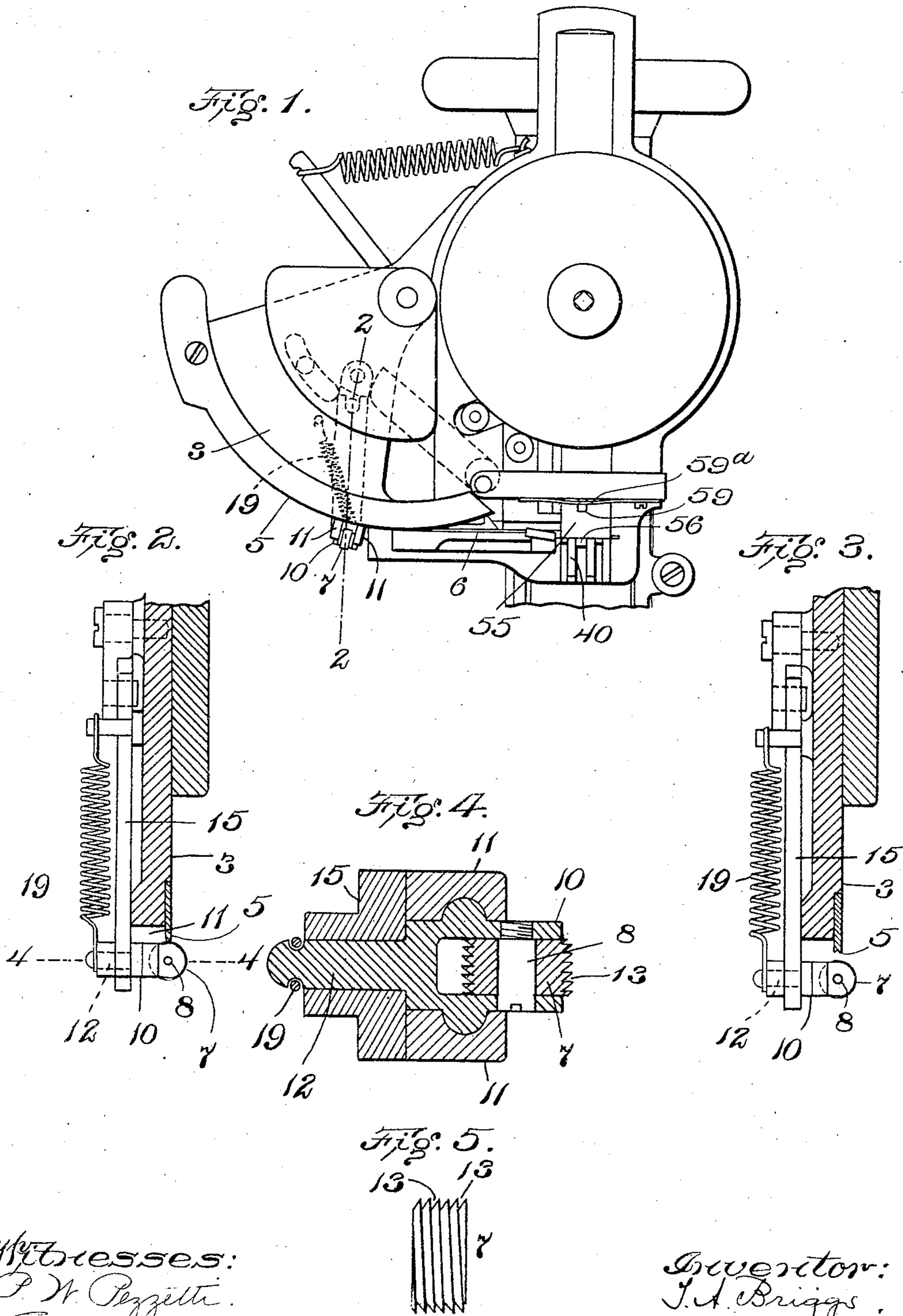


No. 786,187.

PATENTED MAR. 28, 1905.

T. A. BRIGGS.
STAPLING MACHINE.
APPLICATION FILED FEB. 12, 1904.

3 SHEETS—SHEET 1.



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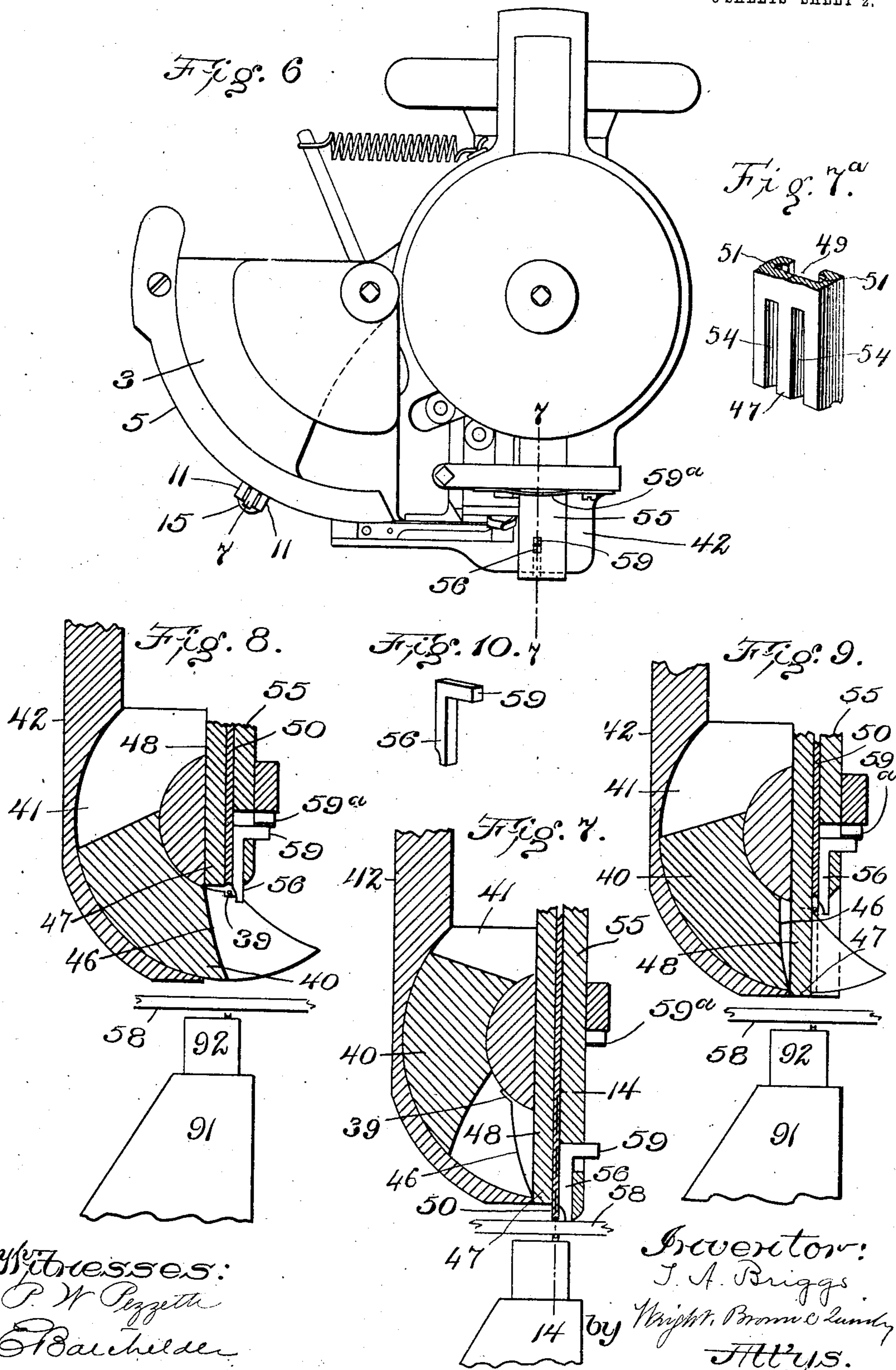
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3 SHEETS—SHEET 3.

Fig. 11.

Fig. 14.

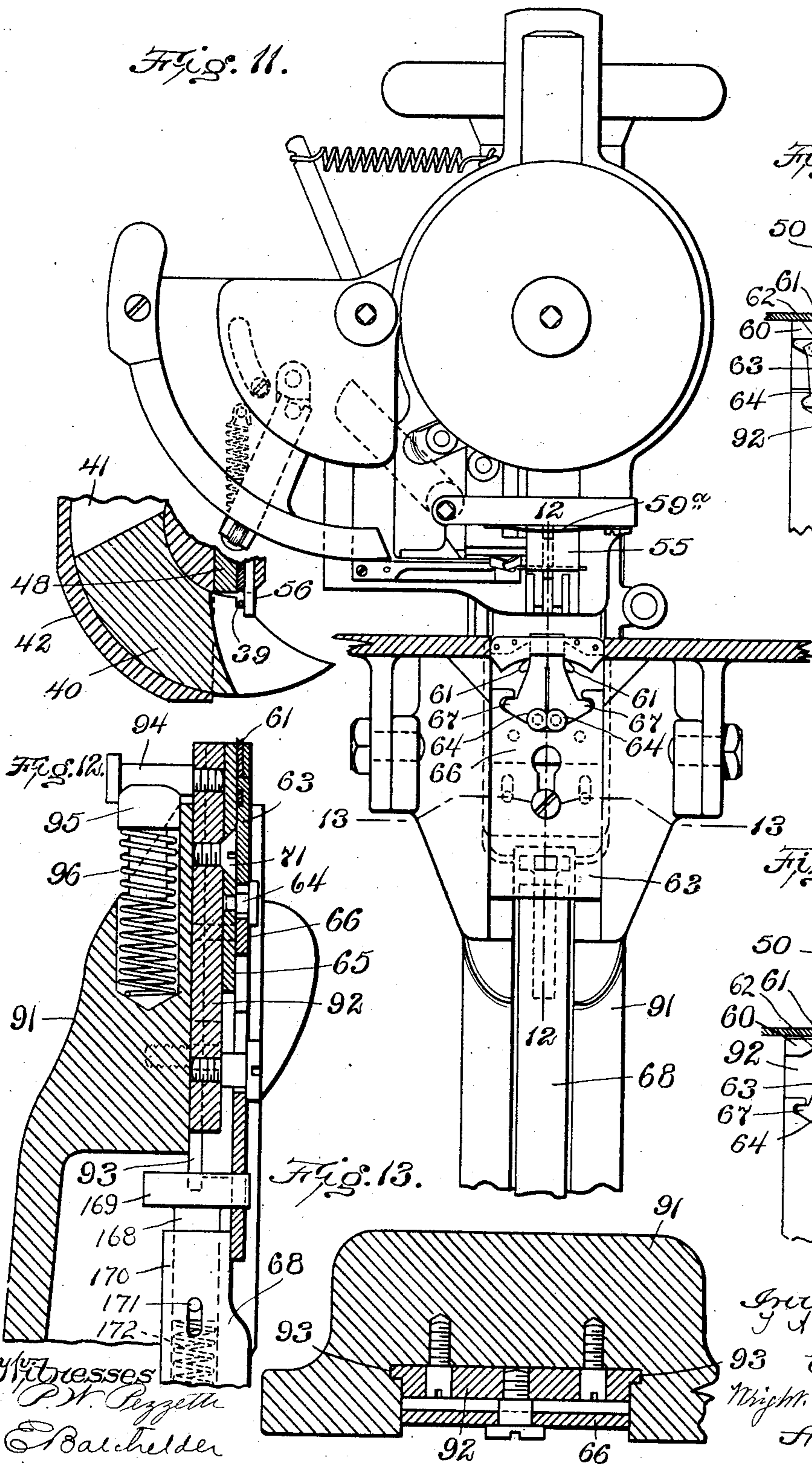


Fig. 15.

Fig. 13.

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UNITED STATES PATENT OFFICE.

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STAPLING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 786,187, dated March 28, 1905.

Application filed February 12, 1904. Serial No. 193,307.

To all whom it may concern:

Be it known that I, THOMAS A. BRIGGS, of Arlington, in the county of Middlesex and State of Massachusetts, have invented certain
5 new and useful Improvements in Stapling-Machines, of which the following is a specification.

This invention relates to stapling-machines of the type shown in Letters Patent No.
10 662,184, dated November 20, 1900. The machine shown in said patent comprises wire-feeding mechanism which feeds the staple-wire forward step by step, wire-cutting mechanism which severs from the wire lengths or
15 blanks suitable for staples, staple forming and driving mechanism which bend the wire blanks into staples and drive the staples into the layers to be fastened together, and clenching mechanism which bends the projecting
20 ends of the staple-legs against the bottom layer of material.

The present invention consists in certain improvements hereinafter described relating to the wire-feeding mechanism, the staple forming or bending mechanism, and the clenching mechanism, said improvements having for their object to increase the efficiency and improve the operation of the several parts of the machine to which they relate.

30 Of the accompanying drawings, forming a part of this specification, Figure 1 represents a partial front elevation of a stapling-machine, showing the improved wire-feeding mechanism. Figs. 2 and 3 represent sections
35 on line 2 2 of Fig. 1, showing the outer jaw of the feeding mechanism in different positions. Fig. 4 represents a section on line 4 4 of Fig. 2. Fig. 5 represents a side elevation of the lower jaw removed from its carrier.
40 Fig. 6 represents a view similar to Fig. 1, showing the bending and driving devices in a different position. Fig. 7 represents a section on line 7 7 of Fig. 6, on an enlarged scale. Fig. 7^a represents a perspective view of the
45 lower portion of the bending-bar. Figs. 8 and 9 represent views similar to Fig. 7, illustrating different stages of the operation. Fig. 10 represents a perspective view of the wire-retaining finger. Fig. 11 represents a front

elevation showing the clenching mechanism. 50
Fig. 12 represents a section on line 12 12 of Fig. 11. Fig. 13 represents a section on line 13 13 of Fig. 11. Figs. 14 and 15 represent sectional views on line 14 14 of Fig. 7.

The same reference characters indicate the 55 same parts in all the figures.

Wire-feeding mechanism.—The wire is fed to the cutting, bending, and driving devices by the coöperation of an oscillating arm 3, having a segmental outer edge 5, which is 60 grooved to guide the wire 6, Fig. 1, and a wire grasping and releasing outer jaw 7, which is moved alternately toward and from the segmental edge 5, the latter constituting an inner jaw. The said outer and inner jaws move in 65 unison toward and from the wire-cutters, the outer jaw having the additional movement above mentioned toward and from the inner jaw. The mechanism for oscillating the arm 3 and for moving the outer jaw toward and from 70 the inner jaw is or may be the same as set forth in the above-mentioned patent, to which reference may be had for a fuller description of said mechanism. My present improvement in the wire-feeding mechanism relates entirely to the 75 outer jaw 7, and consists in making said jaw in the form of a rotatable roll, which is mounted to rotate loosely upon a stud 8, affixed to a jaw-carrier 10. Said jaw-carrier is movable in guides or ways 11 11, affixed to the arm 3, 80 and is engaged with a spring 19, which normally draws the jaw-carrier 10 inwardly and holds the jaw 7 in engagement with the wire. The carrier 10 is provided with a stud or cylindrical extension 12, which engages said 85 spring and also engages a bearing formed for its reception in the lower end of the link 15, which link is movable endwise and is operated as described in the above-mentioned patent in such manner that it moves the carrier 90 10 and outer jaw 7 away from the inner jaw at intervals, the spring 19 acting alternately with the link 15 in forcing the outer jaw into engagement with the wire. The axis of rotation of the outer jaw is substantially parallel with the path of the wire, so that the jaw cannot be rotated by contact with the wire. 95 The outer jaw is adapted to rotate freely in

its holder. Hence the acting portion of the outer jaw may be very conveniently renewed from time to time by imparting a slight rotation to the said jaw. I prefer to provide the outer jaw 7 with peripheral acute-angled corrugations 13, which enable the said jaw to firmly engage the wire.

It will be seen that by making the outer jaw rotatable and arranging it as described, so that its acting surface can be renewed, I am able to prolong the usefulness of this jaw, its acting portion including the entire periphery of a circular body, which can be turned from time to time to present a new acting portion until the whole periphery is worn out.

Staple forming and bending mechanism.—The wire blank which is severed by the cutters is deposited upon shoulders 39, formed on a segmental anvil 40, which is fitted to slide in a sectional slot or guide 41 in a vertically-movable presser 42. The anvil 40 and presser 42 are constructed and operated as shown in the above-mentioned patent, and they cooperate, as described in said patent, with a bending-bar 48, a staple-driver 50, and a driver-guiding bar 55. The bending-bar is provided with a longitudinal recess 49, Fig. 7^a, in one side to receive the driver 50, the edges of said recess having grooves 51, which not only engage the edges of the driver, but also confine the legs of the staple when the bending-bar descends. The lower end of the bending-bar has slots 54, Fig. 7^a, formed to receive the horns of the anvil. The portion of the bending-bar between the slots constitutes a finger 47, which enters the space between the anvil-horns, the lower end of said finger constituting an intermediate face located between said grooves and bearing on the incline 46 at the inner end of the space between the said horns to displace the anvil when the bending-bar descends. The legs of the staple are bent downwardly over the outer sides of the horns of the anvil by the descent of the bending-bar. The said bar in its descent from the position shown in Fig. 8 to that shown in Figs. 7 and 9 displaces the anvil, thus removing the shoulder 39 from the path of the driver, as described in the above-mentioned patent.

My improvement relating to this portion of the machine is comprised in a wire-retaining finger 56, which is located in a slot formed in the inner side of the guide-bar 55, said slot and one side of the driver 50 constituting a guide in which the finger is movable endwise by gravitation, so that its lower end projects below the shoulders 39, as shown in Fig. 8, when the driver and its guide-bar are elevated, the finger being thus held in position to retain the wire on the shoulders 39 and prevent it from slipping outwardly therefrom under the inclined faces of the horns of the anvil. When the driver and its guide-bar 55 are depressed to drive the staple, the finger 56 moves downwardly with them until arrested by contact

with the work 58 in which the staple is driven. The finger 56 is thus caused to yield, as indicated in Fig. 7. When the driver and guide-bar rise, the finger will be cleared from the work and from the neck of the staple last driven. The upward movement of the driver and guide-bar cause the shank 59 on the upper end of the finger 56 to strike a buffer-spring 59^a, attached to a fixed support, said buffer-spring being so arranged that it will act on the shank 59 and insure the depression of the finger 56 before the finger and its guide reach their highest position, so that the finger is again depressed, as shown in Figs. 8 and 9, and is in position to again cooperate with the shoulder 39 in retaining the wire. It will be seen that the retaining-finger 56 prevents all liability of the slipping of the wire blank out of the path of the driver.

Clenching mechanism.—The legs of the driven staple are received in a slotted throat 60, which is located below the staple forming and driving devices and is supported by a vertically-adjustable jack 91, said jack being constructed and adjusted as described in the above-mentioned patent, excepting as to the yielding section 92 of said jack, which constitutes my present improvement. The said section 92 is a plate or slide fitted to move in guides 93, Fig. 13, in the jack 91 and is provided with a rearwardly-projecting stud 94, which rests upon a vertically-movable block 95, yieldingly supported by a spring 96, interposed between said block and the bottom of a socket in the jack 91. The throat 60 is formed on the upper portion of the yielding section 92 and is therefore adapted to yield vertically to the downward pressure of the staple forming and driving mechanism instead of being rigidly attached to the jack, as heretofore. This provision for a yielding movement of the staple-receiving throat compensates for any considerable variation between the thickness of successive articles presented to the machine for the reception of staples and prevents excessive strain upon and breakage of any of the cooperating parts in case one article is considerably thicker at the point where the staple is inserted than another of the articles to which the machine has been adjusted. To illustrate, supposing the machine to be employed in inserting staples in paper bags containing seeds and a portion of the contents of the bag becomes lodged in the edge of the bag in which a staple is to be inserted, thus abnormally increasing the thickness of the bag over the thickness provided for by the adjustment of the machine, the descent of the bending and driving devices will cause pressure to be exerted upon the thickened portion of the bag and the yielding movement of the throat will enable the throat to descend below its normal position to compensate for the increased thickness. The clenching devices and the means for operating them are substantially the same

as described in said patent. Two clenching-jaws 61 61 are located at opposite ends of the slot in the throat 60 and are movable diagonally on inclined guide-faces 62 62, Figs. 14 and 15, in the throat to clench the projecting portions of the prongs of the staple. The clenching-jaws are pivoted to levers 63 63, which are fulcrumed at 64 64 on the yielding section 92. In this respect the construction differs from that shown in the said patent, in which the levers 63 are fulcrumed to a supporting-piece rigidly attached to the jack. The levers 63 are oscillated to move the clenching-jaws to and from the positions shown in Figs. 14 and 15 by the following means: 66 represents a plate having ears or lugs provided with recesses which engage projections 67 on the levers 63. Said plate is connected with an arm 68, which is supported by the jack 91 and is reciprocated vertically therein by the means described in the above-mentioned patent. The connection between the plate 66 and the arm 68 is yielding, as shown in said patent, so that the clenchers when in the position shown in Fig. 15 can adapt themselves to the thickness of the wire. Said connection comprises a stud 168, fitted to have a limited vertical movement in a socket 170 in the arm 68, its movement being limited by a pin 171 inserted in the arm and passing through a slot in the stud. The stud has a head 169 projecting into a slot in the plate 66. A spring 172, interposed between said stud and the arm 68, imparts upward movement from the arm to the stud, the plate 66, and the clenchers when the arm is rising and permits the stud, plate, and clenchers to stop in case the clenchers have done their work before the completion of the upward movement of the arm.

I claim—

1. In a stapling-machine, a wire-feeding mechanism comprising an arm or carrier having a forward-and-backward movement, an inner jaw carried by the arm, a jaw-holder also carried by the arm and having an inward-and-outward movement thereon toward and from the inner jaw, and a circular outer jaw journaled in said holder with its axis of rotation substantially parallel with the path of the wire, the said outer jaw being rotatable in its holder to bring different portions of its periphery into operative relation to the inner jaw.

2. In a stapling-machine, a wire-feeding mechanism comprising an arm or carrier having a forward-and-backward movement, an inner jaw carried by the arm, a jaw-holder movable on the arm toward and from the inner jaw, and a rotatable circular outer jaw journaled in the holder with its axis of rotation substantially parallel with the path of the wire, the said outer jaw having peripheral corrugations which extend crosswise of the said path.

3. In a stapling-machine, in combination, a

presser, an anvil carried by the presser and movable independently thereof, said anvil having wire-supporting shoulders which are operative when the anvil is in its normal position, the anvil having also two horns with inclined outer faces and an inclined face between said horns, a bending-bar having grooves to receive the legs of a staple, and an intermediate face to cooperate with the face between the staple-prongs in forcing the shoulders of the anvil out of the path of the formed staple, a driver movable in the grooves of the bending-bar, the inclined outer faces of the anvil-horns being in the path of the driver, and a wire-retaining finger carried by the bending-bar and having an independent endwise movement, said finger being displaceable from its acting position by contact with the work.

4. In a stapling-machine, in combination, a presser, an anvil carried by the presser and movable independently thereof, said anvil having wire-supporting shoulders which are operative when the anvil is in its normal position, the anvil having also two horns with inclined outer faces and an inclined face between said horns, a bending-bar having grooves to receive the legs of a staple, and an intermediate face to cooperate with the face between the staple-prongs in forcing the shoulders of the anvil out of the path of the formed staple, a driver movable in the grooves of the bending-bar, the inclined outer faces of the anvil-horns being in the path of the driver, a wire-retaining finger carried by the bending-bar and having an independent endwise movement, and a spring arranged to exert downward pressure on the finger, and through the latter on the bending-bar to hold the finger against the wire on the said shoulders, said finger being displaceable from its acting position by contact with the work.

5. In a stapling-machine, the combination of a work-support having a staple-receiving throat, staple forming and driving mechanism above said throat, said support comprising a relatively fixed body portion having vertical guides, and a yieldingly-supported section which is independently movable on said guides and adapted to yield downwardly from the said mechanism clenchers-supporting levers having arms formed thereon and pivoted to said yielding section, clenching-jaws pivoted to said levers and adapted to enter the throat, an operating-slide engaged with arms on said levers and adapted to oscillate the latter, and a reciprocating arm engaged with the slide, the throat and jaws being permitted to yield in unison by said yielding section.

In testimony whereof I have affixed my signature in presence of two witnesses.

THOMAS A. BRIGGS.

Witnesses:

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E. BATCHELDER.