

(No Model.)

2 Sheets—Sheet 1.

M. V. B. HILL.

MACHINE FOR PUNCHING STRIPS FOR SPRING BEDS.

No. 414,314.

Patented Nov. 5, 1889.

Fig. 1

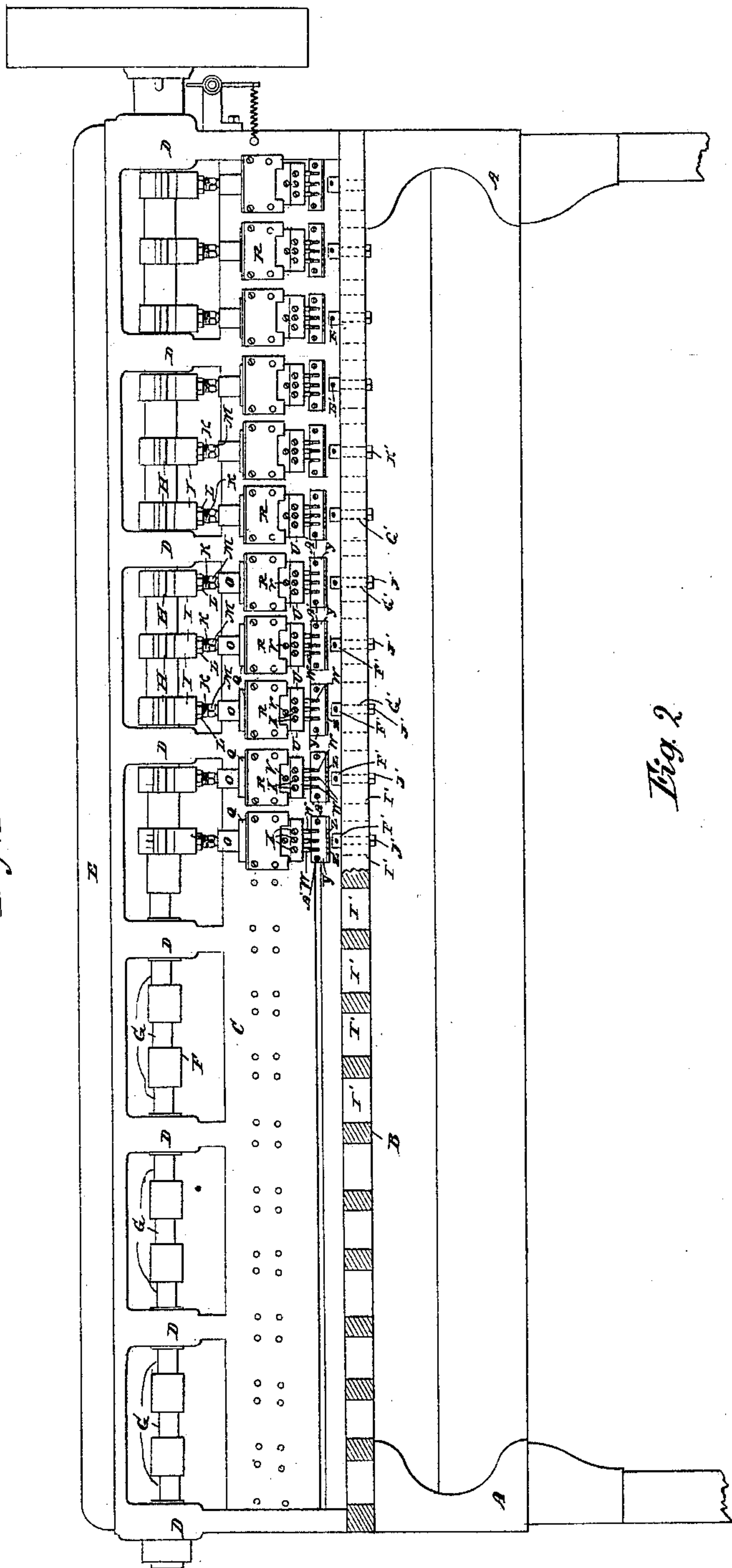
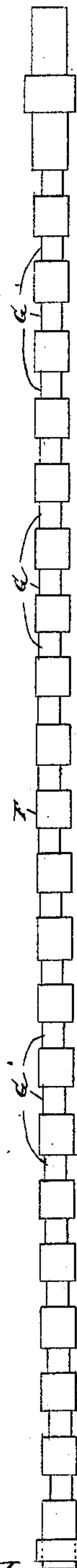


Fig. 2



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(No Model.)

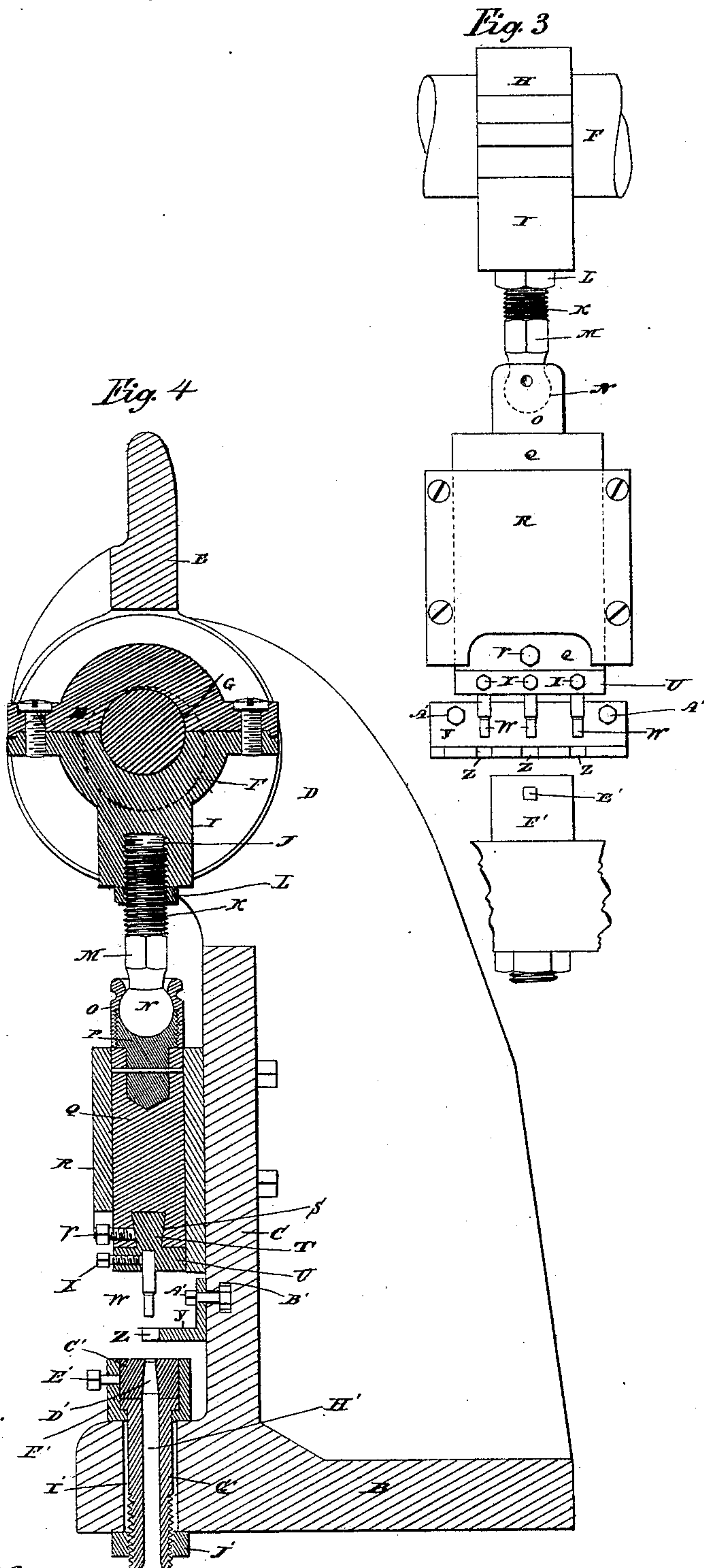
2 Sheets—Sheet 2.

M. V. B. HILL.

MACHINE FOR PUNCHING STRIPS FOR SPRING BEDS.

No. 414,314.

Patented Nov. 5, 1889.



Witnesses:

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UNITED STATES PATENT OFFICE.

MARTIN V. B. HILL, OF NEW HAVEN, CONNECTICUT.

MACHINE FOR PUNCHING STRIPS FOR SPRING-BEDS.

SPECIFICATION forming part of Letters Patent No. 414,314, dated November 5, 1889.

Application filed March 26, 1889. Serial No. 304,884. (No model.)

To all whom it may concern:

Be it known that I, MARTIN V. B. HILL, residing at New Haven, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Machines for Punching Strips for Spring-Beds; and I do declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to an improved punching-machine particularly designed for punching the holes in the long sheet-metal binding-strips of spring-beds, the object being to provide a power-machine adapted to receive an entire strip and to punch any desired arrangement of holes in the same without calling on the machine to punch more than one hole at a time and without any intermediate handling of the strip.

With these ends in view my invention consists in a machine having certain details of construction and combinations of parts, as will be hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a view in front elevation of one form which a machine embodying my invention may assume, with a part of the punch-connections removed and a part of the machine-bed in section to show the slots therein for the adjustment of the dies. Fig. 2 is a detached view in elevation of the operating-shaft. Fig. 3 is a detached enlarged broken view in front elevation, showing a section of the shaft, one of the punch-connections, and a die-holder and bolt and a section of the machine-bed. Fig. 4 is a view of the said parts in vertical section on the line *a b* of Fig. 3, and Fig. 5 is a diagram illustrating how the eccentric wrists are arranged so as to secure a progressive action of the punches and a clearance for the introduction and removal of the strips.

As herein shown, the frame of the machine includes a standard A, a bed B, a back C, eight parallel upright arms D, and a cross-beam E, uniting the upper ends of the arms. A long horizontal operating-shaft F, mounted in the said arms, is provided throughout its length with eccentric wrists G, equidistant

each from the other, and arranged as will be completely described later on. To each of these eccentric wrists a punch-connection is applied, forming a series extending throughout the length of the machine. Inasmuch as these connections are like each other, a description of one will describe them all. Each consists, then, of a two-part box H, having a depending sleeve I, provided with a vertical threaded bore J, as shown. An adjustable threaded coupling-bolt K, screwed into such bore and locked in place by a nut L, bearing against the lower end of the sleeve, is faced, as at M, to adapt it to be turned and adjusted and provided at its lower end with a ball N, received and playing within a suitably-threaded socket O, secured to a small block P, pinned into the upper end of a vertically-reciprocating head Q, mounted in a case R, bolted to the back C of the machine, the ball and socket forming a flexible connection between the box, which has a rotary movement with its eccentric wrist and the head, which is confined to vertical movement in one plane by the case, of which there is one for the head of each punch-connection. A horizontal longitudinal dovetail groove S, formed in the lower end of the head, receives a dovetail T, formed upon the upper edge or face of a sliding punch-block U, secured to the lower end of the head by means of a horizontal set-screw V, mounted therein, and impinging against the dovetail, the block being adjustable either to the right or to the left to the extent of half of the space between the punches W. As herein shown, each sliding block is adapted to receive three of the said punches, and is thereto provided with three set-screws X for holding them in place. It is apparent, however, that I may employ other ways for securing the sliding blocks to the reciprocating heads and for securing the punches to the sliding blocks. If desired, also, one or more of the punches may be replaced by knives or cutters (not shown) for trimming the ends of the strips or performing any other cutting operation upon them that may be required. Thus by providing the end punch-connections with suitable cutters the strips may be rounded at their ends at the same time they are punched, whereby the la-

bor and time required for putting the strips through a separate machine for rounding their ends is avoided.

Each punch-connection is provided with a
 5 stripper Y, having three open slots Z extending inward from its edge for the respective punches to play through and secured to the back of the machine-frame by two bolts A' A', the heads whereof are located in a horizontal
 10 T-shaped slot B', formed in the said back and extending throughout the length thereof, and permitting the several strippers to be adjusted to conform to the positions of the sliding punch-blocks. A die C', having a central
 15 clearance-opening D' and located below each head, is secured by a set-screw E' in a cup-shaped holder F', receiving a bolt G', having a longitudinal clearance-bore H', and passing through an elongated slot I', formed in the
 20 bed of the machine, the die, holder, and bolt being adjustable under the head within the range of the said slot and secured in place by means of a nut J', screwed upon the bolt and working against the lower face of the bed,
 25 which is provided with an elongated slot, a die, a holder, and a bolt for each punch-connection. In case one or more cutters are employed, as suggested, the corresponding dies and strippers will be modified to conform to
 30 them.

By adapting the sliding punch-blocks to be adjusted so as to take up all the space between the punches, as described, every point in any strip which the machine may receive
 35 may be covered by a punch, whereby the machine may be set for punching the holes in any arrangement called for, the strippers and dies being adjustable to conform to the adjustment of the punches.

40 This machine, as has been explained, is designed for punching the strips of spring-beds by power without handling the strips after they have been placed in the machine and without calling on the machine to punch more
 45 than one hole at a time. It is necessary, therefore, that each punch shall keep a different stroke without interfering with the action of any other punch, and that all of the punches shall act together, so far as is required, to give
 50 clearance to the strip in introducing it into the machine and withdrawing it therefrom. The amount of throw given to each punch will be determined by the thickness of the stock to be punched. The principle, how-
 55 ever, of arranging the wrist to secure the described action of the punches is shown by the diagram, which has been made Fig. 5 of the drawings. The circle *a*, described about the
 60 axis *b* of the shaft, represents the extreme throw of the eccentrics, and may be made larger or smaller, according to the length of the throw required. The surface of this circle is spaced off into a number of equal divisions, which must slightly exceed in length
 65 the thickness of the stock to be punched. Each of these spacing-points, obtained as described, is taken as a center of a wrist. It

will thus be seen that while each wrist bears the same relation to the axis of the shaft as every other wrist none of the wrists coincide with each other, but are equally separated from each other on a circle around that axis, and virtually form in the longitudinal perspective of the shaft a spiral series of wrists. It will be noticed, however, that all
 75 of the wrists are struck from points within the same half of the "wrist-circle," so called, so that while the line of wrists will be curved it will never quite go around half of the shaft. This arrangement is followed for giving
 80 up half of the throw of the shaft to clearing all of the punches at the same time, so as to give clearance to the stock. The spacing of the wrists and the amount of throw given up to clearance may not follow the diagram,
 85 but will be based, at all events, on the principle which it shows. If desired, however, the shaft with the described arrangement of eccentric wrists may be replaced by other means for effecting the same operation of the punches;
 90 but preferably the shaft will be employed, as it affords, perhaps, the simplest mode of attaining the desired results.

I would have it understood that I do not limit myself to the exact construction and arrangement of parts shown and described, but hold myself at liberty to make such changes and alterations as fairly fall within the spirit and scope of my invention.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a punching-machine, the combination, with a shaft having eccentric wrists respectively arranged in advance of each other, of a series of vertically-reciprocable heads, cases secured to the frame of the machine and forming bearings for the heads to play in, flexible connections between the said shaft and heads, horizontally-adjustable punch-
 105 blocks attached to the said heads, one or more punches carried by each of the said blocks, horizontally-adjustable strippers located below the punches, and adjustable dies located below the strippers, substantially as set forth.

2. In a punching-machine, the combination, with a shaft having eccentric wrists respectively arranged in advance of each other, of a series of vertically-reciprocable heads having their lower ends longitudinally grooved, cases secured to the frame of the machine and forming bearings for the said heads to play in, connections between the said heads and the shaft, horizontally-adjustable punch-
 115 blocks having dovetails entered into the grooves in the heads, one or more punches carried by each block, strippers located below the punches, and adjustable dies located below the strippers, substantially as set forth.

3. In a punching-machine, the combination, with the bed thereof, which is provided with elongated slots, of a cup-shaped die-holder mounted upon the said bed over a slot therein, a bolt having a longitudinal clearance-

bore passing through the cup and slot and
projecting below the bed and having its head
engaged with the cup which it holds in place
and its threaded lower end provided with a
5 nut impinging against the lower face of the
bed, and a die located in the cup and secured
therein, substantially as set forth.

In testimony whereof I have signed this
specification in the presence of two subscrib-
ing witnesses.

MARTIN V. B. HILL.

Witnesses:

FREDERICK L. ELLIS,
CHAS. B. SHUMWAY.