

No. 883,510.

PATENTED MAR. 31, 1908.

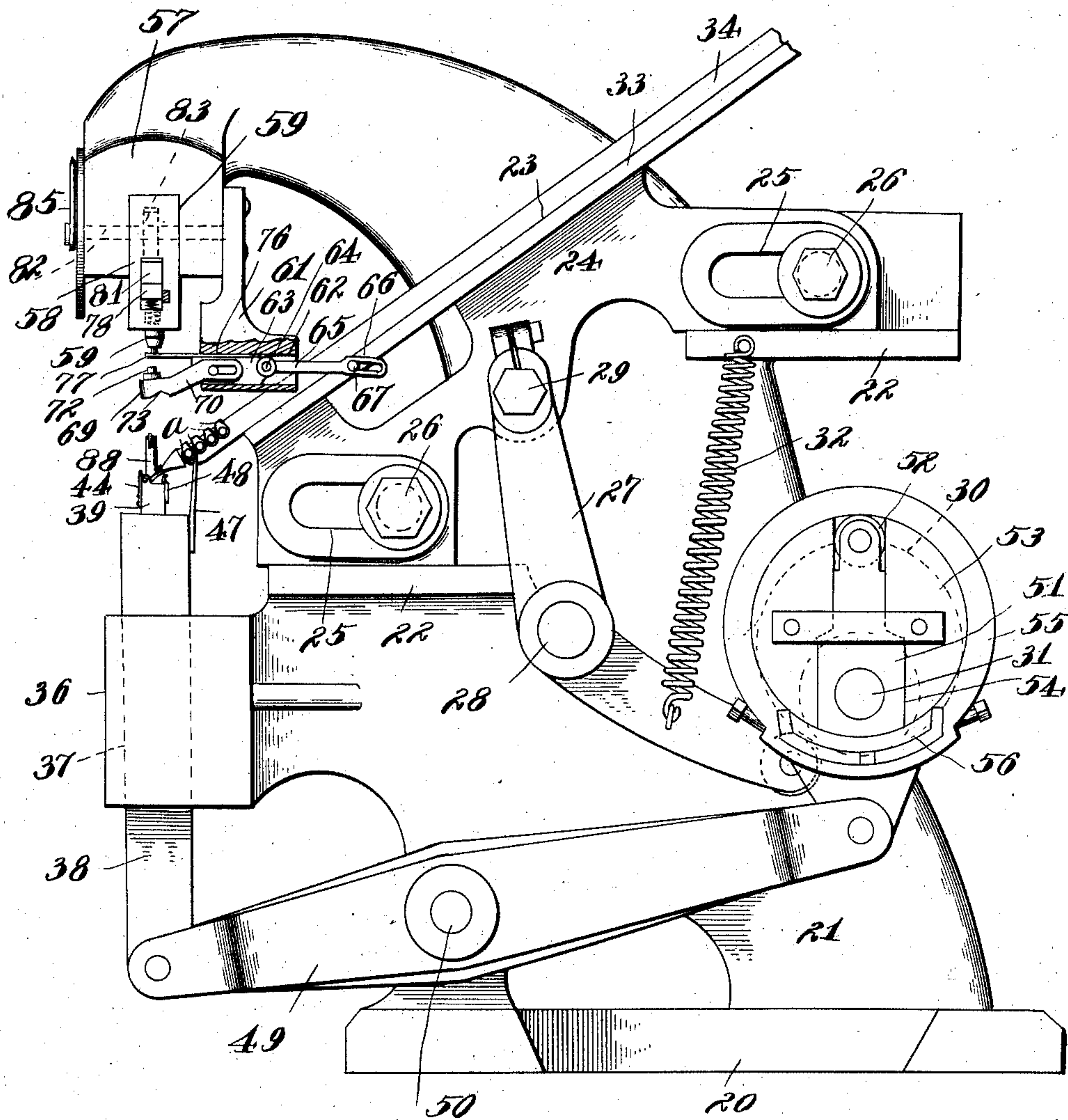
J. W. BARNA & V. HOFFMAN.

HOOKE SETTING MACHINE.

APPLICATION FILED APR. 23, 1906.

3 SHEETS—SHEET 1.

Fig. 1



Witnesses.

G. A. Paulschmidt
Arthur D. Seibol.

Inventors.

Joseph W. Barna
Valentine Hoffman

By Colburn McRoberts
Their Attys

No. 883,510.

PATENTED MAR. 31, 1908.

J. W. BARNA & V. HOFFMAN.
HOOK SETTING MACHINE.

APPLICATION FILED APR. 23, 1906.

3 SHEETS—SHEET 2.

Fig. 2.

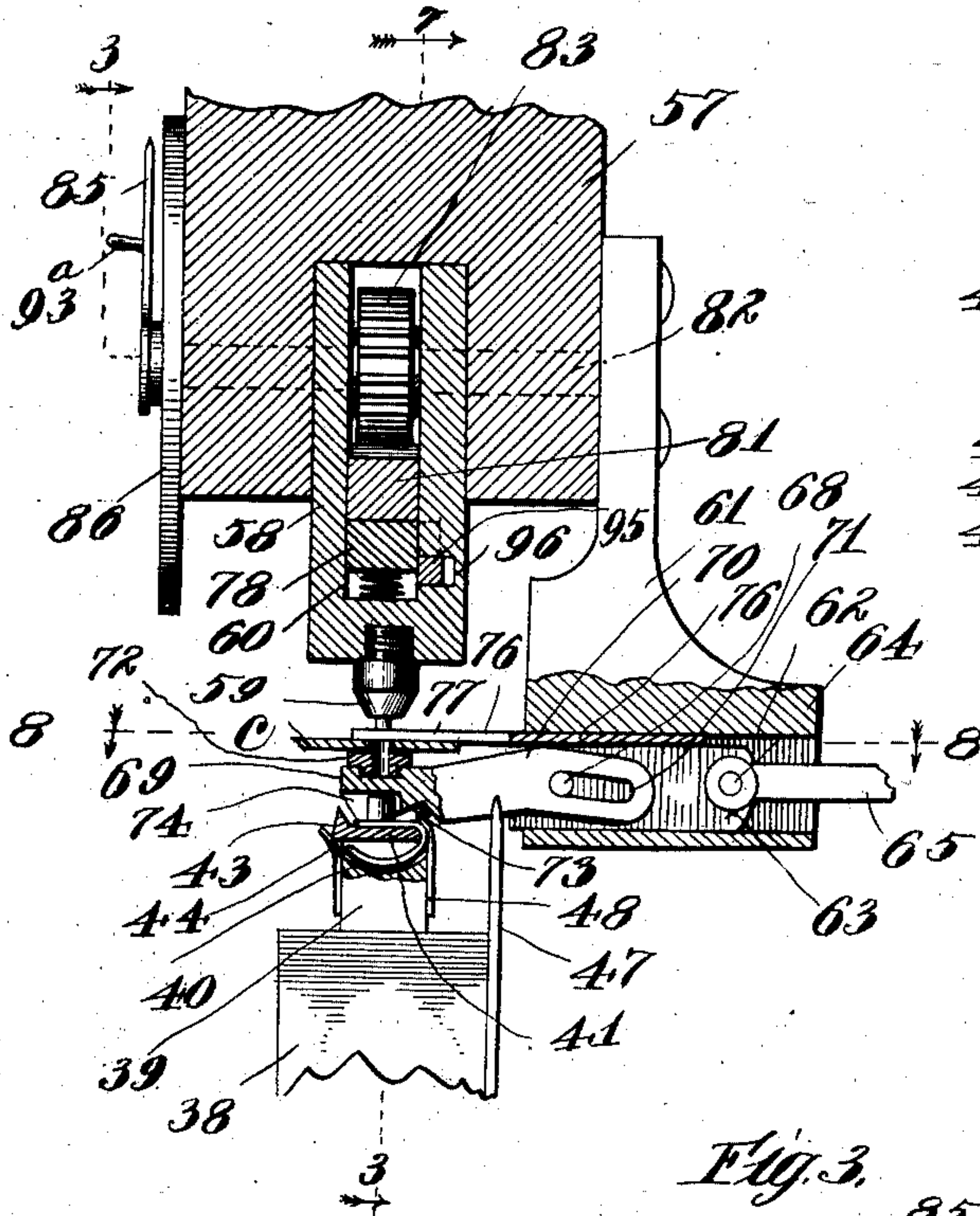


Fig. 4.

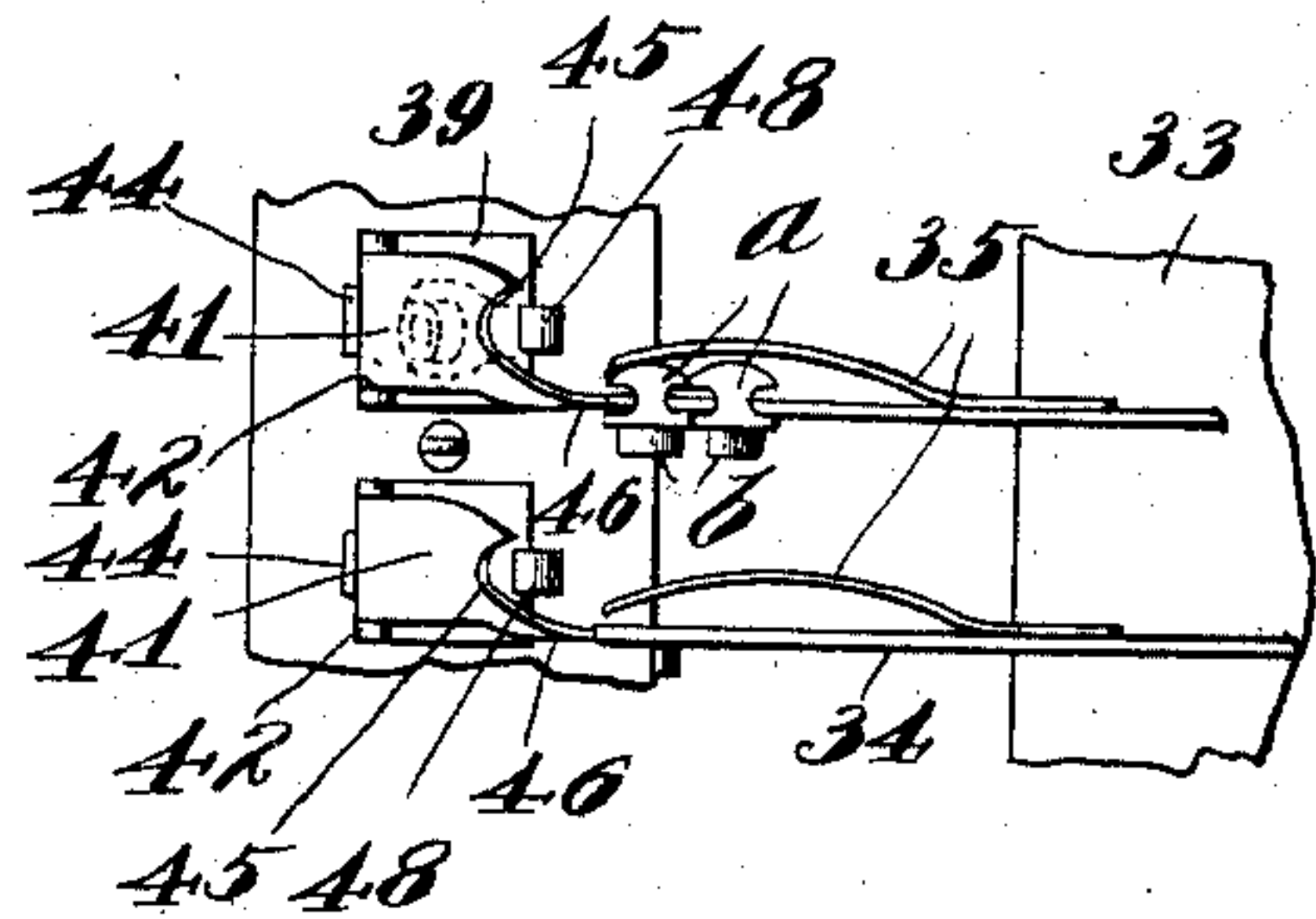
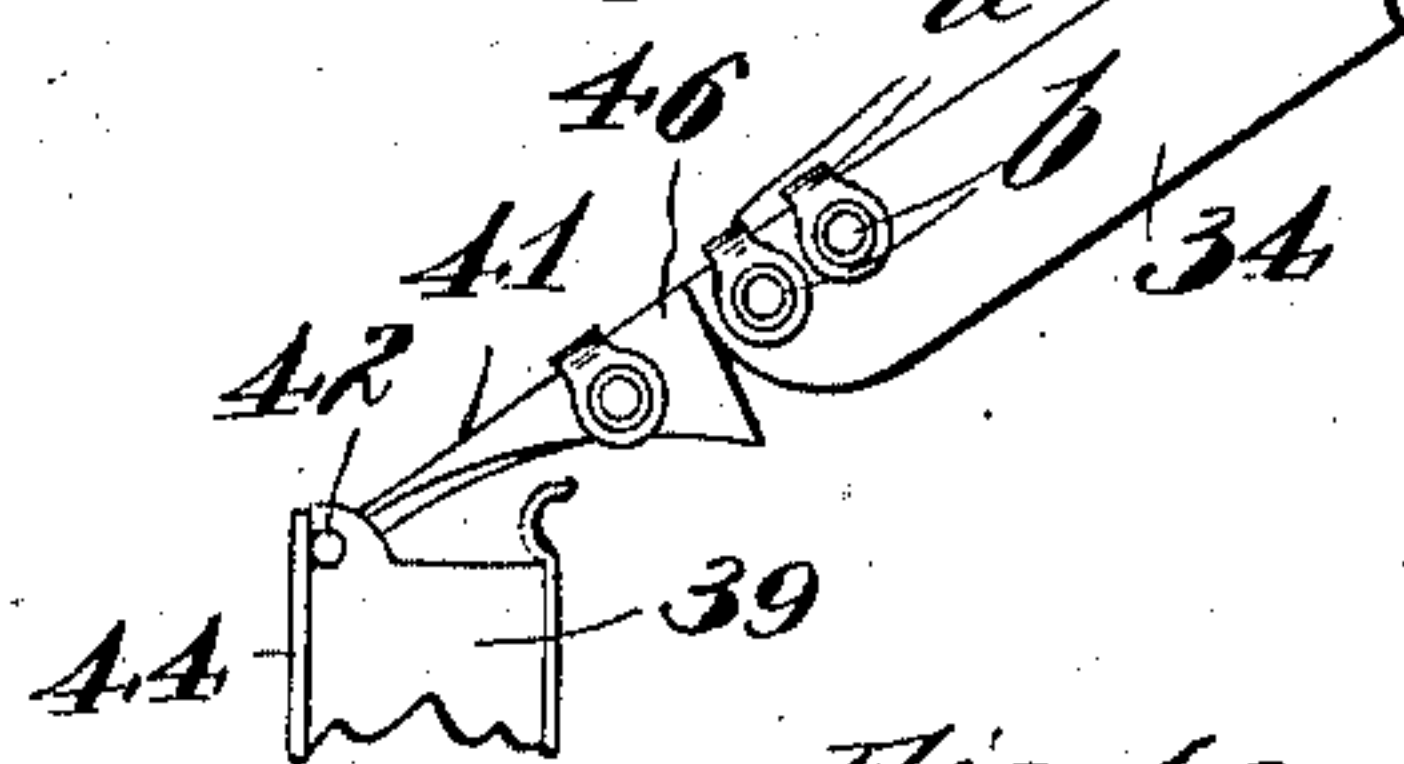


Fig. 5. a



No. 883,510.

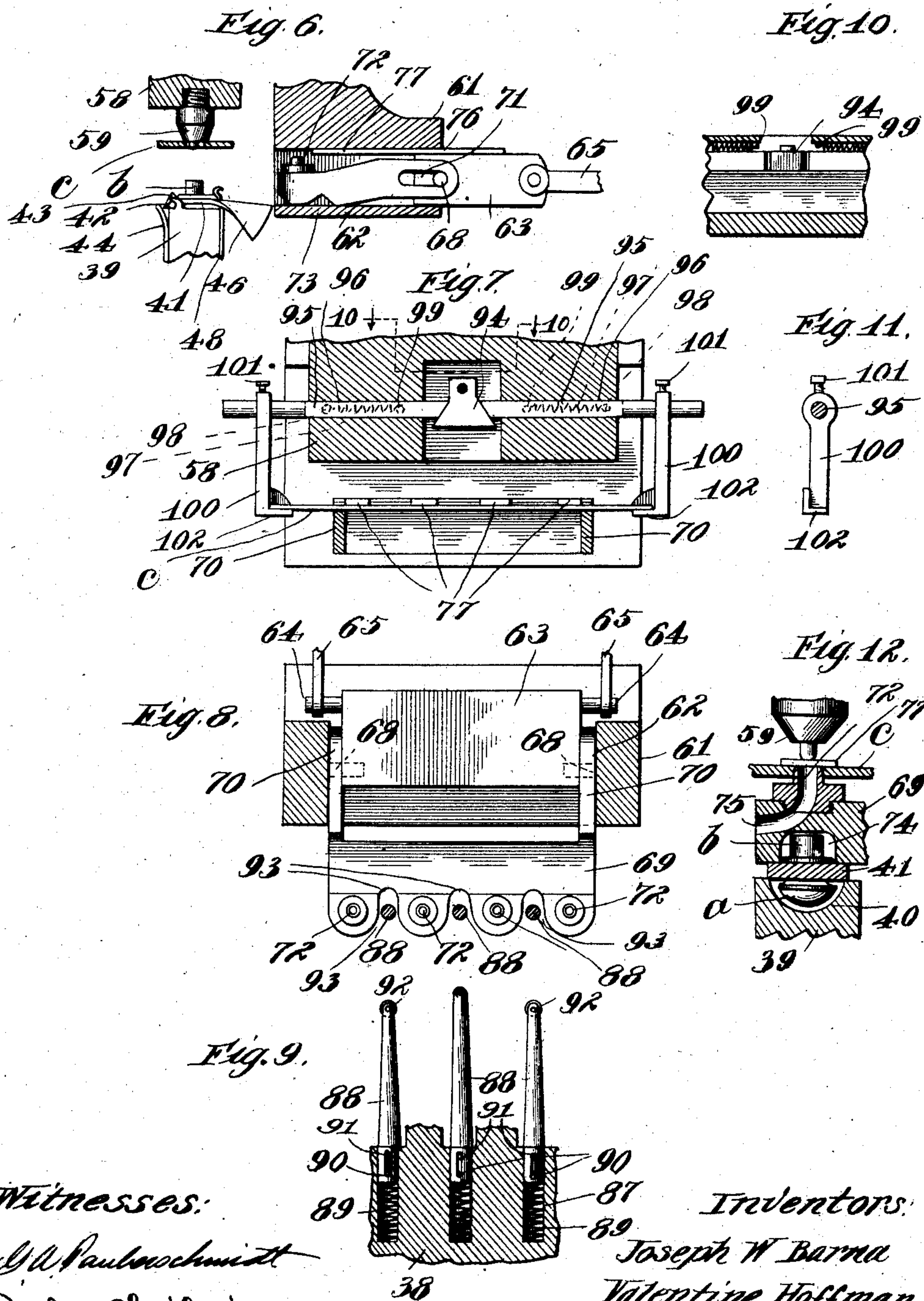
PATENTED MAR. 31, 1908.

J. W. BARNA & V. HOFFMAN.

HOOK SETTING MACHINE.

APPLICATION FILED APR. 23, 1906.

3 SHEETS—SHEET 3.



Witnesses:

Dr. Paul Schmidt
Arthur Seibel.

Inventors:

Joseph W. Barna
Valentine Hoffman
By *Colman McRoberts*
Their Attys

UNITED STATES PATENT OFFICE.

JOSEPH W. BARNA AND VALENTINE HOFFMAN, OF CHICAGO, ILLINOIS.

HOOK-SETTING MACHINE.

No. 883,510.

Specification of Letters Patent.

Patented March 31, 1908.

Application filed April 23, 1906. Serial No. 313,142.

To all whom it may concern:

Be it known that we, JOSEPH W. BARNA and VALENTINE HOFFMAN, citizens of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Hook-Setting Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to a machine for setting fastening devices, such as shoe hooks, along the edges of the uppers of boots, shoes and other articles.

One of the objects of the invention is to provide certain new and useful improvements in the hole punching mechanism of hook setting machines and the like.

A further object of the invention has reference to a novel form of setting mechanism for such machines.

Another object of the invention is to provide a machine of this character which is adapted for use with articles, such as shoe uppers, of varying sizes, and so arranged as to space the fastening devices to correspond with different sizes of uppers, without adjustment of the devices for punching the holes or of the devices for setting the fastening devices, but by adjusting the article itself so that the fastening devices when set will be at the desired distance apart.

Other objects and advantages of the invention will be pointed out in the appended description.

The invention consists of the organizations and arrangements of parts hereinafter fully described and then pointed out in the appended claims.

In the accompanying drawings—Figure 1 is a view in side elevation of a hook setting machine showing an embodiment of the various features of our invention; Fig. 2 is a vertical sectional detail view, partially in elevation, and on an enlarged scale, showing the parts in the positions they assume during the punching operation; Fig. 3 is a sectional view on the line 3—3 of Fig. 2; Fig. 4 is a detail plan view of two of the movable sets and their hook holders and also showing the raceway guide rails for directing the hooks to the holders; Fig. 5 is a view in side elevation of one of the movable sets with its hook holder in its open or receiving position and the associated guide rail; Fig. 6 is a detail view partially in section showing the positions of the

parts after the punching operation and before the setting operation, the punch and anvil being in their retracted positions; Fig. 7 is a sectional view on the line 7 of Fig. 2, showing the gage and the means for adjusting the same; Fig. 8 is a sectional view on the line 8—8 of Fig. 2, particularly illustrating the punch block and work adjusting posts, the movable sets being omitted for the sake of clearness; Fig. 9 is a detail view of the work adjusting posts; Fig. 10 is a fragmentary view showing the means for adjusting the gages, the view being taken on the line 10—10 of Fig. 7; Fig. 11 is a detail view of one of the gages; Fig. 12 is a detail sectional view on an enlarged scale through one of the movable sets and the punch and anvil associated therewith, showing the relation of the parts during the punching operation; and Fig. 13 is a top plan view on an enlarged scale of one of the movable sets and its hook holder showing in dotted lines two positions of a hook thereon.

In the present instance we have shown and shall describe the various features of our invention as embodied in a shoe hook setting machine. It will be obvious, however, that certain of the features may be used independently of each other and in machines for setting other fastening devices than shoe hooks.

Referring to Fig. 1, 20 indicates the base of the machine having a standard 21. The standard 21 is provided with ledges 22 to support a raceway 23, the frame 24 of which rests on the ledges and is provided with horizontal slots 25 which receive bolts 26 fixed to the standard 21 to permit the raceway frame to slide back and forth in the usual manner of such devices. The means for sliding the raceway consists of a lever 27 which is pivoted to the standard, as at 28, and at its upper end, at 29, is in pivotal engagement with the raceway frame, the other end of the lever 27 being engaged by a cam 30, shown in dotted lines in Fig. 1, fixed on the driven drive shaft 31 of the machine. A contractile spring 32 is anchored at one end to the lever 27 and at its other end is attached to a fixed part of the standard 21. The tendency of the spring 32 is to move the raceway frame 24 forward and the raceway is retracted in opposition to the spring by the cam on the shaft 31. The raceway is composed of a plate 33 which is inclined at a suitable angle, and a plurality of guides or rails 34 which consist in the present instance of suitable

strips standing on edge on the upper face of the plate and of a thickness slightly less than the opening of the smallest sized hooks so that the latter will slide freely thereon. The hooks are fed to the guides from a suitable reservoir (not shown) and the number of guides corresponds to the number of hooks to be set at each operation. The forward ends of the guides 34 terminate at such position that when the raceway is at the end of its forward movement, as shown in Fig. 1, they will be in position to deliver the hooks to the hook-holders, hereinafter described. In order to prevent the hooks from leaving the guides until positively moved therefrom each guide is provided with a spring finger 35 (Fig. 4) which may be of the character shown.

As shown in Fig. 1, the standard 21 is provided with a forward extension 36 under the forward end of the raceway, and this extension is provided with a vertical opening 37 in which is adapted to reciprocate a carrier 38. At its upper edge the carrier 38 is provided with a series of sets 39 consisting of blocks suitably spaced apart and hollowed out or recessed at the top as at 40, Fig. 2. The sets 39 are provided with the hook holders 41 each of which, in the present instance, consists of a plate pivoted at 42 at its edge remote from the raceway to its associated set 39 and which in its open or receiving position, as shown in Fig. 5, is inclined at an angle substantially corresponding to the inclination of its associated guide or rail 34. The pivoted edge of each holder is beveled, as at 43, as shown in Figs. 2 and 6, and cooperating therewith is a leaf spring 44 attached to the set 39. The action of this spring is such that when in engagement with the beveled edge of the holder it maintains the latter in its receiving position, as shown in Fig. 5; and when the holder is in its closed horizontal position it engages the angle of the edge to maintain the holder in its horizontal position, thereby preventing accidental displacement of the holder in either of its positions. Each hook holder 41 has a curved recess 45 at its rear edge, as shown in Fig. 4, and at one side of the recess 45 is provided with a rearward tongue 46 which gradually curves from the plane of the body of the holder to a plane at a right angle thereto so that its end is in the plane of the associated guide 34, as shown in Fig. 4. The hooks *a* are moved from the guides 34 to the holders 41 by fingers 47 one of which is associated with each guide and secured to the carrier 38 in such position that the beveled end thereof enters between the end hook on the guide and the succeeding hook and overcoming the resistance of the holding spring 35 moves the hook upon the tongue of the associated holder, the hook then straddling the tongue and sliding by gravity along the same and,

following the curvature of the tongue, finally enters the recess 45, as indicated by dotted lines in Figs. 4 and 13, with its tubular portion *b* extending upwardly. A leaf spring 48 is secured to each set 39 at the side opposite the spring 44, the purpose of which is to cooperate with the hook as hereinafter explained. Heretofore it has been the practice to feed the hooks to the sets by raceways capable of feeding hooks of only one size so that when it was desired to operate with hooks of a different size, it has been necessary to substitute a raceway adapted for use with hooks of such size. In the present arrangement this is obviated by employing rails, which are capable of use with hooks of different sizes, or any size hook that will straddle the guide rails, and having such rails deliver the hooks to the sets without the intermediation of the usual vacuory.

The carrier 38 is reciprocated through the medium of a lever 49 pivoted between its ends, as at 50, to the standard 21. The forward end of the lever 49 is pivotally connected to the carrier 38 while its opposite end cooperates with an eccentric on the shaft 31. This eccentric comprises a hub portion 51 set eccentric with reference to the shaft 31, on which it is fixed, and provided with an extension having an antifriction roller 52. Slidably mounted on the hub 51 and its extension is a disk 53 having a slot 54 in which the hub 51 is seated. The eccentric sleeve 55, to which the lever 49 is pivoted, is provided on its inner face with a recess 56 of suitable length. This eccentric is shown and described in a patent granted to us April 4, 1905, No. 786,340, and no further explanation thereof herein is deemed necessary. In its operation the eccentric, through the medium of the connecting mechanism, first advances the slide 38 a definite distance and then after the punching operation, and before the setting operation, when the roller 52 reaches the recess 56 permits the disk 53 to slide vertically on the hub under the force of gravity due to the weight of the carrier 38, thus retracting the carrier, after which it again advances the slide to perform the setting operation.

The standard 21 has a depending head 57 which is located over the carrier 38. This head 57 is provided with a transverse groove in its under face, in which is located a block 58 to the under face of which the stationary sets 59, which may be of the usual or any suitable construction, are screwed, one of such sets being associated with each movable set 39, and located directly over the same. As shown in Figs. 2 and 3 the block 58 has a transverse opening 60, the purpose of which will be explained hereafter.

A depending guide 61, consisting of a block located at the rear of and secured to the head 57, is provided with an elongated longitudinal

nal opening 62 in which is mounted a slide 63 having lateral studs 64 at its rear end. A pair of links 65 are pivoted to the studs 64 and provided at the opposite ends with elongated slots 66 which engage suitable studs 67 fixed to the side edges of the plate 33 of the raceway, as shown in Fig. 1. As shown in Fig. 8, the length of the slide 63 is slightly less than that of the opening 62, and fixed to the ends of the slide near the front thereof are studs 68. A punch block 69 is provided with rearward arms 70 having elongated slots 71 adapted to the studs 68 of the slide 63, and the height of the arms, which are shown as angular in the present instance, is less than the height of the opening 62 to permit of pivotal movement of the punch block on the slide 63. The punch block 69 is provided on its upper face with suitable punches 72 which are spaced apart similarly to the sets 59. The under face of the punch block 69 is inclined or beveled rearwardly, as at 73, and is also provided with undercut recesses 74 to receive the shanks *b* of the hooks during the punching operation, and these recesses open through the front face of the punching block, as shown in Fig. 2, in order to avoid interference by the hooks when the punch block, is retracted, as hereinafter explained. As shown in Fig. 12, the openings in the punches 72 communicate with passages 75 in the punch block for the escape of the punchings. A plate 76 is fixed to the upper face of the slide 63 and this plate is provided with forward extensions 77, one for each punch and providing the anvil for such punch. The upper face of the anvils is in a plane substantially in line with the end of the teats of the sets 59, only sufficient clearance being provided to permit the anvils to be moved under the sets. During the punching operation the anvils react against the sets 59, as shown in Fig. 2.

In the present instance, the series of punches and sets are in fixed spaced relation, that is to say, are not adjustable laterally with reference to each other, and to provide for variation in spacing of the hooks in the material or stock of the uppers, to permit of the employment of the machine with different sized uppers, means are provided for bending or crimping the upper so that the upper itself is adjusted to provide for the desired spacing of the hooks. This feature of the invention is carried out in the present instance in the following manner. In the opening 60 of the block 58 is located a wedge block 78 having its upper face thereof beveled or inclined. To this block is attached a plurality of abutments in the form of rods 79 in the present instance which pass through suitable openings in the bottom of the block 58, one of such rods being located between each adjacent pair of sets 59, as shown in Fig. 3. The lower ends of the rods

79 are provided with transverse curved recesses. Suitable springs 80 react between the bottom of the opening 60 and the block 78, normally tending to thrust the block upward. A cooperating wedge 81, having its face adjacent the block 78 reversely beveled and its opposite face toothed, is located between the block 78 and the top of the opening 60. A shaft 82 is suitably journaled on the head 57 and is provided with a pinion 83 located in a suitable opening 84 in the block 58 and meshing with the teeth of the wedge 81. The shaft 82 is provided with a pointer 85 which moves in front of a dial 86 on the front of the head 57, and this dial is provided with graduations to indicate the adjustment of the abutments 79 and consequently the spacing of the eyelets. The carrier 38 is provided with cavities 87, one between each adjacent pair of sets 39, in which is seated the lower end of a post 88, one of such posts being associated and in line with each abutment 79. Coil springs 89 located in the recesses under the posts 88 normally tend to thrust such posts upwardly. These posts are prevented from turning by pins 90 fixed to the carrier 38 and passing through elongated vertical slots 91 in posts 88. As shown in Fig. 9, the center post 88 is slightly longer than the outer posts and preferably has its upper end roughened. The outer posts are preferably provided with rollers 92 the plane of rotation of which is transverse to the machine. In order to prevent interference of the posts 88 with the punch block 69 when the latter is in its advanced position such block is provided with recesses 93 between the punches, as shown in Fig. 8.

The adjustable abutments 79 define the degree of crimp or deflection imparted to the upper by the posts 88, and this may be readily varied by adjusting the bar 78. The graduations of the dial 86 are such as to indicate a certain spacing when the pointer 85 is opposite a certain graduation, and by moving the pointer 85, by a suitable handle 93^a, the wedge 78 will be correspondingly adjusted, so that by this means the spacing of the hooks may be readily varied to correspond with the particular size of the upper being operated on.

It is the usual practice to place the top hook of the upper a particular distance from the upper edge of the upper irrespective of the spacing of the hooks. In order to insure this relation of the top hook to the stock of the upper edge of the uppers suitable gages are provided, one being employed in setting the hooks of one member or side of an upper while the other is employed in setting the hooks of the other member or side of such upper. The gages are designed to be controlled by the mechanism controlling the adjustable abutments 79. To this end the wedge block 78 has fixed thereto a wedge 94,

which coöperates with the inner ends of the oppositely extending slides 95 seated in grooves 96 in the block 58. The wedge acts to move the slides outwardly and they are
 5 designed to be moved inwardly by springs 97 which are connected at their outer ends, as at 98, to the slides and at their inner ends to the block 58, as at 99.

The ends of the slides 95 project beyond
 10 the sides of the head 57 and each is provided with a gage arm 100 adjustably secured to the associated slide 95 by a set screw 101. The lower end of each arm 100 has an angular flange 102 forming a seat for the corner of
 15 the upper. When the bar 78 is moved downwardly through the medium of the pinion 84, to reduce the crimping action, the gages 100 are moved inwardly by the springs 97, while on the other hand upward move-
 20 ment of the bar 77 owing to the action of the wedge 94 moves the gages outwardly, the parts being so arranged that movement in either direction bears a definite relation to the movement of the posts 79. It is obvious
 25 that inasmuch as the center portion of the upper is crimped and held by the central co-operating posts 79 and 88 and is further crimped by the respective side post, the material at each side of such portion will be
 30 drawn in a definite distance, such distance depending upon the amount of crimp. The amount of this movement being determined, the position of the gage is originally set to correspond therewith. As the side of the uppers
 35 to be provided with hooks are rights and lefts, one of the gages is located at each side of the machine, such gages being automatically adjusted as the spacing of the eyelets is varied.

The operation of the machine will be
 40 readily understood. At the beginning of the operation the hook holders 41 are in the inclined or open position shown in Fig. 5, the carrier 38 being in its lower or depressed position. As the carrier 38 is elevated by the
 45 eccentric, the raceway is moved forward by its cam until the forward ends of the guide rails 34 substantially meet the ends of the tongues of the hook holders, at which time the fingers 47 engage the end hooks on the
 50 guides and move the same upon the holders, in the manner heretofore described. In the retracted position of the raceway, the punch block 69 is also in its retracted position, as shown in Fig. 6. During the advance of the
 55 raceway, the studs 67 thereon traverse the slots 66 in the rear ends of the links 65 and when they reach the forward ends of such slots move the links and consequently the slide 63 forward to the position of Fig. 1.
 60 During the initial movement of the slide 63 the punch block 69, owing to the slots 71, remains stationary, but when the studs 68 on the slide engage the forward ends of the slots in the arms 70, the punch block is also ad-
 65 vanced from the position shown in Fig. 6 to

that in Fig. 1, dropping under the action of gravity to provide clearance for the stock or work *c* between the punches and anvils. The end hooks having passed to the hook
 holders, the raceway then begins its retractive
 70 movement, and the carrier 38 continues its ascent until the side portions of the hook holders beyond the sides of the hooks en-
 75 gage the beveled under face 73 of the punch block and the holders are turned or moved into their closed horizontal position. In
 this position of the hook holders the crowns of the hooks enter the cavities 40 in the sets
 39, and the springs 48 engage the flanges of the hooks, as shown in Fig. 2, holding the lat-
 80 ter and incidentally assisting the springs 44 in maintaining the holders in closed position. As the carrier 38 continues its ascent, the posts 88 engage the portions of the stock or
 work between the anvils 77 and bend such
 85 portions upwardly, against the abutments 79 which by their positions of adjustment define the degree of deflection or crimp and consequently the spacing between the holes to be cut by the punches and the location of the
 90 top hole. The springs 89 are sufficiently strong to prevent yielding of the posts until the abutments are engaged. By making the center post 88 longer than the outer posts
 95 and roughening the end of the same, such post engages the work first, and holds the intermediate portion against the center abutment, and while thus held the portions of the stock or work at the side are free to move
 100 inwardly as is necessary under the crimping action. The rollers 92 enable the side portions of the stock or work to move freely so as to avoid stretching or binding. During this
 action the carrier continuing its advance the punch block is moved on its pivot, forcing
 105 the punches through the work, as shown in Figs. 2 and 12. During the punching operation the raceway is being retracted, but before the studs 67 thereon reach the rear ends
 110 of the slots 66 in the links 65, the carrier 38 drops slightly under the action of the eccentric and the punch block by its weight also drops disengaging the punches from the
 stock or work which however continues to be held by the posts 88 under the action of
 115 their springs. Further retraction of the raceway results first in retracting the slide 63 and then in retracting the punching mechanism as the slide studs 68 reach the ends of the slots 71, of the punch block. The eccen-
 120 tric now advances the carrier 38 again, forcing the shanks *b* of the hooks through the openings just punched in the upper and under the action of the coöperating movable and
 125 stationary sets upsetting the same to secure them to the upper. During the setting operation the upper limbs of the hooks rest against the hook holders 41, as shown in Fig. 12, and the depressions 40 in the sets 39 are
 130 sufficiently deep to clear the crowns of the

hooks to prevent scratching or breaking of the enamel thereon. As soon as the setting operation is completed, the eccentric lowers the sets 39, and the act of withdrawing the stock or work restores the hook holders to their normal or open positions.

Having described our invention what we claim is—

1. In a device of the class described, a plurality of punches, and means between the punches for bending the work to vary the spacing of the holes cut by the punches.

2. In a device of the class described, a series of punches in fixed lateral relation, a post for bending the work between the punches to determine the spacing of the holes cut by the punches, and means for moving the punches.

3. In a device of the class described, a plurality of punches in fixed lateral relation, a post for deflecting the work between the punches, and an adjustable abutment to determine the deflecting action of the post.

4. In a device of the class described, a plurality of punches, an anvil associated with each punch, a post for bending the work between the punches, an adjustable abutment to determine the deflecting action of the post, and means for moving the punches against the anvils.

5. In a device of the class described, a plurality of punches, an anvil for each punch, spring pressed work deflecting posts between the punches, and adjustable abutments in the line of the posts.

6. In a device of the class described, a plurality of punches, anvils therefor, spring pressed posts between the punches, an abutment associated with each post, and an adjustable bar to which the abutments are fixed.

7. In a device of the class described, a plurality of punches, anvils therefor, spring pressed posts between the punches, an abutment associated with each post, an adjustable bar to which the abutments are fixed, and a wedge for adjusting the position of the bar.

8. In a device of the class described, a plurality of pivoted punches, an anvil for each punch, spring pressed posts between the punches, an abutment associated with each post, a vertically adjustable bar to which the abutments are fixed, springs for moving the bar in one direction, and a wedge for moving the bar in the opposite direction, whereby by the adjustment of the bar the spacing of the holes cut by the punches may be varied.

9. In a device of the class described, a plurality of punches, an anvil associated with each punch, a slide for moving the punches into engagement with the anvils, spring pressed posts carried by the slide and alter-

nating with the punches, a bar, abutment posts carried by the bar and cooperating with the spring pressed posts, springs for moving the bar in one direction, a toothed wedge for moving the bar in the opposite direction, a pinion engaging the wedge and provided with a pointer, and a graduated scale over which the pointer moves.

10. In a device of the class described, a plurality of punches, means for varying the spacing of the holes cut by the punches, and a gage controlled by such means to space the top hook from the edge of the stock.

11. In a device of the class described, a plurality of punches, means for varying the spacing of the holes cut by the punches, and an adjustable right and left hand gage controlled by such means.

12. In a device of the class described, a plurality of punches, an anvil for each punch, means for adjusting the work between the punches to determine the spacing of the holes cut by the punches, a gage controlled by such means, and means for moving the punches against the anvils.

13. In a device of the class described, a plurality of punches, an anvil for each punch, spring pressed posts for adjusting the work between the punches to determine the spacing of the holes cut by the punches, abutments for the posts, means for adjusting the abutments to vary the spacing, and a gage automatically adjusted by such means.

14. In a device of the class described, a plurality of punches, an anvil for each punch, posts for crimping the leather between the punches to vary the spacing of the holes cut by the punches, abutments associated with the posts, a vertically adjustable bar to which the abutments are secured, and a gage controlled by the bar.

15. In a device of the class described, a plurality of punches, an anvil associated with each punch, a slide for moving the punches, spring pressed posts carried by the slide, and located between the punches, abutments, a bar to which the abutments are secured, a wedge for moving the bar in one direction, oppositely extending slides provided with gages and thrust outwardly by the wedge when the bar is moved upwardly, and springs for moving the slides inwardly when the bar is moved downwardly.

16. In a device of the class described, a stationary set, a movable guide rail, a movable set, a pivoted holder mounted on the movable set and having a tongue which is alined with the guide rail when the latter is in its advanced position and directs the hook to the holder, and means to close the holder down upon the movable set.

17. In a device of the class described, a stationary set, a guide rail, a movable set, a pivoted hook holder mounted on the latter

set and normally in an inclined position to receive the hooks from the guide rail, and means for throwing the holder to its closed position as the movable set is advanced to the stationary set.

18. In a device of the class described, the combination with an inclined guide straddled by the hooks, of a pair of cooperating sets one of which is stationary, a carrier by which the other set is carried, such other set being provided with a pivoted hook holder which in its receiving position is tilted so as to receive the hooks from the guide, a device in the path of the holder to throw the same into a horizontal position while moving towards the stationary set, and means for retracting the guide and then the said device.

19. In a device of the class described, the combination with an inclined guide straddled by the hooks, of a stationary set, a reciprocating carrier, a set thereon, a hook holder pivoted to the set, said holder in its receiving position being inclined and having a tongue which is then alined with the end of the guide, a finger on the carrier for moving the hook from the guide to the tongue along which it passes to the holder, a device located in the path of the plate to throw the latter into horizontal position as the slide moves toward the stationary set, a spring for holding the plate either in its inclined or horizontal position, and a spring to engage the hook to hold the same on the holder.

20. In a device of the class described, a plurality of stationary sets and cooperating sets, each of the latter being provided with a pivoted hook holder having a guide to direct the hooks to the holder, means to close the holder upon its associated set and means to maintain the holder in its open and closed position.

21. In a device of the class described, a plurality of stationary sets and movable sets cooperating therewith, each of the latter sets being provided with a pivoted hook holder having a tongue to guide the hook to the holder, and means to close the holders upon the associated sets.

22. In a device of the class described, opposed series of cooperating sets, one of such series being stationary and the other of which is movable relatively thereto and each provided with a pivoted hook holder which in its receiving position is tilted on its pivot and is adapted to be moved from such tilted position while the movable series is moving towards the stationary sets.

23. In a device of the class described, the combination with guide rails, of opposed series of cooperating sets, one of such series being stationary and the other of which is movable, each of the latter sets being provided with a pivoted holder which in its position to receive a hook from its guide is inclined and is adapted to be moved from its

inclined position while the movable series is moving towards the stationary series.

24. In a device of the class described, the combination with a series of inclined guides adapted to be straddled by the hooks, of a series of stationary sets, a reciprocating carrier, a series of sets on the carrier, a hook holder pivoted on each set, such holders in their receiving positions being inclined and each having a tongue which in the receiving position of the holder is alined with the end of the associated guide, fingers on the carrier for moving the end hooks from the guides to the tongues along which they pass to the holders, means for moving the carrier towards the stationary sets, a device for throwing the holders into horizontal position, and means for retracting such device.

25. In a device of the class described, the combination with a stationary set, a punch, an anvil associated with the punch, a movable set provided with a hook holder which in its receiving position is tilted, the said punch and anvil in their operative positions being located between the sets, and means for moving the movable set into engagement with the punch whereby the said hook holder is thrown from its tilted position and the punch is forced against the anvil, and means for retracting the punch and anvil after the punching operation and before the setting operation.

26. In a device of the class described, a guide rail, a stationary set, a punch, and an anvil associated therewith, a movable set provided with a hook holder to which the hooks are delivered by the guide rail and which in its receiving position is inclined, means for moving the movable set to engage the hook holder with the punch to throw the said holder into a horizontal position, then to retract the movable set to permit of the withdrawal of the punch and anvil and then advance the movable set into cooperation with the stationary set, after the withdrawal of the punch.

27. In a device of the class described, the combination with a guide rail, of a stationary set, a movable set provided with a hook holder having a tongue to guide the hooks from the guide rail to the holder, the said holder in its receiving position being inclined, a punch block having a punch and an anvil, means for advancing the punch block and anvil into the path of the movable set whereby as the movable set advances the hook holder engages the punch block and is thrown to a horizontal position, and then moves the punch into cooperation with the anvil, and means for retracting the movable set to permit of the withdrawal of the punch block and anvil and then again advance the movable set into cooperation with the stationary set.

28. In a device of the class described, a

guide-rail, a stationary set, a movable set, a hook-holder on the movable set to guide the hooks from the rail to the holder and normally standing in open position, a punch and anvil, means to advance and retract the punch and anvil into and out of the path of the movable set whereby the hook-holder engages the punch and is moved to closed position as the movable set advances, means to advance and retract the movable set and again advance it after the retraction of the punch and anvil.

29. In a device of the class described, a guide-rail, a stationary set, a movable set, a hook-holder on the movable set to guide the hooks from the rail to the holder and normally standing in open position, means in the path of the holder to close the latter as it is moved toward the stationary set, means to withdraw the closing-means, and means to advance the movable set into co-operation with the fixed set.

30. In a device of the class described, the combination with a guide rail, means for advancing and retracting the guide rail, a stationary set, a movable set consisting of a hook holder which when the guide rail is in its advanced position and the hook holder is in its receiving position is inclined, a punch block and anvil, connection between the punch block and anvil and the guide rail whereby as the latter advances the punch block and anvil are moved into the line of movement of the movable set and the hook holder engaging the punch block is thrown into horizontal position and then forces the punch block into coöperation with its anvil, and means for retracting the movable set after the punching operation, whereby as the guide rail is retracted the punch block and anvil are withdrawn to permit of the advance of the movable set into coöperation with the stationary set.

31. In a device of the class described, the combination with a raceway provided with a plurality of guides adapted to be straddled by the hooks, a series of stationary sets, a carrier, a series of sets on the carrier, and each of which is provided with a pivoted hook holder having a tongue, the said hook holders in their receiving positions being inclined and the tongues then being alined with the ends of the guides, a punch block provided with a series of punches, an anvil for each punch, connection between the punch block and raceway whereby as the raceway is advanced the punch block and anvil are moved into the line of movement of the movable sets to throw the hook holders into horizontal position and then force the punches against the anvils, means for retracting the movable sets after the punching operation to permit of the withdrawal of the punch block as the raceway is retracted, and means for advancing the movable sets after

the withdrawal of the punch block to perform the setting operation.

32. In a device of the class described, the combination with a raceway provided with guides consisting of inclined strips standing on edge, of a series of stationary sets, a carrier having a series of sets each of which is provided with a hook holder consisting of a pivoted plate which in its receiving position is inclined and provided with a tongue which is then alined with the associated guide, fingers carried by the carrier for moving the end hooks on to the tongues, a slide block having forwardly extending anvils, links connecting the slide block to the raceway, a punch block provided with slotted arms, studs on the slide block entering the slots in the said arms whereby as the raceway is advanced the punch block is moved into the line of movement of the movable sets and as the said sets are advanced the hook holders thereof engage the punch block and are moved to horizontal position and then force the punches into coöperation with the anvils, means to permit of the retraction of the movable sets to permit of the withdrawal of the punch block and anvils by retractive movement of the raceway, and then advance the movable sets into coöperation with the stationary sets.

33. In a device of the class described, a pair of coöperating sets one of which is movable and is provided with a pivoted hook holder having a tongue for directing the hooks to the holder, and a movable guide rail which in its delivering position abuts against and is alined with the tongue so that the hooks slide from the guide directly to the tongue.

34. In a device of the class described, a series of stationary sets and a series of movable sets each of the latter being provided with a pivoted hook holder having a tongue, and movable guide rails which are adapted to aline with the tongues of the holders so that the hooks slide therefrom directly on to the tongues.

35. In a device of the class described, a raceway having a series of guide rails adapted to be straddled by the hooks, a series of stationary sets and an opposing series of movable sets, each of the latter sets being provided with a pivoted hook holder having a tongue, said tongues when the hook holders are in inclined receiving position are alined with associated rails so that the hooks slide from the rails directly to the tongues and are directed by the latter to the hook holders.

36. In a device of the class described, a plurality of punches and a similar number of sets for affixing fastening devices in the holes cut by the punches, and means for deflecting the work between the punches to determine the spacing of the fastening devices.

37. In a device of the class described, a

plurality of punches and a similar number of sets for affixing fastening devices in the holes cut by the punches, and posts for deflecting the work between the punches to determine
5 the spacing of the fastening devices.

38. In a hook setting machine, a plurality of punches in fixed lateral relation and a similar number of sets for affixing the hooks in the holes cut by the punches, adjustable abut-
10 ments between the punches, and posts alined with the abutments and coöperating therewith to deflect the work between the punches to determine the spacing of the holes.

39. In a hook setting machine, a plurality
15 of stationary sets and a plurality of movable sets, a plurality of punches one of which is associated with and adapted to be moved into the line of each opposing pair of sets so as to be actuated by the movable set of such
20 pair and then be retracted to permit of the setting operation, adjustable abutments located between the stationary sets, and posts moving with the movable sets to deflect the work between the punches against the abut-

ments and hold the same during the punch- 25
ing and setting operations.

40. In a hook setting machine, a plurality of stationary sets and a carrier provided with a series of sets, punches having anvils and
being movable into the path of the movable 30
sets, so as to be actuated thereby, and then being retracted to permit of the advance of the movable sets into coöperation with the stationary sets, a block having abutments
located between the stationary sets, means 35
for adjusting the block to vary the position of the abutments, and spring pressed posts on the carrier and coöperating with the abutments to deflect the work between the punches and hold the same during the punch- 40
ing and setting operations.

In testimony whereof we affix our signatures in presence of two witnesses.

JOSEPH W. BARNA.

VALENTINE HOFFMAN.

Witnesses:

ARTHUR B. SEIBOLD,
J. McROBERTS.