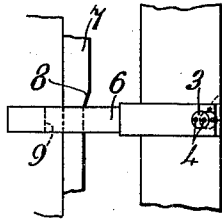
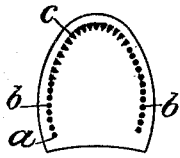


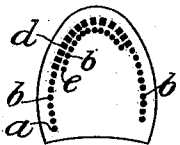
## Patented Oct. 3, 1911.



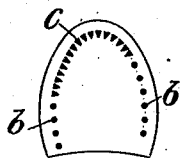
*Fig 2.*



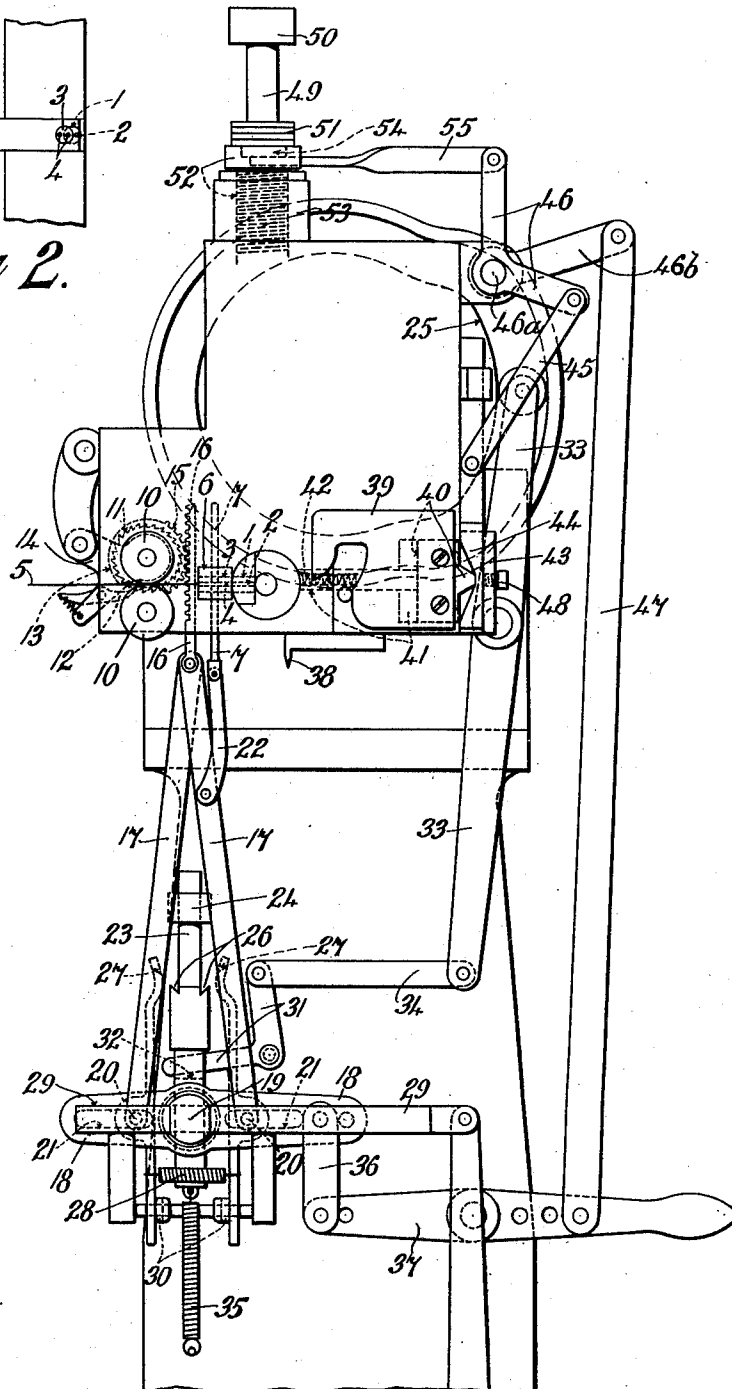
*Fig 3.*



*Fig 4.*



*Fig 5.*



*Fig 1.*

*Inventor:-*

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Witnesses:-

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# UNITED STATES PATENT OFFICE.

WILLIAM HEATON, OF LEICESTER, ENGLAND.

## SLUGGING-MACHINE.

1,005,031.

Specification of Letters Patent.

Patented Oct. 3, 1911.

Application filed June 25, 1910. Serial No. 568,902.

*To all whom it may concern:*

Be it known that I, WILLIAM HEATON, a subject of the King of Great Britain, residing at Leicester, in the county of Leicester, England, have invented new and useful Improvements in or Relating to Slugging-Machines for Use in the Manufacture of Boots and Shoes, of which the following is a specification.

10 This invention relates to machinery employed in the manufacture of boots and shoes, and has particular reference to slugging and analogous machines of the type wherein the nails, slugs or the like are automatically cut from the end of a continuous length of wire.

20 An example of the type of slugging machine with which the present invention is concerned, is described in the specification of prior British Patent No. 9117 of 1900, and although the improvements comprising the present invention may be applicable to slugging and analogous machines in general, such improvements are designed, and will be hereinafter described as being more particularly for application to the type of machine of said prior patent.

30 The object of the invention is, briefly, to provide a slugging machine with mechanism which will enable the material, the length or size, the number, and the disposition of the nails or slugs which are being inserted into the work, to be varied at will and during the continuous operation of the machine. That is to say according to the present invention it is possible to change from one class of nail to another class, or to vary the lengths of the nails, or to alter the distances between the nails, or further, if desirable, to effect a combination of any or all of the said changes at the will of the operator during a single continuous operation of the machine. As an example, when slugging or nailing a heel, a row of nails may be commenced on one side at the edge consisting of round brass nails and these may continue for a distance and then be changed to diamond iron nails and after these have been inserted for a suitable distance the row may be completed with round brass nails as at the commencement. Or, according to another example, round brass nails may be inserted on the edge of the

heel at the commencement of a row, then for a distance, square iron nails may be inserted in the same row and round brass nails on a second or inner row, after which the single outer row may be completed with round brass nails as at the commencement. As examples of the other changes, which are rendered possible by the present invention, when changing from a single row of brass nails to a row of iron nails and an inner row of brass as just described, the said inner row of brass nails may be made shorter than the single row of brass nails, and again when changing from brass nails to iron nails, the latter may be inserted at a closer pitch than the brass nails and vice versa.

70 It will be understood that the shapes, material and arrangements of the nails above mentioned are only quoted as examples and that these will allow of very considerable variation, the important feature of the invention being that all the changes of the nails whether from brass to iron, long to short, square to round, close pitch to wide pitch, and vice versa, may be effected at the will of the operator during a single continuous operation of the machine.

80 The various changes in the nails inserted are brought about by the actuation of a knee lever, handle or equivalent member by the operator, and the mechanism may be adjusted so as to bring about any or all of the changes as may be desired.

90 In further describing the invention reference will be made to the accompanying drawing wherein a slugging machine of the type previously referred to is shown provided with the improvements according to this invention.

95 Figure 1 is a front view of the upper portion of the machine. Fig. 2 is a side view of the mechanism for moving the wire feeding throat. Figs. 3, 4 and 5 illustrate different examples of nailing heels according to this invention.

100 As previously mentioned, according to this invention the changes made in the class, length or disposition of the nails are, any or all of them, brought about during the continuous operation of the machine and in order that the subsequent description and claims may be better understood, I will first describe the diagrammatical views 3 to 5

which clearly illustrate examples of the changes which may be effected in a single continuous operation of nailing a heel.

Referring to Fig. 3, a row of nails may be commenced on one side at the edge—say at *a*—consisting of round brass nails *b* and these may continue for a distance and then be changed to diamond iron nails *c* and after these have been inserted for a suitable distance the row may be completed with round brass nails *b* as at the commencement. Or, according to the example illustrated in Fig. 4, commencing at *a* round brass nails *b* may be inserted for a suitable distance, then in the same row may proceed with square iron nails *d* and at the same time a second inner row *e* of round brass nails *b* may be inserted after which the single outer row may be completed with round brass nails *b* as at the commencement. Further, in Fig. 5 a single row is commenced with round brass nails *b* then a change is made to diamond iron nails *c* which latter are inserted at a closer pitch than the brass nails and the row is finished with brass nails *b* inserted at a wider pitch the same as at the commencement. A further change may also be brought about for example when nailing a heel as illustrated in Fig. 4 by making the second inner row *e* of brass nails *b* shorter in length than the brass nails in the outer row, and again, the double row of nails may be inserted at a different pitch to the single row in the same heel if desired.

It is to be understood that the descriptions just given are only mentioned as examples of the changes which may be effected during the nailing operation and the important feature of this invention is that the said changes are effected at will by the simple actuation of a knee lever or equivalent member without stopping the machine, that is to say, the operation of the latter upon the work is continuous from the commencement of the row to the finish thereof.

I will now describe the mechanism which—according to the present invention—is applied to a slugging machine for the purpose of effecting changes in the nailing of work, examples of which have just been given. The usual driver throat 1 of the machine is furnished with one or more passages 2 therethrough which correspond in number to that of the rows of nails or slugs to be inserted into the work. The wire feeding throat 3 which comes into register with the driver throat 1 to feed the wire thereto is furnished with a plurality of passages 4, one for each kind of wire or nail to be inserted. As two kinds of nails are found to be the most practicable, the invention will be described as being concerned with the insertion of two different kinds only, but it will be understood that a larger number may be inserted by correspondingly increasing the number

of feed throat passages 2 and 4 and other requisite parts. In like manner the invention will be described as being concerned with the insertion of either one or two rows of nails, but the number of rows may also be increased by providing a correspondingly increased number of both drivers (not shown), and passages 2 in the driver throat 1. The wire feeding throat or block 3 is arranged and actuated in such a manner as to move from one position to another so as to change the relationship of its passages 4 with the passage or passages 2 in the driver throat 1 according to which kind of nail is required. The different nails or slugs are supplied from a corresponding number of continuous lengths of wire 5 each passing through or over a ratchet feed device. When the feed throat 3 is moved to change the feed from one kind of wire to another the ratchet feed devices are correspondingly started or stopped as the case may be, and this is brought about by mechanism which is actuated in conjunction with the throat moving mechanism, as will be described later. The wire feeding throat 3 (Figs. 1 and 2) is preferably arranged to have a sliding movement across the driver throat 1 and for this purpose may consist of a block or die in which the wire passages 4 are formed. This sliding block may be mounted in a slidable bolt or rod 6 suitably mounted in a bearing or other convenient part of the machine head. The said bolt 6 is reciprocated to move the throat block 3 by means of a transversely slidable bar or cam lever 7 having an inclined edge or face 8 (Fig. 2). The bar 7 passes through a slot or recess 9 in the side of the rod 6 and as it is moved transversely to the said rod the latter is caused to reciprocate by the engagement of the inclined edge or face 8 of the bar 7 with the end of the slot or recess 9. A spring (not shown) may be combined with the sliding rod 6 to move it in one direction or the transversely moving bar 7 may positively move the said rod 6 in both directions.

The feed mechanism for feeding the lengths of wire 5 to the feed throat 3 may be of known type comprising feed rollers 10 between which the wire 5 is passed, said rollers being actuated by ratchet wheels 11 intermittently rotated by pawls 12 in the usual manner. Combined with the pawls 12 and ratchet wheels 11 are guards 13 rotatable around and over the ratchet wheels in a known manner to lift the said pawls out of driving engagement with the ratchet wheels. This type of feed mechanism is fully described in prior British Patent No. 773 of 1905 and it is to be understood that in the present case there is provided for each length of wire separate feed rollers 10, a ratchet wheel 11, pawl 12, and guard 13, that is to say, each length of wire has its particular

feed device although all the pawls 12 may be actuated from a common rock lever 14 which receives motion from a cam in the usual way.

5 According to this invention, the guard 13 of each feed device is furnished on the back or edge with teeth 15 which gear with the teeth on a sliding rack 16 (Fig. 1). The movement of the racks 16 causes the guards  
10 13 to rotate and put the feeding devices into or out of action in the known manner, as the case may be, and these racks 16 are actuated by the following mechanism.

One end of each sliding rack 16 is pivotally connected by a link 17 to a centrally pivoted rock lever 18 mounted upon a suitable pin or fulcrum 19. The rack 16 of one feed device is connected to one end of or on one side of the rock lever 18, and the rack  
20 of the other feed device is connected to or on the opposite end or side of said rock lever, each of said connections being by a pivoted link 17. The said links 17 are connected to the rock lever 18 by pins 20 which are adjustable along slots 21 in the said rock lever  
25 ends for a purpose hereinafter mentioned. Now it will be obvious that when the rock lever 18 is turned or rocked on its centrally disposed fulcrum 19, one rack will be moved  
30 in an opposite direction to the other *i. e.* one will move up and the other down, and thus the result will be that when the guard 13 of one feed device is rotated to disengage the pawl 12 from its ratchet wheel 11 and stop the  
35 feeding of one wire, the guard of the other feed device will rotate in an opposite direction to allow the pawl thereof to come into engagement with its ratchet wheel and start the feeding of the other wire, and vice versa.  
40 The inclined slidable bar 7 which reciprocates the feed throat rod 6 may conveniently be connected by a pivoted link 22 to one of the links 17 which actuate the guard racks 16 so as to move the feed throat 3 simultaneously with the change in the opera-  
45 tion of the feed devices.

The mechanism for imparting movement to the rock lever 18, comprises a rod 23 which is passed through the fulcrum pin 19 of the rock lever and is suitably carried by a bearing 24 and adapted to have a (preferably continuous) reciprocating movement imparted to it from a groove cam 25 or other driven part of the machine in a manner to be described later. Located on opposite sides of the reciprocating rod 23 is a tooth 26, or similar projection and, also located on opposite sides of said rod, are two detents 27 pivotally mounted on or connected to the rock lever 18 on each side of its fulcrum 19. A spring 28 is combined with the said detents 27 to normally hold their ends apart and clear of the teeth or shoulders 26 on the reciprocating rod 23.  
65 An arm 29 horizontally slidable through the

pin 19 has prongs 30 which embrace the two pivoted detents 27 on the rock lever 18, and this arm 29 is connected by any suitable intermediate mechanism with a knee lever or other similar member (not shown) conveniently situated on the machine to be moved by the operator.

The function of the forked arm 29 when actuated by the knee lever or similar member is to move either to one side or the other for the purpose of bringing either one or the other of the detents 27 into engagement with the tooth or shoulder 26 located on that side of the reciprocating rod 23. The upward movement of the rod 23 results in the rock lever 18 being moved either in one direction or the other, according to which detent 27 is moved inward and a corresponding change will thereupon be brought about in the feeding of the wires. That is to say, if, for example, brass and iron wire is being used in the machine, when the knee lever is moved in one direction the detent 27 on one side of the reciprocating rod 23 will engage the tooth 26 on the same side thereof and brass wire will be fed. When however the knee lever is moved in the opposite direction, the other detent 27 will engage the tooth on the opposite side of the reciprocating rod and iron wire will be fed. When one detent 27 is moved inward to engage its tooth 26 the opposite detent is simultaneously moved outward to be free of its tooth so that when one feed device is started the other is simultaneously  
100 stopped. Or the parts may be adjusted so that both feed devices may operate together for a double row and upon the movement of the rock lever one device may be thrown out of action to insert a single row of nails.

A convenient arrangement of mechanism for reciprocating the detent engaging rod 23 may comprise a pivoted bell crank lever 31 one end of which passes through a slot or opening 32 in the said rod 23. The said lever 31 is rocked to reciprocate the rod 23 by means of a groove cam 25 on the driving shaft, a pivoted lever 33 and an intermediate link 34 being employed to transmit the motion from the cam 25 to the bell crank lever 31. A spring 35 may be employed to move the reciprocating rod 23 in one direction—for example downward—or the bell crank lever 31 may be arranged to impart both the upward and downward movement to the said rod. The rock lever 18 may be connected by a link 36 with a second rock lever or pivoted handle 37 by which latter the said lever 18 may be moved by hand.

In the operation of the mechanism heretofore described, when it is desired to make a change from one class of nail to another class in a single row (as shown in the example of Fig. 3), the two different classes  
130

of wire are passed one through each feed device and the latter are arranged so that when one feeds, the other remains quiescent, and vice versa. If however it is desired to  
 5 change from inserting, say brass nails to iron nails in the same row and at the same time insert an additional row of brass nails (for example as shown in Fig. 4), then the feed device for the brass wire would  
 10 be arranged to remain continuously in action and when the knee lever is moved to start the feeding of the iron wire, the movement of the wire feed throat 3 would carry the brass wire to another passage in the  
 15 driver throat 1 to produce the additional row of nails. Again, in order to vary the length of the nails, as for example when brass nails cease to be inserted on one row and commence to be inserted on another  
 20 row (as in Fig. 4) the feed device is arranged so as to feed more wire for one row than it will do after the change has been made for the other row, and vice versa.

In order to bring about the above results  
 25 the actuation of the feed devices relatively one to the other may be varied and this is effected by adjusting the pins 20 of the rack connecting links 17 along the slots 21 of the rock lever 18 before mentioned so  
 30 that the pawl guards 13 are moved *i. e.* rotated to a greater or less extent as may be desired to give the increased or decreased amount of feed required.

In practice it has been found advantageous as regards cost and wear to place the  
 35 brass fasteners or slugs such as *b* at wide distances apart and the iron slugs *c* or *d* closer together, and to accomplish this, the present invention as before stated, includes  
 40 a mechanism for varying the distance apart at which the nails or slugs may be inserted into the work, and this mechanism will now be described.

In the type of machine to which the present invention is particularly applicable, the  
 45 work is moved or fed under the machine nose by a lateral movement of the awl 38 and the said awl is limited in its rearward travel by a plate 39 or other stop. This plate  
 50 39 or other stop is—in the specification of prior British Patent No. 9117 of 1900—adjustable by means of set screws and slots or similar means so that the rearward motion of the awl may be increased or decreased  
 55 to correspondingly alter the amount of feed to be imparted to the work. The adjustment of the awl stop for the purpose described has to be effected while the machine is quiescent, but according to the present invention, improved means are provided  
 60 whereby the position of said awl stop or adjusting plate 39 may be altered during the operation of the machine and either simultaneously with, or independently of, the  
 65 other changes which may be effected in the

class or lengths of the nails. To this end, the awl stop or adjusting plate 39 is mounted upon a plunger, slide, or equivalent movable member 40 suitably arranged in or on  
 70 the machine head. The preferred manner is to employ a plunger which slides in a bore 41 in the head, a spring 42 being located between the end of said bore and the plunger 40 to normally press the latter outward.

Movably arranged between the outer end  
 75 of the sliding plunger 40 and a projecting shoulder or bracket 43 is an inclined slide or wedge block 44 adapted to have a movement transverse to that of the plunger 40 imparted to it by suitable mechanism when it  
 80 is desired to adjust the position of the awl stopping plate 39. The mechanism for moving the inclined slide or wedge block 44 may comprise a link 45 forming a connection between the block 44 and one arm of a bell  
 85 crank lever 46 pivotally mounted on the upper part of the machine head. The bell crank lever 46 is mounted on a spindle 46<sup>a</sup> on which is an arm 46<sup>b</sup> coupled by a link 47 to one end of the before mentioned pivoted  
 90 handle 37 which operates in conjunction with the rock lever 18. The connection between the block and the rock lever is preferably such that it may be adjusted, for example the link 47 may be connected to different  
 95 holes in the handle 37, or it may be disconnected if it is desired to adjust or vary the pitch of the nails independently of the change in their class or length, but the preferred manner of arranging the parts is so  
 100 that the one operation of the knee lever or equivalent will bring about all the changes which require to be made.

It will be understood that by a movement of the inclined slide or wedge block 44 across  
 105 the end of the sliding plunger 40, the latter will either be moved inward by the block or will be moved outward by the spring 42. The desired variation in the position of the awl stop or plate 39 may be obtained by the  
 110 hereinbefore mentioned adjustment of the connections between the block and the actuating means thereof. When not being actuated from the handle 37 the block 44 may be fastened in position to give a uniform pitch  
 115 of nails by means of a set screw 48.

It has been found that when a change is made from inserting one row of nails to inserting two or more rows during a continuous operation of the machine (as in Fig. 4),  
 120 or from inserting long nails to inserting shorter nails, and vice versa, it is essential to the successful working of the machine, that a corresponding change should at the same time be effected in the power or blow  
 125 of the driver. For instance, when starting with the insertion of a single row of nails the spring of the driver, being previously adjusted, imparts a blow of the requisite force to drive the nails to the proper depth, but  
 130

when changing from the insertion of a single to a double row of nails, it will be obvious that unless the power of the driver is adjusted *i. e.* increased, the double row of nails requiring a correspondingly heavier blow to drive them, will not be inserted so far into the work. On the other hand, when changing from inserting a double to a single row of nails, or from long nails to shorter nails, a correspondingly lighter driving blow is required. This invention therefore includes as one of its essential features, mechanism which will automatically adjust or vary the power of the nail driving blow according to the requirements of the case, such adjustment being effected simultaneously with the actuation of the previously described mechanism or mechanisms for bringing about the change in the nails and also being actuated by the movement of the knee lever or equivalent member.

In the type of machine to which the present invention is applicable, the downward movement of the driver bar 49 is arrested by a head 50 thereon coming into contact with a buffer 51, usually of leather. According to the present invention it is proposed to provide instead of a fixed buffer as previously, a movable buffer *i. e.* a device which may be adjusted so as to arrest the downwardly moving plunger either earlier or later, as the case may be, so that the blow of the driver may be lightened or increased, according to the requirements of the nails to be driven.

According to a convenient construction of this device, a sleeve 52 is provided in a boss or bearing 53 through which the driver bar 49 passes, and said sleeve is adapted to be raised and lowered within said boss or bearing, for which purpose it may be screw threaded therein and be rotated to cause it to move up or down as required. The upper end of the sleeve may be furnished with a leather or other washer or pad 51 thereon against which the usual head 50 on the driver bar 49 will make contact.

The mechanism for rotating the buffer sleeve 52 may comprise a pin or arm 54 projecting from the said sleeve, to which arm is pivotally connected a lever or link 55 coupled at its opposite end to the before mentioned bell-crank lever 46 located on the upper part of the machine head. By means of this arrangement, when the knee lever is moved to bring about the other changes before described, the buffer sleeve 52 will, through the medium of the bell-crank lever 46 and the connecting lever or link 55, be rotated within its boss or bearing 53 and will thus be raised or lowered as the case may be to vary the blow of the driver in accordance with the change which is to be simultaneously effected in the insertion of the nails.

The connections between the buffer sleeve and its actuating mechanism may be provided with means whereby adjustment may be effected to vary the normal blow for different classes of work and these means may consist of a screwed rod, slotted link or any other convenient means (not shown).

What I claim then is:—

1. A slugging machine of the kind herein described, having, in combination, a movable wire feeding throat provided with a plurality of passages to which latter a plurality of wires are fed, an independent feed device for each wire, and means adapted to be brought into operation by the operator to automatically put the respective feed devices into or out of action at will, substantially as and for the purpose described.

2. A slugging machine of the kind herein described, having, in combination, a movable wire feeding throat provided with a plurality of passages to which latter a plurality of wires are fed, an independent feed device for each wire, and means adapted to be brought into action by the operator to automatically put the respective feed devices into or out of action at will and simultaneously move the wire feeding throat, substantially as and for the purpose described.

3. A slugging machine of the kind herein described, having, in combination, a movable wire feeding throat provided with a plurality of passages to which latter a plurality of wires are fed, an independent feed device for each wire, means adapted to be brought into action by the operator to automatically put the respective feed devices into and out of action at will, a movable awl stopping device and connecting and actuating means between the awl stopping device and the aforesaid automatic means to adjust the position of said awl stop, substantially as described.

4. A slugging machine of the kind herein described, having in combination, a movable wire feeding throat provided with a plurality of passages to which latter a plurality of wires are fed, an independent feed device for each wire, means adapted to be brought into action by the operator to automatically put the respective feed devices into and out of action at will, a movable awl stopping device and connecting and actuating means between the awl stopping device and the aforesaid automatic means to adjust the position of said awl stop, and means actuated by and in company with the aforesaid mechanism to vary the driving blow of the plunger, substantially as and for the purpose described.

5. In a slugging machine of the kind herein described, feed devices, and mechanism for controlling the action of the feed devices consisting of rotatable shields on said devices, sliding racks engaging the rotatable shields, a rock lever, coupling links

adjustably connected to opposite ends of the rock lever and to the sliding racks, spring controlled pivoted detents on opposite ends of said rock lever, a continuously reciprocating rod disposed centrally of the rock lever fulcrum, teeth located on opposite sides of said reciprocating rod and adapted to engage the aforesaid detents, means to impart reciprocation to the rod, a slidable arm adapted to be moved by the operator, and prongs on said arm to embrace the pivoted detents and move either of them into the path of the corresponding tooth on the reciprocating rod, substantially as described.

6. In a slugging machine of the kind herein described, feed devices, and mechanism for controlling the action of the feed devices consisting of rotatable shields on said devices, sliding racks engaging the rotatable shields, a rock lever, coupling links adjustably connected to opposite ends of the rock lever and to the sliding racks, spring controlled pivoted detents on opposite ends of said rock lever, a continuously reciprocating rod disposed centrally of the rock lever fulcrum, teeth located on opposite sides of said reciprocating rod and adapted to engage the aforesaid detents, means to impart reciprocation to the rod, a slidable arm adapted to be moved by the operator, prongs on said arm to embrace the pivoted detents and move either of them into the path of the corresponding tooth on the reciprocating rod, a movable feed throat, a reciprocating cam lever to actuate the same, and a connect-

ing link between said cam lever and one of the aforesaid coupling links, substantially as described.

7. In a slugging machine of the kind herein described, means for varying the position or pitch of the nails comprising a movable awl stop, a slidable plunger carrying said awl stop, a spring to actuate said plunger in one direction, a sliding wedge to actuate said plunger in the opposite direction, actuating mechanism adapted to be brought into action at the will of the operator, and intermediate connecting links and levers between said mechanism and the aforesaid rotatable sleeve to operate the latter, substantially as described.

8. In a slugging machine of the kind herein described, mechanism for varying the driving blow of the plunger comprising a buffer, a rotatable sleeve to adjust the height of said buffer, actuating mechanism adapted to be brought into action at the will of the operator, and intermediate connecting links and levers between said mechanism and the aforesaid rotatable sleeve to operate the latter, substantially as and for the purpose described.

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

WILLIAM HEATON.

Witnesses:

T. W. C. TAYLOR,  
GEORGE LESTER.