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MACHINE FOR INSERTING SLUGS OR FASTENINGS.

APPLICATION FILED DEC. 8, 1904.

908,437.

Patented Jan. 5, 1909.

2 SHEETS—SHEET 1.

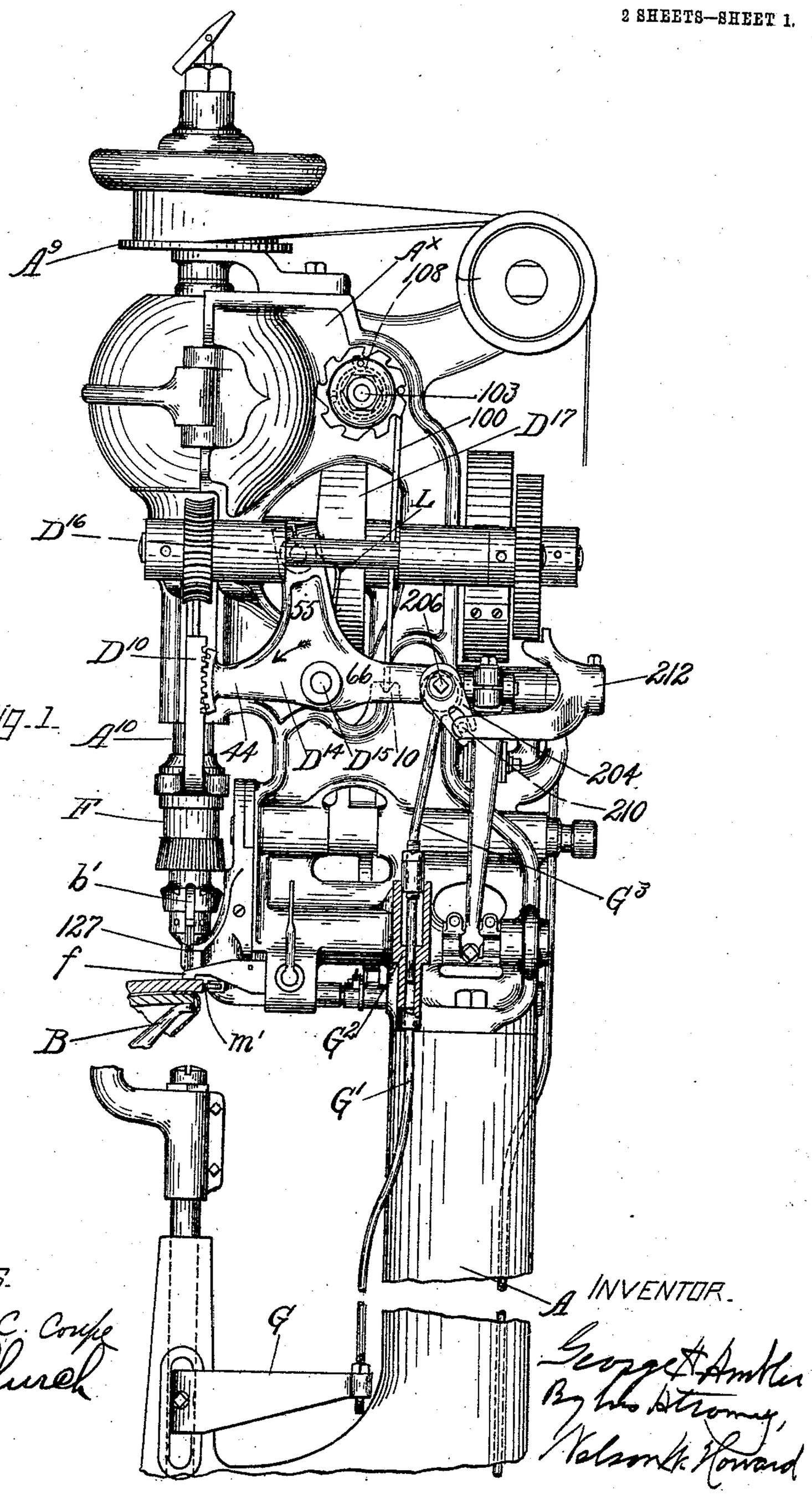

Fig. 1.

WITNESSES.

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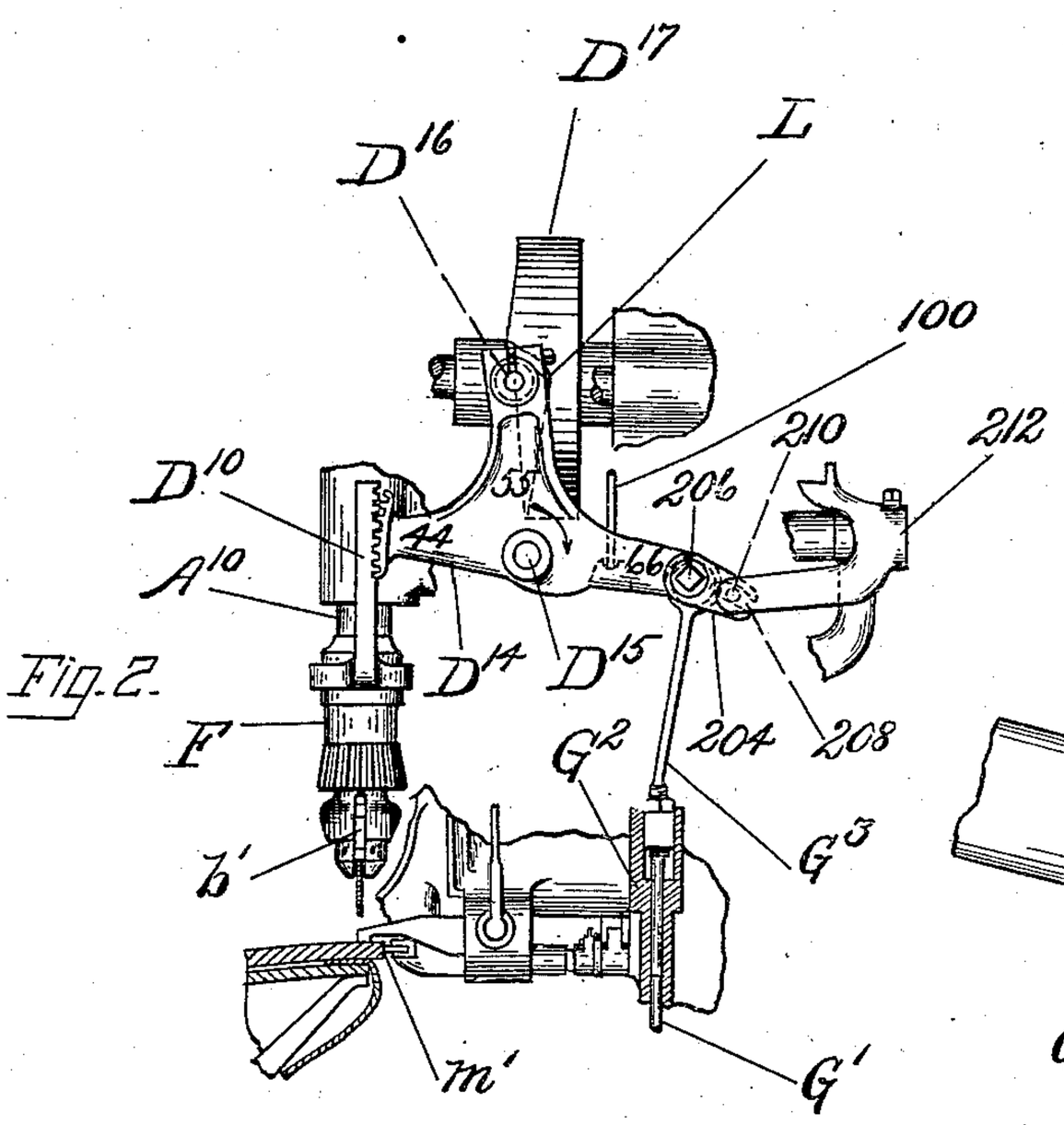

Fig. 2.

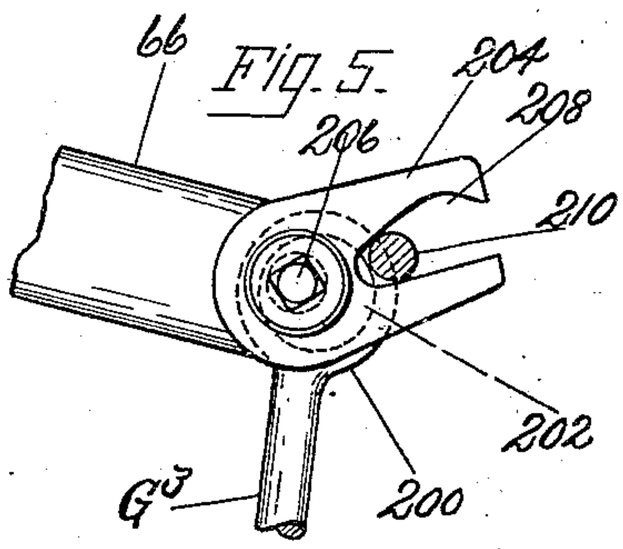

Fig. 5.

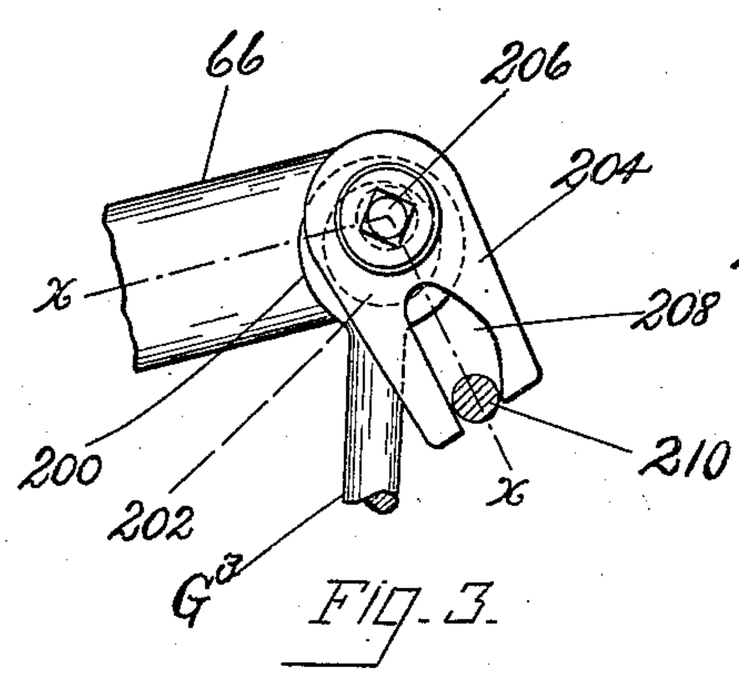

Fig. 3.

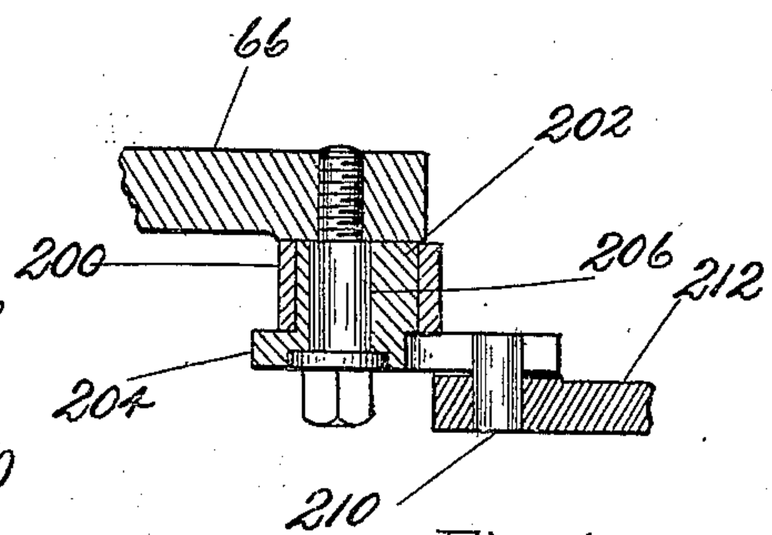

Fig 4.

WITNESSES.

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UNITED STATES PATENT OFFICE.

GEORGE ALBERT AMBLER, OF WINCHESTER, MASSACHUSETTS, ASSIGNOR TO UNITED SHOE MACHINERY COMPANY, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

MACHINE FOR INSERTING SLUGS OR FASTENINGS.

No. 908,437. Specification of Letters Patent. Patented Jan. 5, 1909.

Application filed December 8, 1904. Serial No. 236,067.

To all whom it may concern:

Be it known that I, GEORGE ALBERT AMBLER, a citizen of the United States, residing at Winchester, in the county of Middlesex and Commonwealth of Massachusetts, have invented certain Improvements in Machines for Inserting Slugs or Fastenings, of which the following description, in connection with the accompanying drawings, is a specification, like reference characters on the drawings indicating like parts in the several figures.

This invention relates to machines for forming and inserting slugs or fastenings, and particularly to machines in which continuous material, such, for example, as wire, is inserted into stock and then severed flush with the surface of the stock to form slugs or fastenings of a length varying with the thickness of the stock.

In many of the machines of this type the length of the slugs or fastenings is determined by the extent of movement of the mechanism that feeds the wire from which the slugs or fastenings are formed, and the extent of movement of said mechanism is determined by the thickness of the stock, so that when thick stock is being operated on greater movement is imparted to said mechanism than when thin stock is being operated on. Such machines have heretofore not proved entirely satisfactory for operating upon all kinds of stock, especially very thick or hard stock, because the resistance which the stock presents to the wire being forced into it will either cause the wire to compress or the feeding mechanism to slip on the wire, and in either case the slug or fastening which is inserted will not be of the desired length.

The object of this invention is to provide means for insuring that slugs or fastenings which are inserted in stock of any character or thickness will be of the desired length, and to this end I have, in the preferred embodiment of my invention herein shown, provided means for imparting to the wire-feeding mechanism of a machine of the type described a different extent of movement from that indicated by the thickness of the stock and for automatically varying this difference in extent of movement as the thickness of the stock being operated on varies.

In practice it has not generally been found necessary, unless the stock is particularly hard, to impart an extra degree of movement to the feeding mechanism when operating on the thinner stock, say up to one-half inch thickness, as it has been found that the resistance offered thereby to the passage of the wire is not sufficient to require an increase in the length of the fastening inserted. Accordingly the present invention also contemplates the provision of means which insures the feeding of a portion of wire of a length substantially equal to the thickness of the stock when the thinner stock is being operated upon, and of a length greater than the thickness of the stock when the thicker stock is being operated upon. A preferred form of such means is one in which the mechanism which causes the length of the fastening to exceed the thickness of the stock into which it is to be inserted is made non-effective during part of its range of movement.

I have herein shown the preferred form of my invention as embodied in a machine of the type shown in United States Patent No. 490,621, to L. Goddu, January 24, 1893, said machine being adapted to form fastenings from screw-threaded wire and insert them into stock supported on a movable horn. The wire is fed by grippers which are actuated by a feeding sleeve that is reciprocated by a lever, and said lever is rocked in the direction for imparting downward movement to said sleeve for causing the grippers to feed the wire by means of a cam and is rocked in the reverse direction for elevating said sleeve preparatory to each feeding operation by means of a spring.

The lever which actuates the feeding sleeve is provided with a measuring leg that coöperates with a measuring rod movable with the horn, said rod and leg governing the position of said lever relatively to the cam which actuates it. When the machine is at rest the lower end of the measuring leg is separated from the upper end of the measuring rod a distance equal to the distance between the tip of the horn and the foot plate which engages the upper surface of the stock, and when the machine is started the spring moves said lever downwardly until the measuring leg comes into contact with the measuring rod, thereby moving the feeding sleeve up on the wire a distance equal to that which the measuring leg moved downwardly before it engaged the

measuring rod, so that when said feeding sleeve is moved downwardly it will feed the wire a distance equal to the thickness of the stock clamped between the tip of the horn and the foot plate. As the distance between the tip of the horn and the foot plate varies, according to the thickness of the stock, the distance between the lower end of the measuring leg and the upper end of the measuring rod will be varied accordingly, so that the position of the lever relatively to the cam which actuates it will change as the thickness of the stock varies.

As previously pointed out, when very thick or hard stock is being operated on the feeding mechanism often fails to feed enough wire to produce a fastening equal in length to the thickness of the stock, and for overcoming this objectionable feature and insuring that each fastening which is inserted will be as long as is required irrespective of the character or thickness of the stock being operated on I have, in the embodiment of my invention herein shown, provided means for causing the lever to impart a greater degree of movement to the feeding mechanism than would be required for feeding the wire a distance equal to the thickness of the stock and for automatically increasing this degree of movement as the thickness of the stock being operated on increases, thereby compensating for compression of the wire or slipping of the feeding mechanism on the wire. Preferably said means comprises an eccentric which forms the connection between the measuring leg and the lever which reciprocates the feeding sleeve and means for moving said eccentric so that as said lever is rocked in the direction for elevating the feeding sleeve the measuring leg will be moved relatively to said lever whereby the distance between the end of said measuring leg and lever will be decreased so that said lever will move a greater distance before said measuring leg engages the measuring rod. The connection between the measuring leg and feed lever may be so constructed that the effect of the eccentric is negatived during a predetermined part of its range of movement, preferably, as heretofore indicated, during the lesser movements of the actuating means. A preferred arrangement effects this result through the provision of lost motion between two coöperating parts forming part of the connection referred to.

In the drawings, Figure 1 is a view in side elevation of a fastening inserting machine embodying features of my invention; Fig. 2 is a detail view in side elevation of parts of the machine shown in Fig. 1, showing a piece of stock in position to be operated on and the feeding sleeve elevated preparatory to feeding the wire; Fig. 3 is a detail view in side elevation showing the eccentric connection between the actuating lever and the measuring leg; Fig. 4 is a sectional view taken on the line x—x of Fig. 3; and Fig. 5 is a view similar to Fig. 3 but showing the eccentric connection in a different position.

In the drawings, A designates a standard which supports a head $A^{\times}$ having mounted therein a shaft carrying a cam D^{17} and also the cams which operate the horn-depressing mechanism, the wire-severing mechanism, and the mechanism for feeding the stock. The wire from which the fastenings are formed is supported in a reel mounted on the upper end of a spindle A^{10} which is rotated by a belt passing over a pulley A^{9} on the upper end of said spindle, the wire being fed downwardly through said spindle by feeding grippers b' pivotally mounted on a gripper carrier which surrounds the spindle. A feeding sleeve F surrounds the gripper carrier and has attached to its upper end a yoke D^{10} which slides in guideways formed in the head of the machine. Said yoke is provided with rack teeth which coöperate with rack teeth formed on the arm 44 of a three-armed lever D^{14} which is pivotally mounted on a stud D^{15} in the head of the machine, and another arm 55 of said lever is provided with a roll D^{16} which coöperates with the cam D^{17}, said cam operating to rock said lever in the direction of the arrow in Fig. 1 for moving the feeding sleeve downwardly to cause the feeding grippers to engage and feed the wire.

In order that the wire may be fed through the spindle for varying distances, according to the thickness of the stock clamped between the foot plate f and the tip of the horn B, the extent of movement of the feeding sleeve is automatically varied in accordance with the thickness of the stock. To provide for this, the horn is held normally elevated by a spring, not shown, and the shank of the horn has fixed thereto an arm G to which the measuring rod G′ is fastened, said rod projecting upwardly through a guide G^{2} on the head of the machine and serving as a variable stop for determining the movement in one direction of a suitable coöperating device or part, as a measuring leg G^{3}, connected to the arm 66 of lever D^{14}. The arm 66 of said lever is provided with a lug 10, shown in dotted lines in Fig. 1, which is engaged by the lower end of a rod 100 that is pressed downwardly by a coiled spring 108 surrounding a stud 103 in the head of the machine, see dotted lines in Fig. 1, the stress of said spring operating through rod 100 to rock lever D^{14} in the direction of the arrow in Fig. 2 for elevating the feeding sleeve preparatory to each feeding operation. If the spring 108 is permitted to turn lever D^{14} far enough to permit the roll D^{16} thereon to engage the low portion L of cam D^{17}, then said cam will pro-

duce the maximum stroke of lever D^{14} and the feeding sleeve will coöperate with the feeding grippers to feed the wire a distance equal to the longest fastenings to be inserted, but when the material on the horn is less than the maximum thickness then the measuring rod G′ which coöperates with the measuring leg G^3 will prevent said leg from moving downwardly far enough to permit the roll D^{16} on lever D^{14} to engage the low portion L of the cam, and consequently the movement which said cam will impart to said lever will be less than its maximum stroke and less wire will be fed.

The parts so far specifically referred to by reference characters are substantially the same as those indicated by the same reference characters in the patent referred to.

As the position which the arm 55 of said lever occupies relatively to the cam D^{17} determines the extent of movement of lever D^{14} and consequently the extent of movement of the wire-feeding mechanism, and as the position of said arm relatively to said cam is determined by the measuring leg G^3 and measuring rod G′, it is obvious that if the point of connection between the measuring leg and the lever D^{14} be changed so as to decrease the distance between the end of said measuring leg and the lever, the distance which said lever moves before the measuring leg engages the measuring rod will be increased, thereby carrying the roll D^{16} nearer to the low portion L of the cam. Consequently when said lever is actuated by the cam it will impart greater movement to the feeding mechanism than is required for feeding the wire a distance equal to the thickness of the stock, so that any compression of the wire or slipping of the feeding mechanism on the wire is compensated for by the increased movement which is imparted to said feeding mechanism. For accomplishing this result I have provided the measuring leg G^3 with a strap 200 which encircles an eccentric 202 on the end of a compensating lever 204 fastened to the arm 66 of lever D^{14} by a bolt 206 and having at one end a slot 208 which engages a stud 210 carried by a stationary bracket 212, so that when the lever D^{14} is rocked by spring 108 in the direction of the arrow in Fig. 2 the compensating lever 204 will be rocked on the stud 210 as a fulcrum, and the eccentric thereon will move the measuring leg relatively to the arm 66 of lever D^{14}, thereby decreasing the distance between the end of said measuring leg and said lever. Accordingly the spring 108 will rock said lever for a greater degree and will move the roll D^{16} nearer to the low portion L of the cam D^{17} than it would if the point of connection between said measuring leg and lever had not been changed, so that when the lever is rocked in the reverse direction by the cam D^{17} it will impart a greater degree of movement to the feeding mechanism than is required for feeding the wire a distance equal to the thickness of the stock, thereby insuring the feeding of enough wire to go completely through the stock.

As the extent of movement of lever D^{14} in the direction of the arrow in Fig. 2 increases as the stock being operated on increases in thickness, the distance which the compensating lever is rocked will be correspondingly increased as the thickness of the stock increases, thereby causing the eccentric on said lever to move the measuring leg a greater distance relatively to the lever D^{14}, so as to increase the degree of extra movement which is imparted to the feeding mechanism.

If it is desired to impart an extra degree of movement to the feeding mechanism only when the greater thicknesses of stock are being operated on, the compensating lever may be provided with a curved or cam slot, or one wall of the slot may be curved or otherwise formed with non-parallel sides so as to provide a lost motion connection, as shown in Fig. 3. With such a connection the lesser movements of the lever D^{14} in the direction of the arrow, Fig. 2, will not rock the compensating lever, and thus for these movements the distance between the end of the measuring leg and said lever will not be changed.

After the wire has been forced through the stock into engagement with the tip of the horn, the cutters 127 are actuated for severing the wire, and thereafter the horn is depressed to enable the feeding device *m′* to feed the stock, the mechanism for actuating the cutters, for depressing the horn, and for actuating the feeding device being fully described in the patent referred to. To avoid repetition the word "fastenings" has been used in the claims to include slugs, pegs, staples, etc.

While I have shown my invention as applied to one particular type of machine and have herein illustrated a specific mechanical embodiment of the invention, it will be understood that my invention may be embodied in other types of machines and that the mechanical means employed may be changed in various ways without departing from the scope of my invention.

Having described my invention what I claim as new and desire to secure by Letters Patent of the United States, is:—

1. In a machine for inserting fastenings, means for feeding material from which the fastenings are formed, a movable horn, means controlled by the movement of said horn for varying the operation of said feeding means according to the thickness of the stock being operated on and means for automatically changing the operation of said feeding means from that indicated by the thickness of the stock.

2. In a machine for inserting fastenings, means for feeding the material from which the fastenings are formed, a movable horn, means controlled by the movement of said horn for varying the operation of said feeding means according to the thickness of the stock being operated on, and means for automatically causing the feeding means to feed material of greater length in proportion to the thickness of the stock as the stock increases in thickness.

3. In a machine for inserting fastenings, means for feeding the material from which the fastenings are formed, a movable horn, means controlled by the movement of said horn for varying the operation of said feeding means according to the thickness of stock being operated on, and means interposed between said last-named means and feeding means for automatically changing the operation of said feeding means from that indicated by the thickness of stock.

4. In a machine for inserting fastenings, means for feeding the material from which the fastenings are formed, a movable horn, means controlled by the movement of said horn for varying the operation of said feeding means according to the thickness of stock being operated on, and means interposed between said last-named means and feeding means for automatically causing the feeding means to feed material of greater length in proportion to the thickness of the stock as the stock increases in thickness.

5. In a machine for inserting fastenings, mechanism for feeding the material from which the fastenings are formed, means for actuating said mechanism for varying distances according to the thickness of stock being operated on, and separate means for automatically causing said actuating means to impart to the feeding mechanism a different extent of movement from that indicated by the thickness of stock as the thickness of the stock being operated on varies.

6. In a machine for inserting fastenings, mechanism for feeding the material from which the fastenings are formed, means for actuating said mechanism, a movable horn, means governed by the movement of said horn for controlling the extent of movement of said actuating means, and means for moving said controlling means relatively to said actuating means for varying distances as the thickness of the stock being operated on varies.

7. In a machine for inserting fastenings, mechanism for feeding the material from which the fastenings are formed, means for actuating said mechanism, a movable horn, means governed by the movement of said horn for controlling the extent of movement of said actuating means, and means interposed between said actuating means and controlling means for moving the latter relatively to the former for varying distances as the thickness of the stock being operated on varies.

8. In a machine for inserting fastenings, mechanism for feeding the material from which the fastenings are formed, means governed by the thickness of the stock being operated on for determining the extent of movement of said feeding mechanism, a device connected to the feeding mechanism and coöperating with said last-named means, and means independent of the stock being operated on for automatically varying the relation of said last-named means and cooperating device.

9. In a machine of the class described, fastening-feeding mechanism, actuating means therefor, means governed by the thickness of the stock being operated on for determining the extent of movement of said actuating means, a movable part coöperating with said last-named means, and a positive connection between said movable part and actuating means, said connection including means for varying the movement of the actuating means from that indicated by the thickness of the stock.

10. In a machine of the class described, fastening-feeding mechanism, actuating means therefor, a stop governed in position by the thickness of the stock being operated on for determining the extent of movement of said actuating means, a measuring leg coöperating with said stop, and an eccentric connection between said measuring leg and said actuating means for varying the movement of the actuating means from that indicated by the thickness of the stock.

11. In a machine for inserting fastenings, mechanism for feeding the material from which the fastenings are formed, a lever for actuating said mechanism, means for moving said lever, a stop for determining the extent of movement of said lever, and a measuring leg eccentrically connected to said lever and coöperating with said stop adapted to control the position of said lever relatively to the means which moves it.

12. In a machine for inserting fastenings, mechanism for feeding the material from which the fastenings are formed, a lever for actuating said mechanism, means for moving said lever, a measuring leg connected to said lever and coöperating with a stop for determining the position of said lever relatively to the means which moves it, and means for varying the center of connection between said lever and measuring leg to change the distance between the end of the measuring leg and said lever and thereby vary the position of said lever relatively to its actuating means.

13. In a machine for inserting fastenings, mechanism for feeding the material from which the fastenings are formed, a lever for

actuating said mechanism, means for moving said lever, a compensating lever connected to said actuating lever, an eccentric on said compensating lever, a measuring leg connected to said eccentric, and a stop coöperating with said measuring leg.

14. In a machine for inserting fastenings, mechanism for feeding the material from which the fastenings are formed, a lever for actuating said mechanism, a cam for moving said lever in one direction, a compensating lever connected to said lever and fulcrumed on a stationary stud, an eccentric, on said compensating lever, a measuring leg having a strap encircling said eccentric, a stop coöperating with said measuring leg, and a spring for moving the actuating lever in the opposite direction to that which it is moved by the cam, thereby rocking the compensating lever so that the eccentric thereon will move the measuring leg relatively to the actuating lever.

15. In a machine for inserting fastenings, feeding grippers, a reciprocating sleeve for actuating said grippers, a lever for moving said sleeve, a cam for actuating said lever, a spring for returning said lever into position to be engaged by said cam, a compensating lever fulcrumed on a stationary stud and connected to said lever, an eccentric on said compensating lever, a measuring leg having a strap which encircles said eccentric, a horn for supporting the stock being operated on, and a measuring rod movable with said horn and adapted to coöperate with the measuring leg for governing the position of the lever relatively to the cam which actuates it.

16. In a machine of the class described, mechanism for forming and inserting fastenings, and automatic means controlling the operation of said mechanism constructed and arranged to cause fastenings to be formed and inserted of a length substantially corresponding to the thickness of the stock when the thinner stock is being operated upon and of a length greater than the thickness of the stock when the thicker stock is being operated upon.

17. In a machine of the class described, means for forming and inserting fastenings, mechanism for feeding material thereto and automatic means for varying the operation of said feeding mechanism constructed and arranged to cause fastenings to be formed and inserted of a length substantially corresponding to the thickness of the stock when operating upon the thinner stock, and, when operating upon the thicker stock, fastenings of a greater length than the thickness of the stock.

18. In a machine of the class described, means for forming and inserting fastenings, means governed by the thickness of the stock being operated on for controlling the length of the fastenings, and means for automatically varying the operation of said controlling means from that indicated by the thickness of the stock, said means being effective only when the longer fastenings are being inserted.

19. In a machine for inserting fastenings, means for feeding the material from which the fastenings are formed, means for varying the operation of said feeding means according to the thickness of stock being operated on, and means for automatically causing the feeding means to feed material of greater length in proportion to the thickness of the stock as the stock increases in thickness, said means constructed to be operative only for the greater thicknesses of stock.

20. In a machine for inserting fastenings, mechanism for feeding the material from which the fastenings are formed, means for actuating said mechanism, means for controlling the extent of movement of said actuating means, and means for moving said controlling means relatively to said actuating means for varying distances as the thickness of the stock being operated on varies, said means constructed to be operative only for the greater thicknesses of stock.

21. In a machine of the class described, fastening-feeding mechanism, actuating means therefor, means governed by the thickness of the stock being operated on for determining the extent of movement of said actuating means, a movable part coöperating with said last-named means, and a positive connection between said movable part and actuating means, said connection including means, operative during the greater movements only of the actuating means, for varying the movement of the actuating means from that indicated by the thickness of the stock.

22. In a machine of the class described, fastening-feeding mechanism, actuating means therefor, a compensating lever connected to said actuating means, an eccentric on said lever, a measuring leg connected to said eccentric, a stop coöperating with said leg, and means controlling the movement of said lever for negativing the effect of the eccentric during a predetermined part of its range of movement.

23. In a machine of the class described, fastening-feeding mechanism, actuating means therefor, a compensating lever connected to said actuating means, an eccentric on said lever, a measuring leg connected to said eccentric, a stop coöperating with said leg, a stationary stud, and a lost motion connection between said stud and lever whereby the effect of the eccentric is negatived during a predetermined part of its range of movement.

24. In a machine of the class described, fastening-feeding mechanism, actuating

means therefor, means governed by the thickness of the stock being operated on for determining the extent of movement of said actuating means, a movable part coöperating with said last-named means, and a connection between said movable part and actuating means comprising a compensating lever having at one end a slot having non-parallel sides and an eccentric at the other end, and a stationary fulcrum pin for said lever in said slot.

25. In a machine of the class described, fastening-feeding mechanism, actuating means therefor, a measuring leg connected to said actuating means, a stop coöperating with said leg, a compensating lever having a slot provided with a curved wall, an eccentric on said lever interposed between said actuating means and measuring leg, and a stationary fulcrum pin for said lever in said slot.

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

GEORGE ALBERT AMBLER.

Witnesses:

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ARTHUR L. RUSSELL.