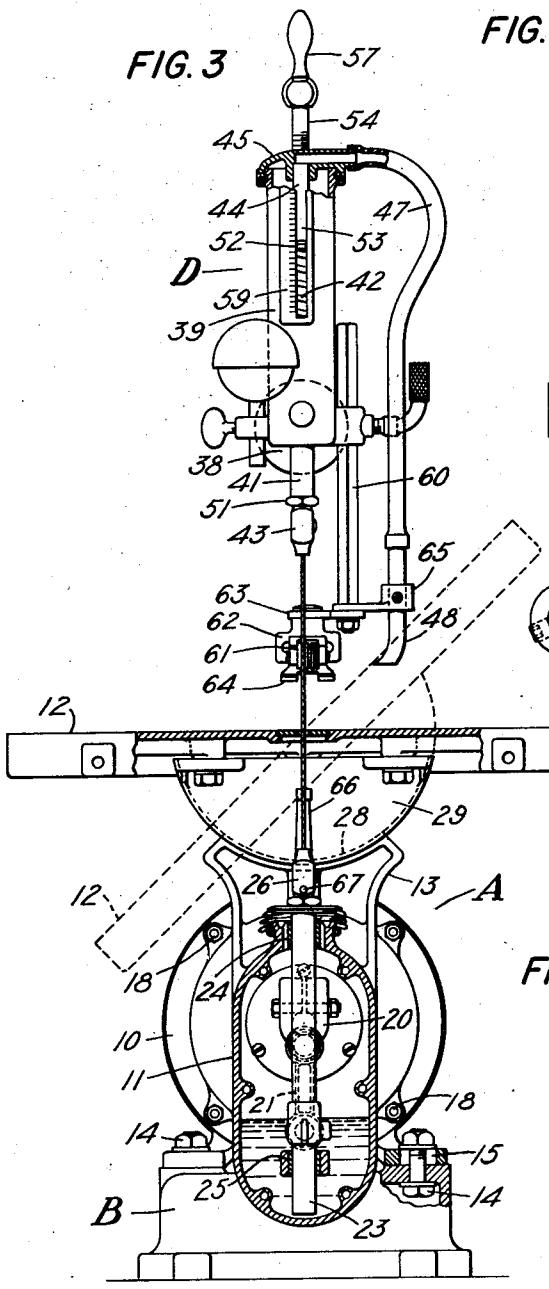


FIG. 6

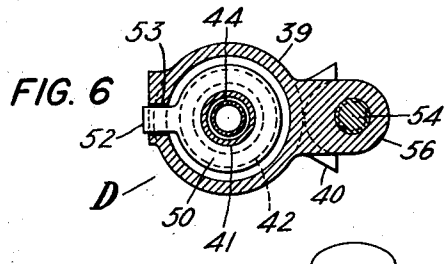


FIG. 7

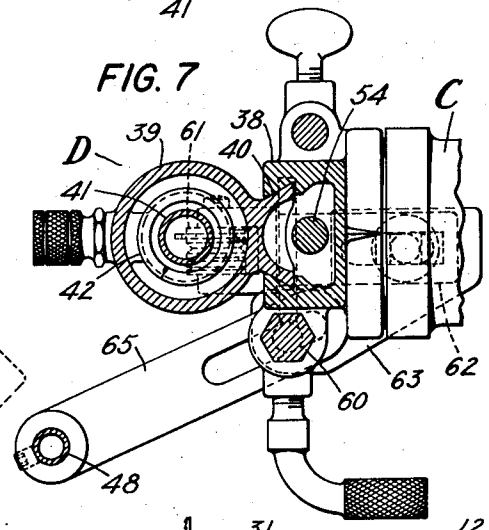
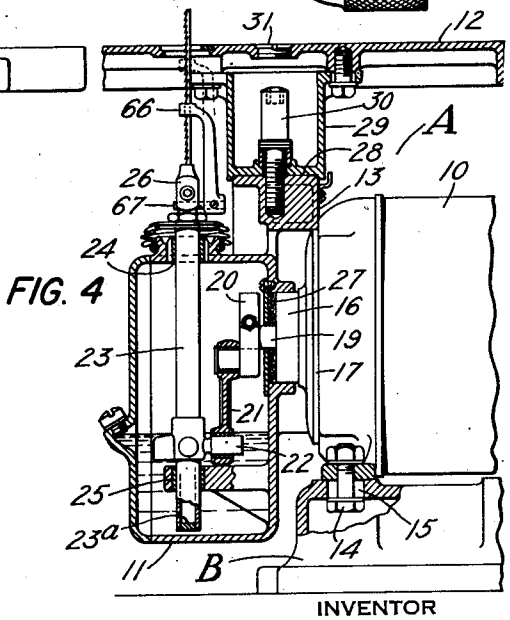


FIG. 4



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FIG. 9

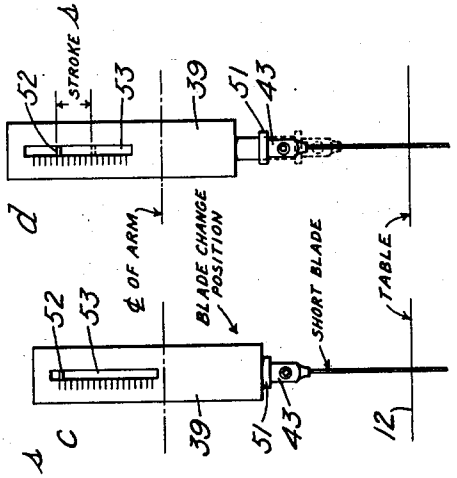


FIG. 8

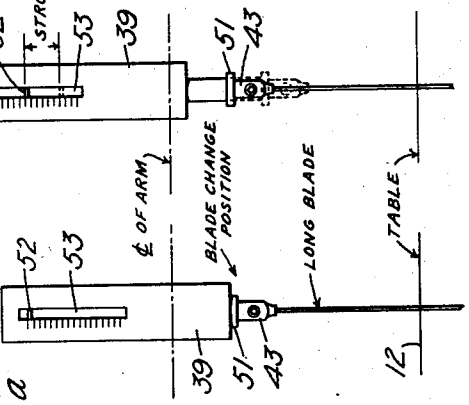
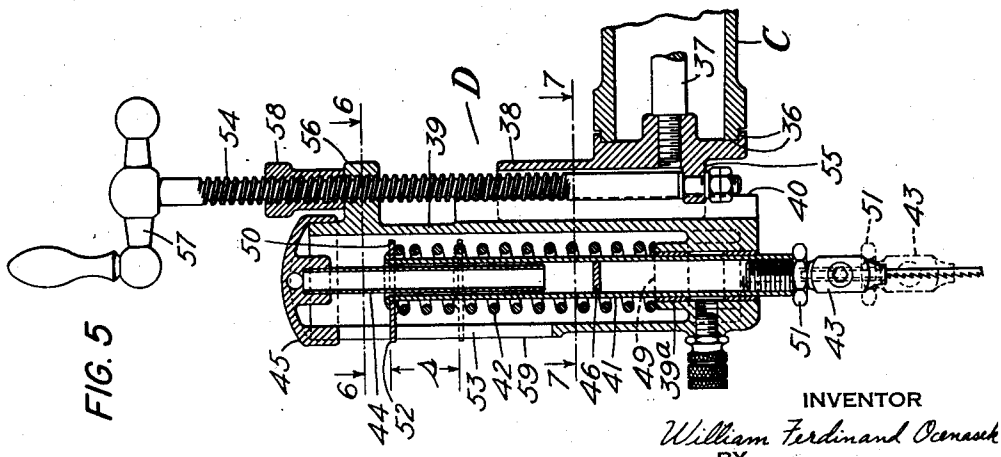


FIG. 5



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UNITED STATES PATENT OFFICE

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TENSIONING MEANS FOR RUNNING JIGSAWS

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Application May 20, 1937, Serial No. 143,658

9 Claims. (Cl. 143—73)

This invention relates to jig-saw machines and particularly to improvements wherein proper blade tension may be applied to the saws of such machines under the conditions as they actually exist during operation.

A primary aim of the invention is to eliminate blade breakage incident to an improper tension being placed upon the saw blade. Heretofore, jig-saws of the spring retracted type have been provided with a means for shifting the upper plunger relative to its casing in definite fixed increments, thereby to cause the plunger to project different distances to suit different length blades. In such devices, however, the spring tension was intended to be substantially constant and the user could not give the particular blade inserted its correct tension. If a user, after repeated trials and tests, did find that a certain position of the plunger gave fairly good results on a certain size blade of a known length, that position was, of course, entirely unsuited for a blade of the same size but a trifle longer or shorter, and likewise incorrect for a blade of a different thickness although of the same length, or if the speed was changed, or if a different workpiece was operated upon.

With the prior machines, if any adjustments were possible, the adjustments were necessarily made when the machine was standing idle and usually without a saw blade being clamped in the chucks, for it was exceedingly difficult to adjust the plunger with the spring therein loaded and impossible if the machine is running. The results at best were, therefore, merely an approximation, and if after reassembling the machine and inserting the saw, the user found there was too little or too much tension on the blade, either of which promotes excessive vibration and blade breakage, it was necessary to stop the machine, disassemble the parts and try a different setting.

The present invention aims to overcome the foregoing disadvantages and to enable the user to insert in the chucks of his machine any saw blade that he selects for the operation, and thereafter to apply the proper tension for that particular blade and to establish the proper tension thereon while the machine is in operation.

By way of additional refinement, the invention further aims to insure longer blade life and more efficient operation by making it practically impossible for the user to fail to give the blade its proper tension.

The invention also aims to overcome the disadvantages and difficulties inherent in spring retracted jig-saws attending the insertion and changing of saw blades. In machines of the prior constructions, the upper plunger automatically moved, under the force of the spring, to its retracted position upon the unclamping of the saw blade. To insert a blade it was necessary first to position the chuck of the lower plunger properly and clamp the blade therein, next, bring the upper chuck down against the compression of the spring until it telescoped the end of the saw blade a distance sufficient to insure clamping, and then, while holding the upper plunger in that position against the force of the spring, clamp the blade in place. This operation was exceedingly difficult to perform because of the manual holding of a loaded spring and also very tedious due to the inability of the user to hold the end of a spring loaded plunger steady and at the same time hold and align the saw blade and manipulate the saw clamping mechanism.

In overcoming these problems, the invention proposes a construction whereby the spring may be in effect unloaded and the plunger shifted axially toward the lower plunger a distance sufficient to allow convenient insertion or removal of blades while the parts are substantially strain free. The invention further aims to permit the operator to insert a relatively delicate blade into the chucks of the machine and to make sure it is properly located and aligned before it is clamped, and after the blade is properly clamped, to gradually and positively retract the upper assembly until the blade is taut.

Proper tension in a given blade can be established only when the saw is being reciprocated under actual operating conditions, and the present invention proposes to enable the user conveniently to ascertain the proper tension during the running of the mechanism by raising or lowering the upper assembly in infinitesimal small increments and thereby obtain any gradation or degree of blade tension that may be desired. Improper blade tension causes blade flexing and lack of synchronism in the movements of the upper and lower plungers which soon results in blade breakage.

Still a further object of the invention is to eliminate belt drives and their attendant and excessive vibratory effects and to drive the reciprocable plunger directly from the motor. It is a known fact that with belt drives, and particularly V-belt drives, a substantial amount of power is consumed merely in bending the belt around small pulleys and in removing the belt from the V after being wedged therein by the forces of the driving operation. The present invention aims to

avoid waste of power occasioned by the continued flexing and withdrawing of the belt and to arrange the lower saw reciprocating mechanism and its drive motor as a complete assembly in a single housing so that the motor drives the saw plunger direct. With such an arrangement the power conserved in eliminating belt drives is utilized to advantage in producing a more powerful machine or, in the alternative, in making it possible to use a drive motor of consequential lower horse power rating, and in either case, without introducing into the machine the whipping and vibrating effects of belt drives.

A further aim of the invention is to provide a direct drive for a jig-saw capable of at least two speeds of operation so that the operator may select the speed suitable to the characteristics of the work being operated upon and with respect to the quality of the blade being used.

Still another object of the invention is to render available a jig-saw machine constructed on the unit principle, each unit of which may be manufactured and machined separately, and then assembled and aligned by adjusting one unit relative to another and contemplates an assembled structure that utilizes the minimum amount of floor or bench space and requires the minimum amount of material.

In carrying out the objectives of the invention, it is proposed to construct a jig-saw with the upper head unit made in two major parts, a supporting bracket which is mounted at the end of the overarm, and a housing element which is slidably mounted in the bracket. The housing element provides the bearings for the upper chuck plunger and houses the blower mechanism, and the spring for retracting the plunger. The entire assembly is arranged to be moved up or down on the bracket by a manually operated hand screw which is of relatively fine pitch for close adjustment.

By operating the hand screw the user may adjust the upper head and plunger toward or away from the lower chuck until the chucks are spaced apart a distance sufficient to accommodate a particular blade and thereafter the blade is inserted and clamped while the parts are free of the pulling forces of the spring. When the blade has been properly positioned and clamped the upper housing is retracted to place the inserted blade under an initial tension and the machine is ready for operation. During the running of the machine, the user by manipulating the hand screw may gradually increase the applied tension until the proper blade tension is established and a harmonious reciprocating cycle, free of vibration, obtained.

The lower and direct drive saw operating mechanism comprises essentially an electric motor upon which is mounted the housing for the driven plunger and the direct acting drive between the motor and the plunger. The housing also supports a tilting table, the entire assembly constituting a single unit which may be adjusted in transverse directions upon a base plate for aligning one plunger with the other.

An important feature of this type of mounting is the coplaner relation of the base, overarm, saw operating plungers, and the motor axis. In jig-saw mechanisms, the forces are substantially entirely vertical and in the plane of the overarm and base, and by designing the structure so that all of the operating mechanisms are likewise in the same plane, the machine can be constructed along considerably narrower lines and the material that ordinarily would be used to give breadth to a machine, may be used to give added strength and rigidness in a vertical plane.

A further aim of the invention is to relieve the saw blade of substantially the entire additional effort of operating an upper head carried air pump, and to direct a gentle breeze, hardly more than a draft of air, about the line of cut of the saw to keep the area slightly in advance of the cut, free of dust and chips.

This aim is achieved by the present invention by incorporating in the translatable upper head a pair of spaced telescoping tubes arranged to telescope upon the upstroke of the saw plunger and expel air through a nozzle located near the workpiece. By reason of the spaced relation of the tubes, valve structures are eliminated and a frictionless blower obtained that will provide a gentle breeze sufficient to remove chips from the line of cut without throwing the chips into the air.

Other objects and advantages will be in part indicated in the following description and in part rendered apparent therefrom in connection with the annexed drawings.

To enable others skilled in the art so fully to apprehend the underlying features hereof that they may embody the same in the various ways contemplated by this invention, drawings depicting a preferred typical construction have been annexed as a part of this disclosure and, in such drawings, like characters of reference denote corresponding parts throughout all the views, of which:

Figure 1 of the drawings is a side elevation of a jig-saw embodying the present invention.

Fig. 2 is a front elevation and view thereof.

Fig. 3 is a front view of the machine illustrating on a larger scale the coplaner relation of the several units.

Fig. 4 is a side front and sectional view of the lower plunger operating mechanism, showing more clearly the direct drive feature and the unitary construction of the assembly.

Fig. 5 is a sectional view of the upper head assembly in a larger scale.

Figs. 6 and 7 are horizontal sectional views taken along lines 6—6 and 7—7 of Fig. 5.

Fig. 8 is a composite illustration of the character of adjustment made in obtaining proper blade tension on a relatively long blade.

Fig. 9 is a composite illustration, similar to Fig. 8, but in respect to a short blade and one requiring a different unit tension.

Referring more particularly to Fig. 1 of the drawings, the jig-saw illustrated consists of four major units, a support and drive unit A, a base B, an overarm structure C, and an upper head unit D. By constructing the machine on the unit principle, each unit may be manufactured and assembled independently, and the units subsequently assembled and aligned by adjusting them relative to each other.

The support and drive unit A consists of a motor 10, a transmission housing 11, a table 12 tiltably supported upon an upstanding portion 13 of the transmission housing. The axis of tilt of the table lies preferably in the plane of the working surface and coincident with the plane and line of cut of the saw. As illustrated in the drawings, the transmission housing 11 is carried directly by the motor 10 and overhangs the forward end of the base B. The entire assembly may be adjusted on the base B for alignment purposes by means of the motor bolts 14 and the

transversely arranged slots 15 in the base and motor footings respectively.

The transverse slots 15 in the motor pedestal and the base allow the machinist greater tolerances in the machining of the larger castings and compensate for variations in castings due to shrinkage on cooling and when the machined units are assembled, the transverse slots form a ready means for obtaining extreme accuracy in the alignment of the lower plunger with the upper plunger.

Fig. 4 of the drawings illustrates a convenient method of mounting the transmission housing upon the motor which consists in turning the periphery of the motor hub 16, and a ring 17, true with the axis of the motor, and forming complemental annular surfaces on the transmission housing. This construction provides a double support of ample proportions for the mounting of the transmission housing in close-coupled relation with the motor. The housing 11 is secured to the motor frame by the bolts 18 in correct alignment relative to the motor footing.

The motor shaft 19 extends into the housing and carries at its end a crank arm 20 which, through the medium of a connecting rod 21 and wrist pin connection 22, reciprocates the saw plunger 23 in the bearings 24 and 25 provided by the housing. The upper end of the plunger 23 carries a saw gripping chuck 26, which is adjustable angularly thereon for the purpose of turning the plane of the blade relative to the normal longitudinal plane on the machine; the crank pin, connecting rod and wrist pin connections prevent rotary movement of the plunger 23.

The plunger 23 is preferably tubular for lightness and also so that the blades of random lengths may project thereinto when necessary. To keep the oil contained in the lower portion of the housing from pumping through the plunger, the lower end of the plunger is plugged at 23a. The plugged end also assists in agitating and splashing the lubricant about within the housing whereby the moving parts are kept lubricated at all times. The lubricant is also kept from splashing into the motor bearings and motor 10, and from leaking out of the housing at that region, by a felt pad 27 provided at the union of the motor and transmission housing.

The upper portion 13 of the transmission housing also provides an arcuate bearing surface 28 for the table trunnion bracket 29 which supports the table 12. The table 12 has a three-point bearing on the bracket 29 and is adjustable thereon, within certain limits, in transverse directions for locating the blade opening therein in proper relation to the axis of the plunger 23. The trunnion 29 permits the table 12 to be tilted about the line of cut in the saw for bevel sawing, and is adapted to be clamped in adjusted position by means of the clamp screw 30 accessible through a normally closed opening 31 provided in the table top.

By designing the machine so that the axis of the motor lies in the general plane of the machine, a much firmer support for the bearing portion 13 of the transmission housing, whose axis of curvature also is in the general plane of the machine, is provided than would be possible if the motor was disposed 90° from the position illustrated. The location of the motor directly behind and integral with the transmission housing, instead of laterally to the side, also makes it possible to use a bed length considerably shorter and of relatively narrow width. The resulting shortening of the bed furthermore, materially reduces the tuning fork action and makes for a more rigid construction all the way through.

In furtherance of the objective to lengthen the life of jig-saw blades, it is proposed to eliminate sources of vibration wherever possible. By close coupling the motor with the reciprocating mechanism, belt drives and their consequent vibratory effects have been eliminated, and a more powerful and smooth running mechanism results. In the present embodiment of the invention the motor 10, capable of yielding two different speeds of operation, has been illustrated. Switch 1, when thrown to its effective position, causes the motor to run at its low speed, and the switch *h* controls its high speed. The user, therefore, has two immediately available speeds from which to select, either before or during the course of a sawing operation. For general jig-saw operations, two speeds of operation fill most of the requirements.

The base B, extends rearwardly and is provided with an elevated bearing surface 32 upon which a complemental surface 33 of a removable overarm C, is seated. A clamp screw 34 and a pivot screw 35 serve as the means for clamping the overarm firmly in position. From the bearing surface 32, the front wall of the base curves generally downwardly and forwardly to the motor and reinforces the base against collapsing stresses.

The overarm C, is in effect, a continuation of the curvature of the base and extends upwardly and forwardly into overlying relationship with the table 12. The arm C is substantially tubular in cross-section and is provided with a plurality of transverse ribs designed to give strength and rigidity to the head assembly mounted at the free end of the arm.

The head D, as illustrated more clearly in Fig. 5, seats upon annular and end bearing surfaces 36 of the arm and is bolted in position thereon by means of a bolt connection 37 operable from the rear of the machine. The head assembly D includes a bracket member 38 and a head or housing member 39 translatable in complemental guideways 40 formed respectively upon the housing and bracket members. The housing 39 provides the bearings 39a for the upper plunger 41 and encases a spring 42 normally operable to retract the plunger and to apply tension on the saw blade. The plunger 41 is also tubular and carries at its lower end a saw gripping chuck 43, and its upper end telescopes with an air tube 44 projecting from the cap 45.

The purpose of the tube 44 is for supplying a gentle current of air to the work table to remove chips from the line of cut. The tube 41 is plugged at 46 intermediate its ends and during the rapid reciprocation of the plunger, the plug 46 acts as a cylinder head of a traveling cylinder and the air that enters the tube 41, through the space provided between the tubes, is expelled on the upstroke of the plunger through the tube 44. A communicating pipe 47 and nozzle 48, situated close to the line of cut of the saw, directs the current of air where it is needed.

Through the mechanism just described, a gentle puff or blast of air is given on each upstroke of the plunger which is ample to remove the chips and dust from the workpiece without throwing it into the air. It will be observed also, that the tubes 44 and 41 do not touch one another and in consequence the air pump is practically frictionless and substantially no additional burden is placed on the saw blade.

As hereinbefore mentioned, an important feature of the invention resides in the ability to insert a saw blade while the spring retracted plunger is free of the forces of the spring and thereafter to apply the correct tension to the particular blade that has been inserted. Figs. 5, 8 and 9 of the drawings, illustrate a preferred means for accomplishing these objectives. In Figure 5, it will be seen, that the lower end of the spring 42 abuts against a lower end surface 49 of the housing, and the upper end of the spring against a collar 50 secured to the plunger. The normal tendency of the spring, therefore, is to retract the plunger until stopped by the check nut 51 adjacent the chuck end. The check nut 51, in addition to acting as a stop for the plunger, serves to lock the hollow chuck 43 against turning relative to the plunger. The plunger itself is prevented from turning by means of a tongue 52 projecting from the collar 50 through an elongated slot 53 in the housing.

With the parts in the position shown in Fig. 5, the housing has been elevated to the position where proper tension is exerted on the blade and is the position the parts will assume under a normal operating condition. The screw 54 for effecting the adjustment is provided preferably with a left handed Acme thread and is rotatably attached to a lug 55 on the guide bracket 38 and is threaded through a lug 56 on the housing 39. A hand wheel 57, carried at the upper end of the screw shaft, provides a convenient means for rotating the shaft to cause the housing 39 to translate major or infinitesimally small distances on the guide bracket 38.

To insert a saw blade in the machine, the user will first attach the blade to the lower chuck and then by actuating the hand wheel 57, translate the upper housing and plunger downwardly until the chuck 43 telescopes the end of the blade the amount required for clamping. Fig. 8*a* illustrates the housing shifted to accommodate a relatively long blade. During the operation the upper plunger is held against movement by the stop collar 51 abutting the under side of the housing, and the operator has no difficulty whatever in properly aligning and clamping the blade in position. When the blade has been clamped, it is merely necessary to turn the hand wheel 57 in the reverse direction to propel the head 39 upwardly until there is a slight clearance between the stop nut 51 and the lower end of the housing.

The initial tension given to the saw in the manner above explained, will not in a majority of cases be the correct tension of the particular blade inserted. However, by the mechanism just described, the user may turn the hand wheel 57 while the machine is running, and gradually move the head to a position represented in Fig. 8*b*, thus applying more tension to the blades, until the proper tension has been established.

In spring retracted jig-saw machines, such as herein illustrated, the function of the spring is to return the blade and to keep it from buckling. If, therefore, there is insufficient tension, the upper chuck does not respond in synchronism with the lower chuck, and in consequence, the saw held by the chucks is caused to bend and flex. On the next down stroke, the slack in the saw blade is taken out with a jerk, and it is this constant jerking that soon breaks the blade and all the while causing extreme vibration in the machine.

On the other hand, too great a tension on a blade places the latter under a stress that exceeds the strength of the blade section and in a short time the blade parts.

There are numerous factors which enter into the problem of applying the proper blade tension, among which may be noted that the springs used in machines of this character rarely are uniform in their tension and compression values, each spring has its own peculiar deflection characteristics; each different size of blade has its own maximum tensile strength which varies as between blades, and as between blades of different manufacturers. The length of blades used also plays an important part, for it is well known that the force required to keep a relatively short blade taut is considerably less than that required to keep a long blade of the same section, equally taut. The thickness and character of the workpiece and nature of the cut being taken also introduce unascertainable modifications in operating conditions, and as a user does not know in advance what the conditions are in a given set-up, it is impossible for him to set the machine before hand to give the proper blade tension.

In addition to the above, there is the speed factor. A setting once made for a certain speed of reciprocation is, due to inertia of the parts, at once incorrect for a different speed of reciprocation. With the present invention, however, the user is given a definite and positive control over blade tension, and irrespective of a variation in one or more of the conditions above mentioned, he may quickly and easily coordinate them all into a harmonious working relation by applying tension under the actual conditions of operation of the machine.

With due regard being given to the length of blade and its sectional area, the speed of reciprocation and the nature of the work, the objective of obtaining the minimum tension on a blade consistent with the conditions, is attained by the present invention in a simple convenient manner.

Fig. 9 of the drawings illustrates the character of adjustment made to adapt the machine to a relatively short blade requiring a different unit tension. In this figure, sketch *c* illustrates the head adjusted downwardly, with the spring therein unloaded to the point where the short blade may be aligned and secured in the chuck. Fig. 9*d* illustrates the head retracted to a position wherein the proper tension is established for that particular length and size of blade having regard also for the speed at which it is reciprocated and the characteristics of the workpiece.

To give the user a visual indicator of the tension he has applied to a blade, a tongue 52 movable with the plunger 41 projects through a wall of the housing. Preferably the projecting tongue is made substantially flush with the outer face 59 of the housing so as not to catch or strike the operator. The distance marked *s* in Fig. 5, represents the stroke that the saw will make during the operation of the machine, and when running, the tongue 52 will appear as a shadow traversing the distance *s* in the housing.

The slot 53 in which the tongue 52 operates is considerably longer than the stroke of the plunger so as to afford a considerable range or latitude of adjustment for applying tension to any one of a large range of blades. In the case of a fine blade that will not stand very high tension, the shadow the tongue 52 makes may appear near the upper end of the slot 53, whereas, with a wide blade that binds more readily and may be given more tension, the shadow may be caused to appear lower in the slot. The position of the

shadow in the slot, however, serves as an indicator of the extremes of tension applied on any given blade. By suitably marking or coloring the face 59 of the housing in accordance with the tension characteristics of the spring, an indicator of the approximate blade tensions is provided which remains good for all lengths of blades. In making an adjustment of the housing, the relatively long and narrow guides 40 between the head proper and the fixed bracket afford an accurate means for maintaining the alignment, and also a firm support for the housing when the latter has been adjusted to its final position. If desired, a lock nut 58 may be mounted upon the screw shaft for locking the translatable head in a given position thereon.

In promoting longevity in blade life the invention further proposes a back support for the blades effective at both sides of the cut, e. g. on each side of the workpiece.

The upper saw guide depends from the fixed bracket 38 at the end of an adjustable guide rod 60 disposed at an angle of 45° from the normal plane of the saw. In the present instance, the saw guide consists of a multigrooved roller 61 which is laterally adjustable on a tranesversely adjustable bracket 62. The bracket 62 is, in turn, mounted on a plate 63 offset from the guide rod 60 so that the guide roller normally will lie behind the saw blade. By inverting the plate 63 and positioning it on the guide rod 60, ninety degrees away from its former position, the same bracket and roller guide may be attached thereto and guide and support the saw when the plane of the latter is turned.

The guide rod 60 also supports a yieldable presser foot member 64 which normally rests upon the top of the workpiece and exerts a pressure thereon to hold the work down. The nozzle 48 of the air blowing mechanism may also be attached to the guide rod 60 by the bracket 65, and when these parts have been adjusted to a position suitable for a given saw blade and workpiece, their positions do not change even though the housing 39 is raised or lowered in inserting or applying tension on the blade.

The under support and guide for the saw consists of a generally V-shaped member 66 mounted on a rod 67 carried by the lower plunger 23. The under guide extends well beyond the chuck and gives support to the blade immediately adjacent the under surface of the table, and as it travels with the plunger, does not create any friction on the blade. To accommodate blades of different thicknesses from front to back, the guide 66 may be adjusted rearwardly on a transverse stud 67 and clamped in adjusted position. The stud 67 is preferably carried by the chuck of the lower plunger so that when the chuck is turned to place the plane of the blade at an angle, the blade back support 66 is likewise turned to the same angle.

Without further analysis, the foregoing will so fully reveal the gist of this invention that others can, by applying current knowledge, readily adapt it for various utilizations by retaining one or more of the features that, from the standpoint of the prior art, fairly constitute essential characteristics of either the generic or specific aspects of this invention and, therefore, such adaptations should be, and are intended to be, comprehended within the meaning and range of equivalency of the following claims:

Having thus revealed this invention, I claim as new and desire to secure the following combinations and elements, or equivalents thereof, by Letters Patent of the United States:

1. A jig-saw machine combining relatively shiftable upper and lower saw reciprocating mechanisms adapted to hold and reciprocate a saw blade, a normally fixed support for each of said mechanisms, power means for actuating one of said mechanisms, resilient means for actuating the other of said mechanisms in opposition, said resilient means also placing the inserted saw blade under tension, and mechanical means positively connecting one of said mechanisms to its support and manually operable to shift the said mechanism toward the other for rendering said resilient means ineffective as a tension applying medium so that a saw blade may be inserted or removed when the parts are free of the effects of the resilient means and thereafter operable during the running of the jig-saw to shift the said mechanism away from the said other mechanism to grade the effectiveness of said resilient means thereby to apply proper tension on the particular blade inserted.

2. A jig-saw combining a work supporting table; a saw reciprocating plunger underlying said table; a cooperating saw reciprocating mechanism overlying said table and spaced therefrom, said upper mechanism comprising a bracket member normally maintained in fixed spaced relation with said lower plunger, a housing member translatable on said bracket, a saw gripping plunger slidable in said housing, a compression spring member encircling the plunger and operating between said plunger and said housing and normally operative to maintain said plunger resiliently in retracted position; and manually operable means for adjusting said housing, compression spring, and plunger electively toward or away from said lower plunger to accommodate blades of different lengths and for adjusting said housing during the normal reciprocating motion of said plunger mechanisms to establish proper blade tension, comprising a manually operable screw shaft operatively connected with said translatable housing and with said fixed bracket member for effecting relative movement therebetween.

3. A jig-saw machine combining an upper and a lower saw reciprocating mechanism adapted to reciprocate a saw blade, power means for actuating one of said mechanisms, a spring means for actuating the other of said mechanisms in opposition, said spring means also placing the inserted saw blade under tension; a normally fixed support for one end of said spring, and manually operable means including a rotatable shaft operatively connected to said support to shift said support to a position rendering said spring ineffective as a tension applying medium thereby to permit the insertion or removal of a saw blade when the parts are free of load and operable during the operation of the jig-saw for rendering said spring effective and for grading its effectiveness; and means carried by the upper saw reciprocating mechanism and cooperating with said shiftable support for visually indicating the unit tension applied to the inserted blade in any adjusted position of said support.

4. A jig-saw machine combining an upper saw reciprocating mechanism comprising a shiftable head member and a support therefor and a lower saw reciprocating mechanism adapted to hold and reciprocate a saw blade, power means for actuating one of said mechanisms, resilient means in the head member for actuating the other of

said mechanisms in timed relation therewith, said resilient means also placing the inserted saw blade under tension, manually operable means including a shaft member connecting said head member and its support, operable electively in reverse directions to shift the head relative to its support to change the tension placed on the said blade, said means being operable in either of said directions during the running of the jig-saw so that the critical tension on the particular size and length blade inserted may be established under actual operating conditions, and means cooperating with the shiftable head member for visually indicating the unit tension applied to a blade of a given length during its stroke.

5. A blade tensioning device and indicator for a jig-saw having an upper and a lower saw reciprocating mechanism, one of which is spring retracted and the other of which is reciprocated in both directions by power, the combination of a translatable housing enclosing one of said mechanisms; a guide bracket member maintained in fixed relation with the other of said mechanisms for supporting said housing; manually operable screw means between said guide bracket and said translatable housing for translating said housing toward or away from the other of said mechanisms thereby to decrease or increase the effective force of the spring on an inserted saw blade of a given length, said screw means being adapted for operation during the reciprocatory motions of the saw; and visual means carried by said plunger and cooperating with said translatable housing for indicating the extremes of tension on any given length blade during its reciprocation.

6. A power jig-saw combining an upper saw operating plunger and a lower saw operating plunger adapted to hold and reciprocate a saw blade, power means for actuating one of said plungers, a helical compression spring element connected at one end with the other of said plungers normally operative to maintain the plunger in retracted position and the inserted blade under tension, said compression spring extending helically around said plunger between said end and the saw; an adjustable abutment for the other end of said spring element whereby the saw blade held by the plunger is placed under tension, supporting and guiding means for said abutment and a positive acting connection between said abutment and said supporting means operatively connecting said adjustable abutment with said supporting means and manually operable electively in reverse directions during the running of the jig-saw to shift said abutment selectively in opposite directions relative to its said supporting means to vary the operating distance between said abutment and the end of said plunger to thereby establish the proper running tension on the said blade.

7. A jig-saw combining a work supporting table; a lower saw reciprocating mechanism underlying said table; an upper cooperating saw reciprocating mechanism overlying said table and spaced therefrom, said upper mechanism comprising a bracket member normally maintained in fixed spaced relation with said lower mechanism, a housing member slidably mounted on said bracket, a saw gripping plunger slidable in said housing, a compression spring member surrounding said plunger and operating between said plunger and said housing and normally operative to maintain said plunger resiliently in retracted position and spaced a predetermined distance from said lower saw reciprocating mechanism; and manually operable means positively connecting said housing to its fixed bracket and operable selectively in reverse directions to shift said housing in opposite directions relative to said bracket to vary said predetermined distance to suit blades of different lengths and to further shift said housing while the machine is in operation to vary the tension exerted by the spring on the inserted saw blade.

8. In a jig-saw mechanism the combination of a head member, a spring in the head for retracting the saw blade and maintaining same under tension, a rigid support for the head member, and manually operable screw means connecting said head and said support, operable during the running of the jig-saw for shifting said head member relative to its said support to vary the tension of said spring.

9. In a jig-saw mechanism the combination of a substantially hollow head member, a saw gripping plunger tube reciprocable in the head, means for reciprocating the plunger; a second tube in the head member arranged in telescoping relation with said reciprocating plunger tube, the walls of said tubes being arranged in non-contacting relation, and means communicating with the interior of said tubes for conducting the air moderately compressed therein during a telescoping movement of the said tubes to a region adjacent the line of cut of the saw.

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