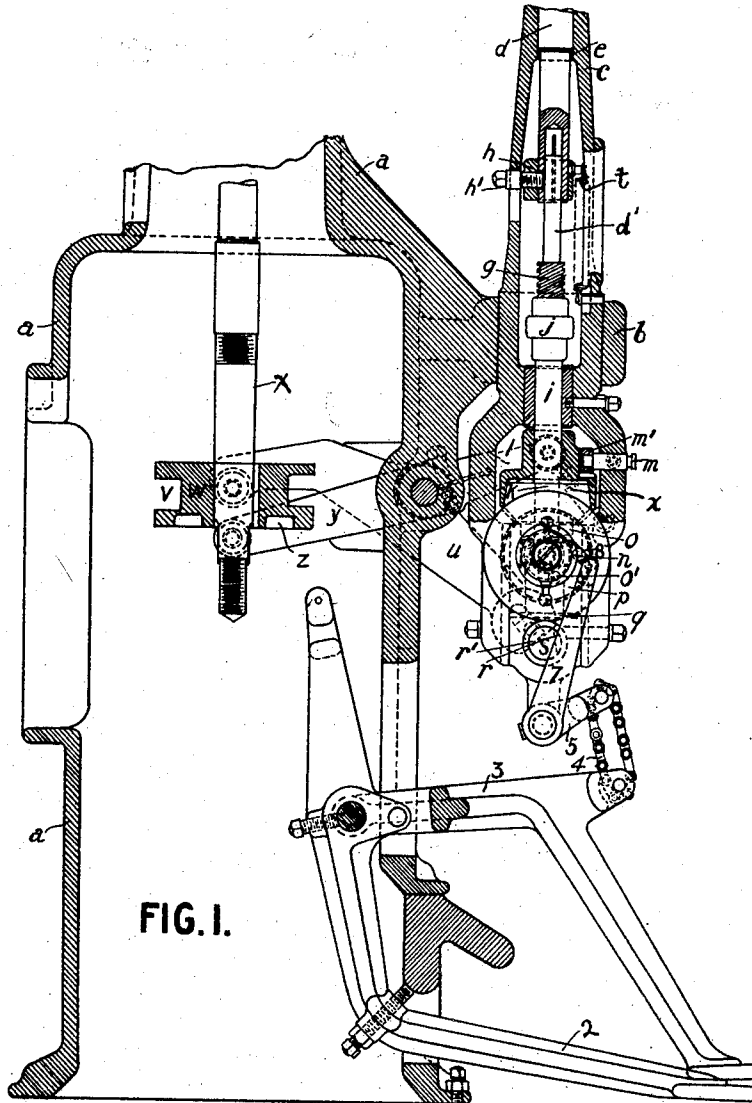


HORN OPERATING MECHANISM OF SLUGGING, NAILING, OR LIKE MACHINES.

1,056,405.

2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.

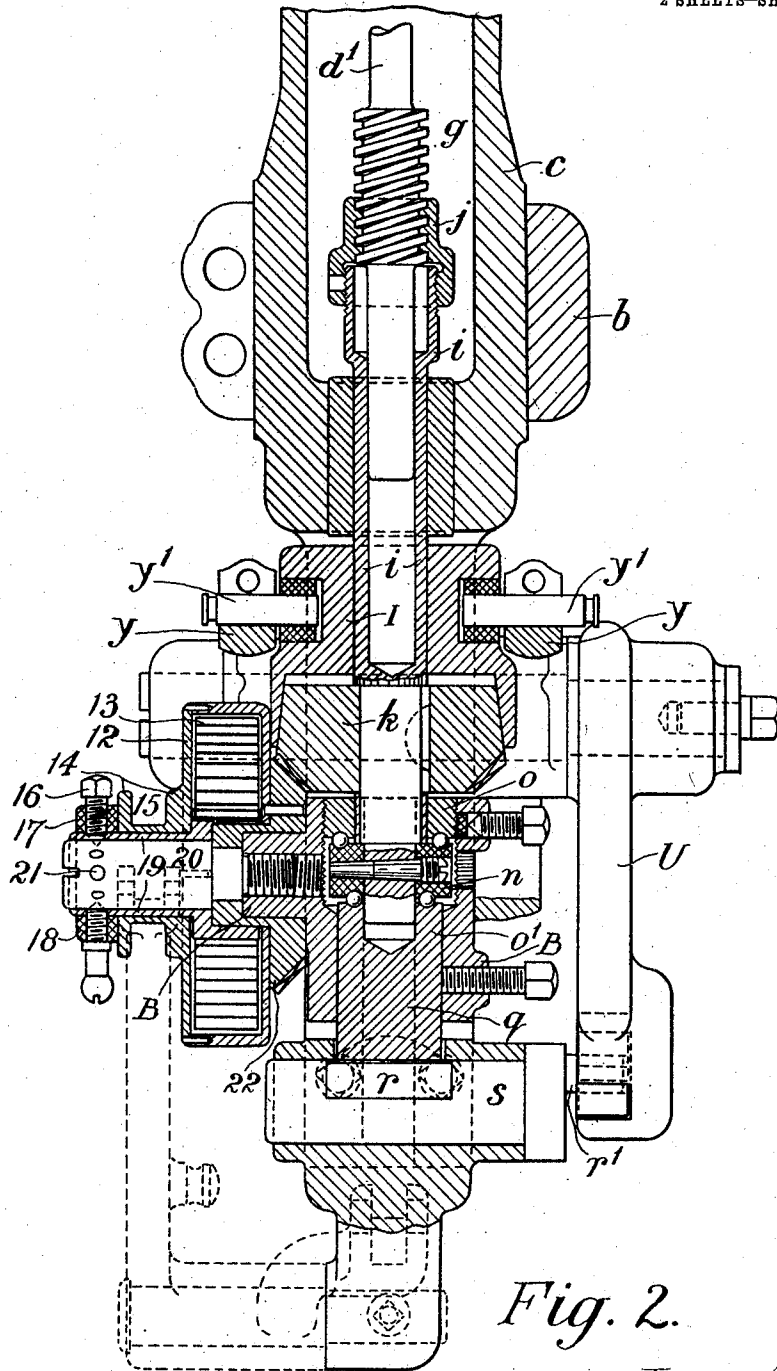


Fig. 2.

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UNITED STATES PATENT OFFICE.

MARK THOMAS DENNE, OF RUSHDEN, ENGLAND.

HORN-OPERATING MECHANISM OF SLUGGING, NAILING, OR LIKE MACHINES.

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Specification of Letters Patent.

Patented Mar. 18, 1913.

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To all whom it may concern:

Be it known that I, MARK THOMAS DENNE, a subject of the King of Great Britain and Ireland, residing at Rushden, Northamptonshire, England, have invented new and useful Improvements in and Relating to Horn-Operating Mechanism of Slugging, Nailing, or Like Machines, of which the following is a specification.

10 This invention has reference to improvements in and relating to horn operating mechanism of slugging, nailing or like machines, in which the depression of a treadle effects the lowering of the horn to enable
15 work to be inserted or removed the said horn being normally retained in its raised position by a spring.

One object of my invention is to insure a heavy pressure being exerted on the work by
20 the spring whereby the horn is raised so as to insure the several thicknesses of material being compacted without however necessitating the exercise by the operator of a heavy counter pressure on the treadle to
25 lower the horn. This it will be readily realized is a matter of considerable moment in machines of the character indicated as the less pressure that the operator has to exert in lowering the horn, the greater will be the
30 ultimate output of the machine as the operator is enabled to continue for a longer period to operate the machine at its full capacity than he could if he had to exert a heavy pressure on the treadle to lower the
35 horn.

My invention further also comprehends means to effect automatically the elimination of all "back-lash" in the parts whereby the horn is held in its raised position as
40 will be described.

To this end my invention contemplates the use in combination of a screw-threaded horn stem or spindle, a screw-threaded nut for raising and lowering the horn, a spring
45 which has a constant tendency to rotate the said nut and thus raise the horn, and means adapted to be operated automatically by a moving part of the machine whereby at the proper time and when the work has been
50 compacted or compressed by the horn spindle the nut is locked, the horn spindle being at the same time supported on a cam block whereby the thrust or blow delivered on the insertion or driving of the fastening will be
55 effectively resisted. The cam block is to be

also automatically operated to permit a slight movement of the horn to release the work when the feed is to be effected the nut being automatically unlocked to permit the parts to adjust themselves to varying thicknesses of the work and to permit the horn to be depressed in the usual manner for the insertion or removal of the work.

Figure 1 is a vertical sectional view and partial side elevation of horn operating
65 mechanism embodying a practical form of my invention; Fig. 2 is a front elevation and sectional view on an enlarged scale of parts shown in Fig. 1.

In said drawing *a* is a suitable standard
70 and *b* a vertical bearing fixedly carrying the horn post *c*. Supported in bearings *e* within the horn post is the horn stem or spindle which may consist of two parts *d*, *d'* adjustably connected together for example by
75 splitting the lower end of the part *d* and providing a collar *h* having a set screw *h'* the tightening up of which will cramp the split end of *d* on the previously inserted part *d'*. The set screw *h'* is made to pass
80 through a vertical slot in the horn post whereby said set screw in addition to the function already described will also serve to prevent rotary movement of the horn while permitting vertical movement thereof.
85

At or near its lower end the horn spindle is formed with a screw thread *g* with which a nut *j* engages and the rotation of which
latter in one direction or the other will serve to raise or lower the horn. The nut *j* is
90 provided with a depending sleeve or spindle *i* on which a toothed or crown wheel *k* is fixed and supported on a horizontal pin 20 screwed into a block B is a crown or toothed wheel 22 which gears with the wheel *k*.
95 Fixed to the wheel 22 is a box 12 containing a spiral spring 13 one end of which is fixed to the box 12 and the other to a sleeve 19 mounted on the spindle 20. The sleeve 19 is provided at its outer end with a collar or
100 equivalent 17 having screwed apertures one of which contains a set screw 16 with a pointed end to enter any one of a series of apertures or countersinks 21 in the spindle 20 and the other contains a set screw 18 to
105 act against the pin 20 but incapable of entering the apertures or countersinks 21. By unscrewing 16 until it is clear of the countersinks 21 the sleeve 19 may be rotated relatively to the box 12 and by this means the

required tension put on the spiral spring 13. The set screw 18 may serve as a brake to prevent the accidental unwinding of the spring during the regulation of its tension.

5 Opposite to the side at which said box is secured to the crown wheel 22 I provide or form said box with a central boss 14 having an annular groove 15 to receive a chain 8. One end of said chain is secured to the boss 10 14 and the other to one arm 7 of a bell-crank or two armed lever pivotally mounted at the lower end of the horn post the other arm 5 of which is connected by a chain 4 or equivalent to a foot treadle 3 the arrangement being such that by depressing 15 the treadle 3 the arm 7 will pull on the chain 8 and thereby rotate the crown wheels 22 and *k* and the latter rotating the nut *j* will force down the horn *d* to permit of the insertion or removal of the work. On releasing 20 the treadle the spring 13 will effect the raising of the horn and by reason of the tension of the spring being exerted through the nut *j* and screw *g* a considerable pressure will be exerted on the work although a comparatively light pressure on the treadle will serve to depress the horn.

It is desirable when for example a nail is being driven into the work that the horn 30 shall offer a solid resistance to the blow delivered by the hammer and although the spring pressure employed to raise the horn must be strong enough to properly compress or press together the several thicknesses of material yet in practice it is 35 not desirable to rely on such pressure alone to withstand the blow of the hammer or the force exerted when a screw or other fastening is being driven or inserted into the work. In order to offer a 40 solid resistance I provide means whereby after the spring 13 has effected the compression of the work in the manner described, the crown wheel *k* is locked to prevent rotation thereof whereby the depression of the 45 horn is rendered impossible and to effect such locking I form the crown wheel *k* with a solid and slightly tapering back to serve as one member of a cone or friction 50 clutch and on the spindle *i* immediately above said crown wheel I provide a hollow cone I slidable on said spindle but prevented from rotating by a pin *m* passing through the horn support and having a 55 roller *m'* engaging a vertical slot in the boss of said hollow cone I and I provide a lever *y* mounted on a suitable part of the standard *a* which at one end is engaged with said boss by pins *y'* and at its other end 60 with a cam groove *z* of a cam disk *W* carried on the usual vertically supported driving shaft *X* the parts being constructed and arranged that so soon as the work has been compressed by the spring 13, the cam groove 65 *z* will operate to permit a spring *x* to pull

the part I of the friction clutch into firm engagement with the back of the crown wheel *k* and thereby prevent rotation thereof and also of the nut *j* thus effectively preventing depression of the horn *d*. Only 70 when the cam groove *z* has depressed the one end of the lever *y* and thereby raised the other end and with the latter the hollow cone I can the treadle be depressed to lower the horn for the removal of the work this 75 being necessary only when the required series of nails, screws or the like have been driven or inserted. After the driving or insertion of each such nail, screw or other fastening the work is fed by any suitable 80 feed mechanism and to facilitate such feeding it is desirable that the work be freed from the pressure acting thereon and to effect this I arrange that the parts *d*, *g*, *j*, *k*, 22 and 20 are movable to a slight extent downward immediately such nail or fastening has been inserted. The extent of such 85 movement may be approximately one-eighth of an inch which will in practice be sufficient not only to relieve the pressure on the work but also to permit the horn to adapt itself to any variation in the thickness of the work as it is fed forward to receive the next fastening. To effect this I mount the 90 spindle 20 on the vertically slidable block B whose bottom part or end *q* rests on a cam shaft or spindle *s* a suitable ball bearing *n*, *o*, *o'* being provided on which the spindle *i* is rotatably carried when the parts are 95 free. The spindle *s* is formed with a flat portion *r* and is provided with a crank arm *r'* engaged by the bifurcated end of a lever U whose opposite end engages with a cam groove V in the cam disk W the parts being 100 so constructed and arranged that immediately after a fastening has been inserted the said groove V rocks the lever U and this in turn rocks the shaft *s* to an extent to bring the flat portion thereof under the 105 part *q* of the sliding block thereby allowing said block and the parts 20, 22, *k*, *i*, *j*, *g*, and *d* to drop to the slight extent necessary as aforesaid. The feed next takes place and immediately this has been effected the cam groove V acting through the lever U 115 restores the said parts to their raised position. It will be observed that while the parts referred to are depressed or lowered the part *k* is disengaged from I and this momentary disengagement permits the 120 spring 13 to adapt the relative position of the horn to the thickness of the work presented when the feed has taken place. The downward movement of the parts as aforesaid may be assisted by a spring *t*. By 125 reason of the spring 13 always tending to rotate the wheels 22 and *k* and the nut *j* on the screw *g* there is constant metallic contact between said parts by which relative movement between said parts is pre- 130

vented when pressure is brought to bear on the horn, in other words all back lash during the operation of the machine is avoided.

In addition to the horn depressing treadle 3 I provide a treadle 2 by the depression of which the machine is started through the instrumentality of any known suitable means and as these form no part of my invention I do not illustrate them.

10 What I claim as my invention and desire to secure by Letters Patent is:—

1. In a machine for inserting fastenings in boots, shoes and leather work, the combination of a longitudinally movable screw-threaded horn spindle, a screw-threaded nut in engagement with the screw-thread on the said spindle, a spring which has a constant tendency to rotate the said nut in the direction to raise the horn, a lever adapted to act through the said spring to rotate the nut in the opposite direction to lower the horn, means for automatically locking the said nut, and means for rigidly supporting the horn spindle while the fastening is being 25 inserted.

2. In a machine for inserting fastenings in boots, shoes and leather work, a vertically slidable horn-supporting block, automatically controlled means for supporting the said block rigidly at different heights in different stages of the cycle of operations, a screw-threaded horn spindle movable vertically relatively to the said block, a screw-threaded nut in engagement with the thread-

ed portion of the said spindle and supported 35 rotatably upon the said block, a spring which has a constant tendency to rotate the said nut in the direction to raise the horn, a lever adapted to act through the said spring to rotate the nut in the opposite direction to 40 lower the horn, and means for automatically locking the said nut on the horn spindle.

3. In a machine for inserting fastenings in boots, shoes and leather work, a vertically slidable horn supporting block, a horizontal 45 rigidly supported rotatable shaft upon which the said block bears and which is formed with a flat portion, a screw-threaded non-rotatable horn spindle movable vertically relatively to the said block, a screw- 50 threaded nut in engagement with the screw threads on the said spindle and supported rotatably upon the said block, a spring which has a constant tendency to rotate the said nut to raise the horn spindle, treadle- 55 operated means acting through the said spring for rotating the nut in the opposite direction to lower the horn, and an automatically operated friction clutch for locking the said nut against rotation. 60

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

MARK THOMAS DENNE.

Witnesses:

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F. HORD.