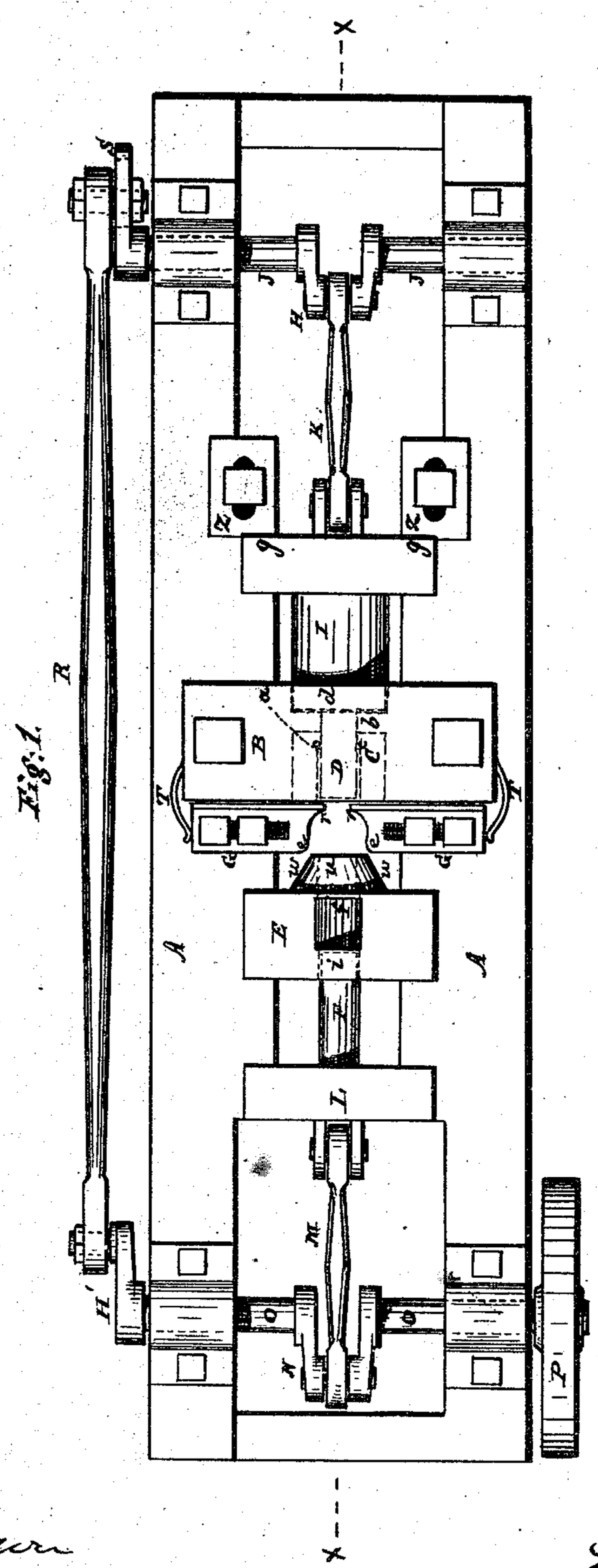
3 Sheets--Sheet 1.

S. W. WOOD.

Machines for Heading Metallic Cartridge Shells.

No. 158,614. Patented Jan. 12, 1875.



Attest:
J. S. Brown
E. M. Gallaher.

Inventor:-
Stephen W. Wood

3 Sheets--Sheet 2.

S. W. WOOD.

Machines for Heading Metallic Cartridge Shells.

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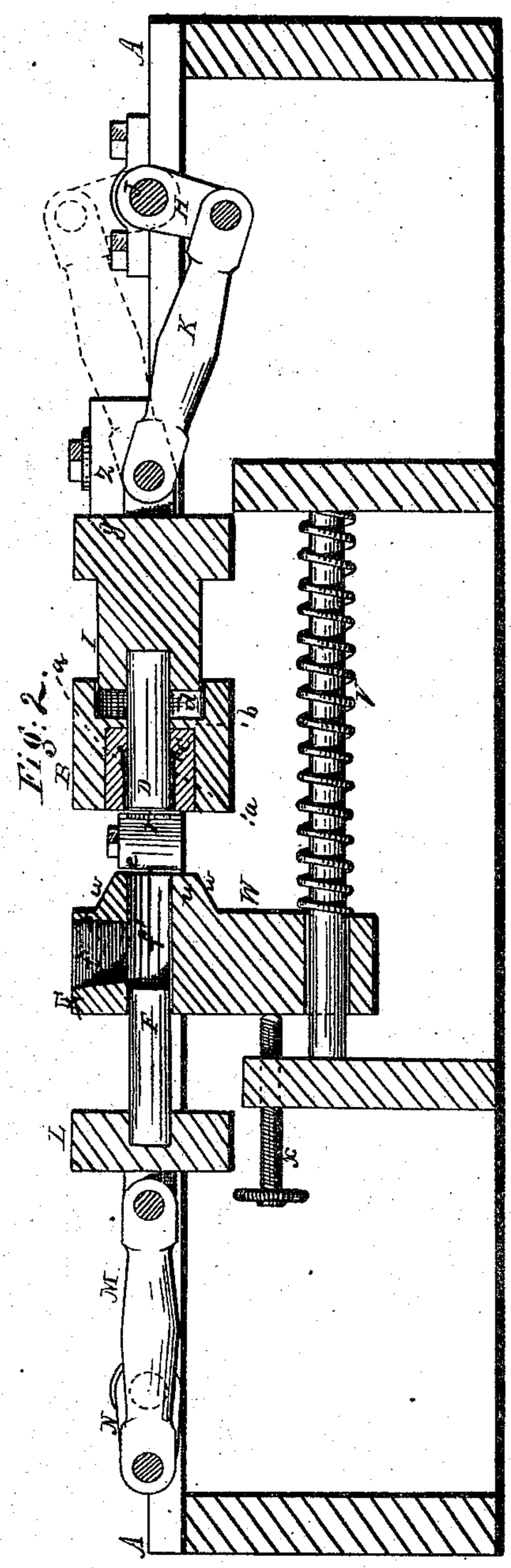

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Stephen W Wood

3 Sheets--Sheet 3.

S. W. WOOD.

Machines for Heading Metallic Cartridge Shells.

No. 158,614. Patented Jan. 12, 1875.

Fig: 3.

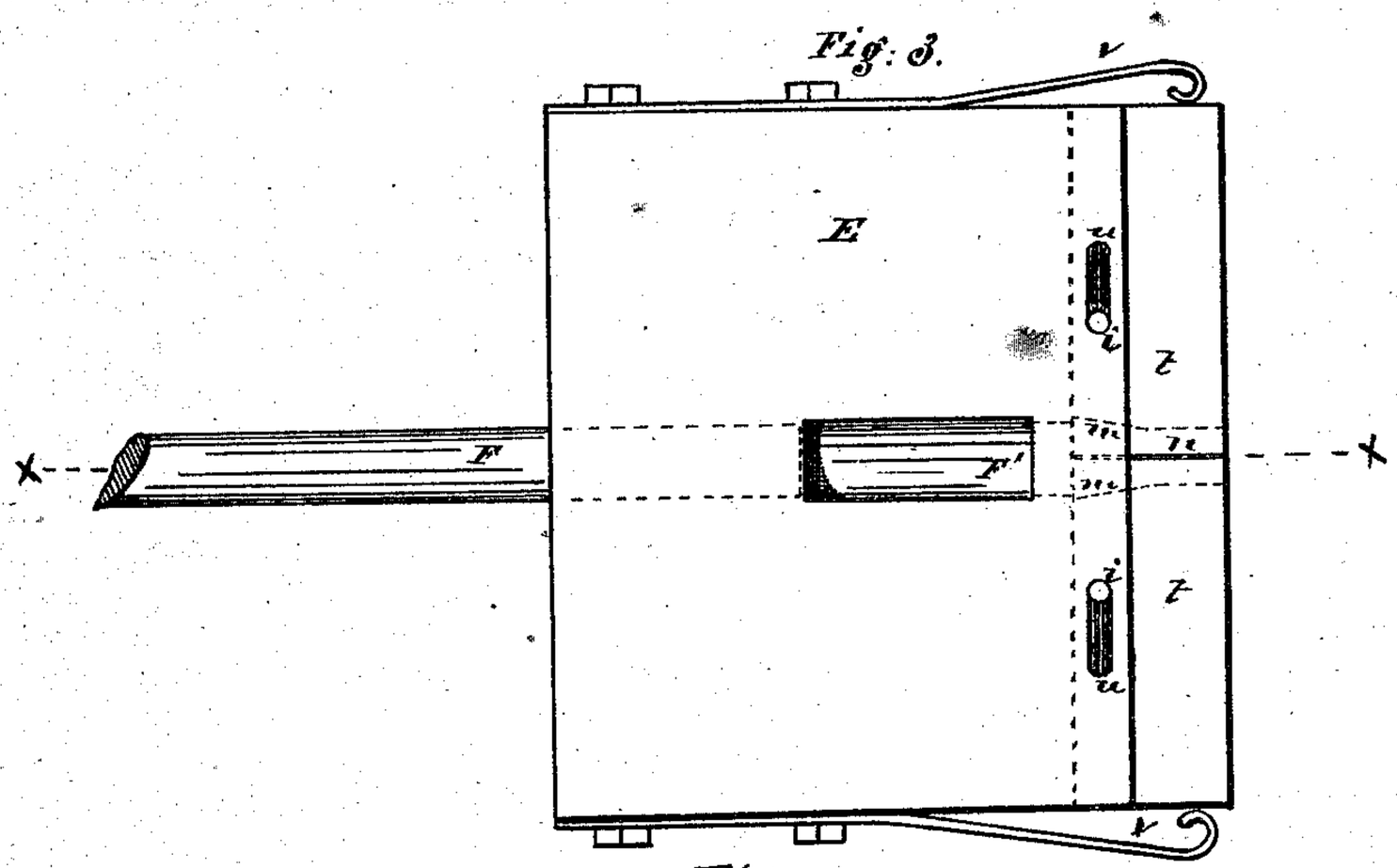


Fig: 4.

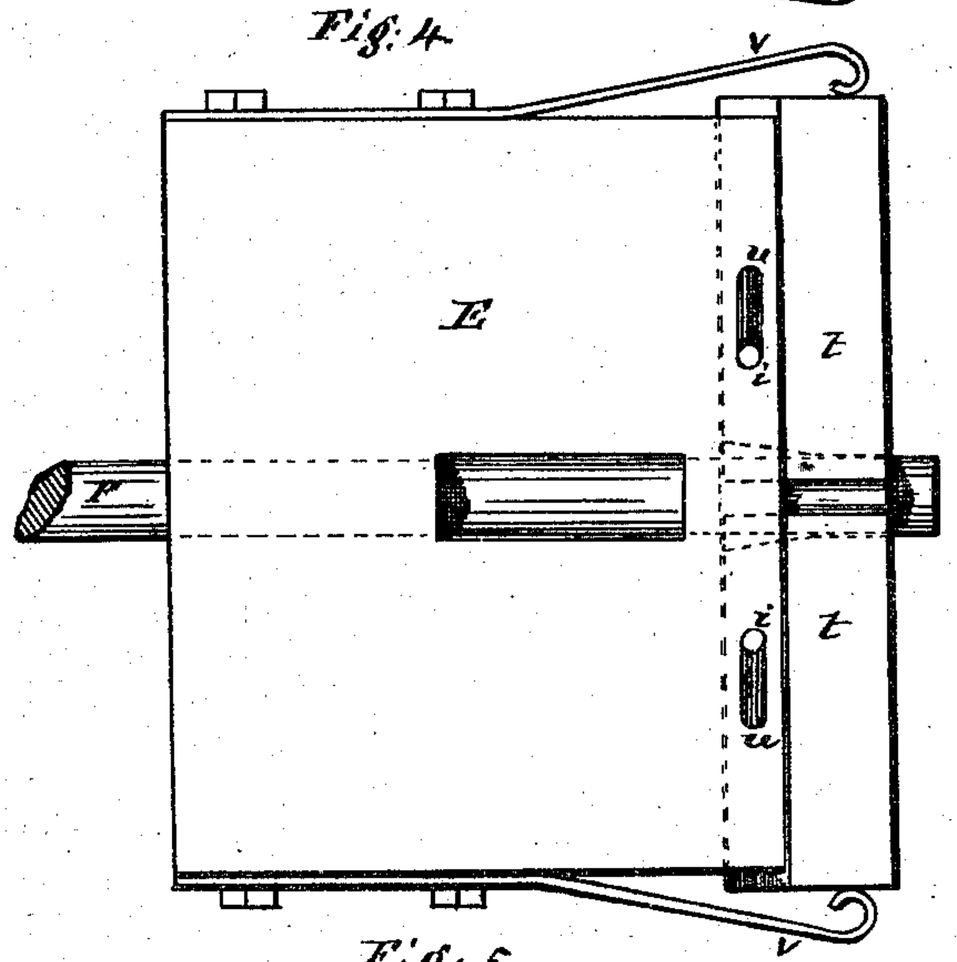
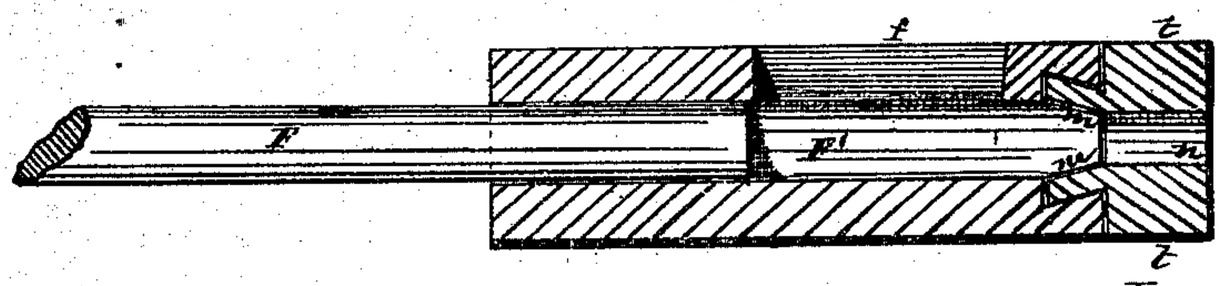


Fig: 5.



Attest:~
C. M. Gallaher.
Jas. S. Brown.

Inventor:~
Stephen W Wood

UNITED STATES PATENT OFFICE.

STEPHEN W. WOOD, OF CORNWALL, NEW YORK.

IMPROVEMENT IN MACHINES FOR HEADING METALLIC CARTRIDGE-SHELLS.

Specification forming part of Letters Patent No. **158,614**, dated January 12, 1875; application filed June 1, 1874.

To all whom it may concern:

Be it known that I, STEPHEN W. WOOD, of Cornwall, county of Orange and State of New York, have invented Improvements in Machinery for Heading Metallic Shells for Cartridges and other purposes, of which the following is a specification:

My said invention relates to improvements in machinery for heading metallic shells for cartridges and other purposes; and consists in introducing them one by one, by hand, or some suitable mechanism, through an aperture into a receiving and guiding tube, through and from which they are pushed and transferred, one by one, into a die by a reciprocating plunger, termed the transferrer and header, the shell as it is being transferred being received on the forward end of a reciprocating mandrel, which moves back into the die with the shell to be headed, the face of this mandrel, in connection with the outer face of the die, constituting the surface against which the shells are headed; and my said invention also consists in combining with the above mechanism other suitable mechanism for imparting to the mandrel two reciprocating movements toward and from the transferrer—first forward to receive the shell to be headed, and back to move with the shell into the die, and the second, after the shell has been headed, to carry the shell out of the die, and back to get out of and discharge the headed shell.

In the accompanying drawings, A represents a suitable frame, and B a die-box, firmly securely to the frame, and containing a die, C, the bore of which is of a diameter suitable to receive snugly the shell to be headed. The bore of this die, from its outer face, against which the heading is to be effected, inward to the shoulder *c c*, must be equal to the length of the shell, less the portion of the length required to be upset to form the head. Back of the shoulder *c c* the bore of the die is of the diameter of a cylindrical rod, termed the mandrel, D, which slides therein, and which is thereby guided in its forward and back movements, the diameter of this mandrel being such as to fit the bore of the shells to be headed. The die is made separate from the die-box for the convenience of substituting dies of different sizes. The shells to be headed are supplied one by one by hand, or by any self-feeding mechanism, through an aperture in the upper side of the receiver E, where, by gravity, they fall into the guiding-tube *f*. The shells must be introduced with the end not to be headed toward the mandrel D. The bore *f'* in the receiver E is in line with the mandrel D, and is fitted with a cylindrical transferring and heading tool, F, which is attached to a sliding cross-head, L, working in suitable ways attached to the frame A. The cross-head L, with the transferring and heading tool F, receives a rectilinear reciprocating motion from a driving-shaft, O, by a connecting-rod, M, and crank N. The purpose of this reciprocating motion is to cause the tool F to push the shell through the receiving-tube *f'* onto the mandrel D, and to follow the mandrel in its back movement until the shell is forced into the die with its forward end in contact with the shoulder *c c* of the die C, and then to head the shell against the face of the die and mandrel by upsetting; and, after having performed these duties, the transferrer and header is drawn back to its original position, that another shell may be fed in front of it for a repetition of the operation.

The mandrel D is required to make two forward and back movements to one of the transferrer and header; one forward—that is, toward the receiver E—to receive a shell as the transferrer and header is pushing the shell through and out of the guiding-tube *f'*, and then back with the shell as it is being forced into the die; and the second forward to carry the headed shell out of the die, and back to draw itself out of the headed shell and discharge it.

This double reciprocating motion of the mandrel to one of the transferrer and header I prefer to impart by combining, with the rotating crank-shaft O, which, as before stated, imparts the one reciprocating motion forward and back to the heading-tool, a rock-shaft, J, which receives two rocking motions from one rotation of the shaft O by a connecting-rod, R, extending from a short crank, H', on the shaft O, to a longer crank, S, on the rock-shaft J, the said rock-shaft imparting the said motions to a slide, I, which carries the mandrel D, by a crank, H, and connecting-rod K.

During the first half-revolution of the crank N the crank H on the shaft J is vibrated from the position represented by full lines to the position represented by dotted lines in Fig. 2, to give the first forward movement to the mandrel to receive a shell, and then back to retire with the shell into the die, and by the other half-revolution of the crank N the crank H is carried back to its original position to impart to the mandrel the second forward and back motions for the discharge of the headed shell; and, although I prefer the mechanism above described for imparting the two forward and back movements to the mandrel during the imparting of one forward and back movement to the transferrer and header, I do not wish to be understood as limiting my claim of invention to the use thereof, as the said motions can be imparted by equivalent mechanism, such, for instance, as cams.

To adjust the motions to the different lengths of shells, the throws of the several cranks can increased or diminished by making the crank-pins adjustable.

At the time the shell is headed it is important that the mandrel should not yield to the force of the heading-tool, and to insure this the cross-head *g g* of the slide I, which carries the mandrel D at the end of the back movement comes into contact with two stops, *z z*, firmly secured to the frame A. This, however, is only a preferred mode of construction.

To insure the discharge of the headed shells from the mandrel on its second back movement, there are two sliding spring-checks, G G, mounted in front of the die C, and fitted to slide in opposite directions toward each other by two springs, T T. The lips *r r* of these sliding spring-checks are made sufficiently thin to spring inward, back of the rear edge of the shell, as the mandrel completes its second forward movement to push the shell out of the die, so that when the mandrel moves back they hold the shell and strip it from the mandrel, and permit it to fall out of the way.

In the mode of application above described the forward tubular end *u* of the receiver guides the shell to be headed until its forward end gets onto the mandrel; and hence the diameter of the transferrer and header, which has to move in this tubular guide, can be of no greater diameter than the shell to be headed, and as it is desirable that the header should be of the full diameter of the head of the shell when formed, the heading-surface of the header is enlarged by the front face of the receiver. To effect this, it is necessary that the front face of the receiver and header should be flush at the time of forming the head on the shell. The receiver E is adapted to slide in ways on the frame A, and during the forward motion of the header the front face of the cross-head L of the header comes into contact with the rear face of the receiver, and so soon as the front faces of the header and receiver become flush, the two move together for the heading operation; and as the header is drawn back to its original position, the receiver is pushed back by the tension of the spring V until it comes into contact with a stop, *x*, which is threaded for the purpose of adjustment to shells of different lengths. To admit of the shells passing over the edges *r r* of the strippers G G and to enter the die to be headed, and of the front face of the receiver acting as a part of the heading-surface of the header, these spring-checks G G must be pushed back, which is effected by the beveled faces *w w* of the receiver coming into contact with the shoulders *e e* of the spring-checks.

I do not wish to be understood as limiting myself to the use of the specific mode of guiding the shells onto the mandrel or into the die, and of getting the full size of heading-surface of the heading-tool, as other and equivalent modes may be substituted, of which the following is an example, reference being had to Sheet 3 of the accompanying drawings, in which—

Fig. 3 is a plan of the receiver with the guiding-jaws closed; Fig. 4, a like view with the guiding-jaws opened; and Fig. 5 is a vertical section taken at the line *x x* of Fig. 3.

In these figures, the receiver E is assumed to be stationary on the frame, the transferrer and header F is of the required diameter, sufficient for heading the largest size of shells, and the bore F′ of the receiver of corresponding size. To the front face of this receiver are fitted two slides, *t t*, by dovetail-joints, both being provided with springs *r r*, the tension of which tends to force them toward each other, and being of sufficient strength to resist any tendency to be moved back by a shell when being transferred. The inner ends of these slides are so formed that when in contact they present a hole concentric with the bore of the receiving-tube and directly in line with the heading-die C, which, from the outer face inward for a distance of about two-thirds of the way, is cylindrical, as at *n*, and then for the rest of the distance, as at *m m*, conical, enlarging to the diameter of the bore of the receiving-tube F′.

The shells, of any diameter from the bore of the receiving-tube F′ down to that of the hole *n*, being supplied to the receiving-tube, and pushed forward by the transferrer, will be guided onto the mandrel by the part *n* of the two slides. If the shell be of greater diameter than the hole *n*, the two slides *t t* are adjusted to the required distance apart, to admit and guide the shell by means of two adjustable bolts, *i i*, which pass through slots *u u* in the receiver E. Thus the two slides will be set apart, so that the shell may pass through the same as though it were of no larger diameter than the hole *n;* and in every instance they will be spread apart after the shell is forced upon the mandrel, or centered into the die by the header acting against the said conical part in its movement forward to head the shell.

Having thus pointed out the character and

mode of operation of my said invention, and described the preferred method of construction, and indicated some of the modification in the manner of construction which may be substituted, I will now specify what I claim as my invention, and desire to secure by Letters Patent.

I claim—

1. In combination with the die and mandrel, the receiver, with its aperture for receiving the shells to be headed one by one, and channel-way for guiding each shell when being transferred, and the reciprocating tool for moving the shell through the channel-way of the receiver and transferring it into the die, substantially as and for the purpose herein described.

2. The combination, as herein described, of the following devices, viz., the receiver for receiving and guiding the shells, the transferring and heading tool, the mandrel and the die, or their equivalents, having a mode of operation substantially such as described.

3. In combination with the receiver, the transferring and heading tool, mandrel and die, substantially as described, the mechanism for imparting to the mandrel two reciprocating motions toward and from the transferring and heading tool to one reciprocating motion of the transferring and heading tool toward and from the mandrel.

STEPHEN W. WOOD.

Witnesses:

J. S. BROWN,

E. M. GALLAHER.