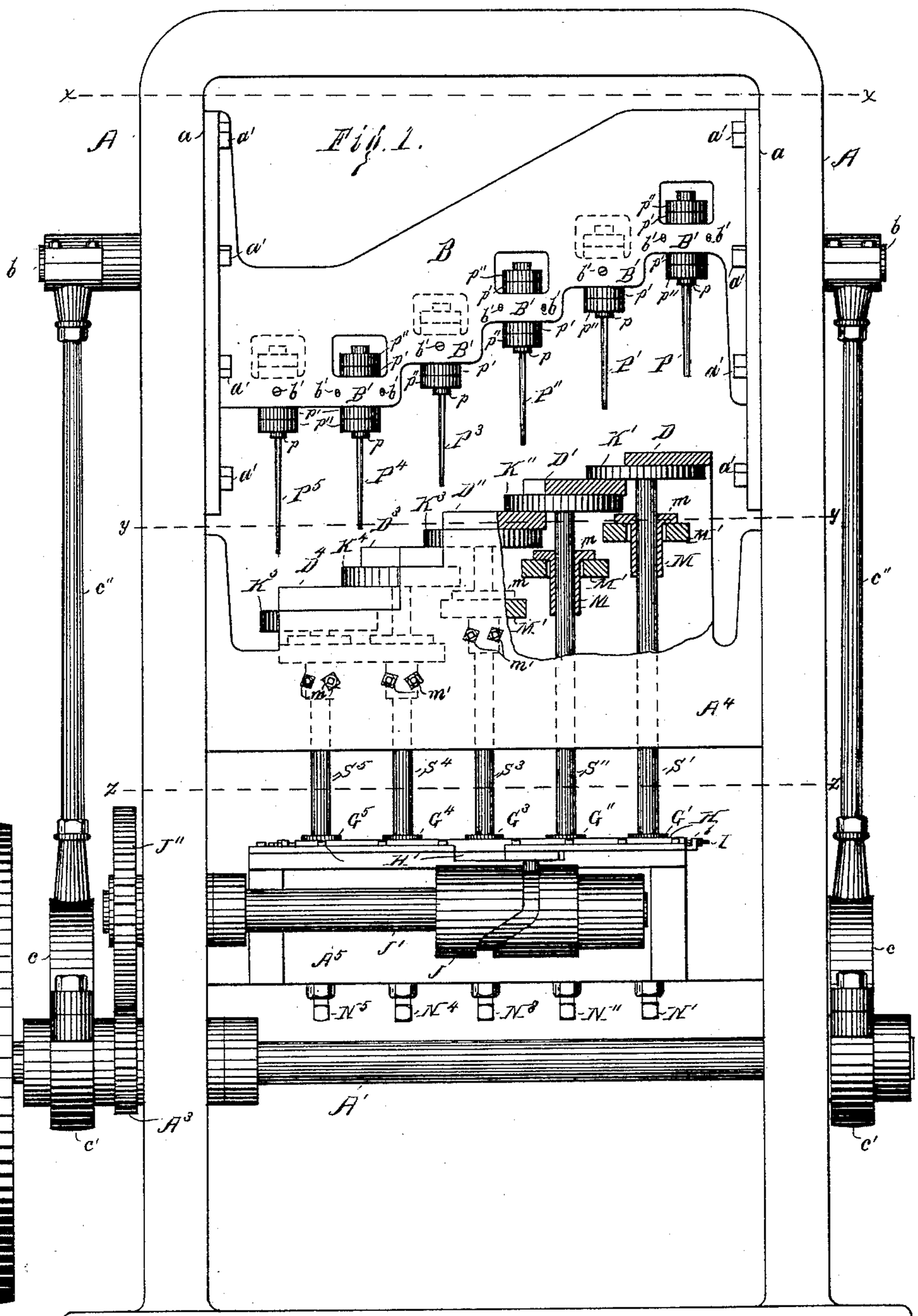
(No Model.) 2 Sheets—Sheet 1.

R. WHITE.

MACHINE FOR DRAWING CARTRIDGE SHELLS.

No. 353,190. Patented Nov. 23, 1886.



Witnesses—
Kirkley Ayer.
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Inventor—
Rollin White
By His Attorneys
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(No Model.) 2 Sheets—Sheet 2.

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Fig. 2.

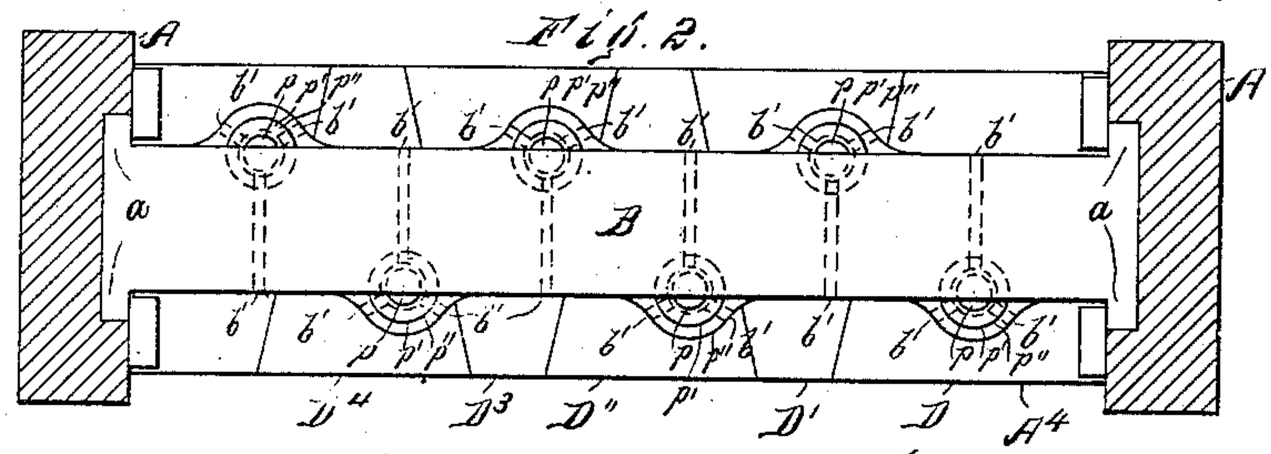


Fig. 3.

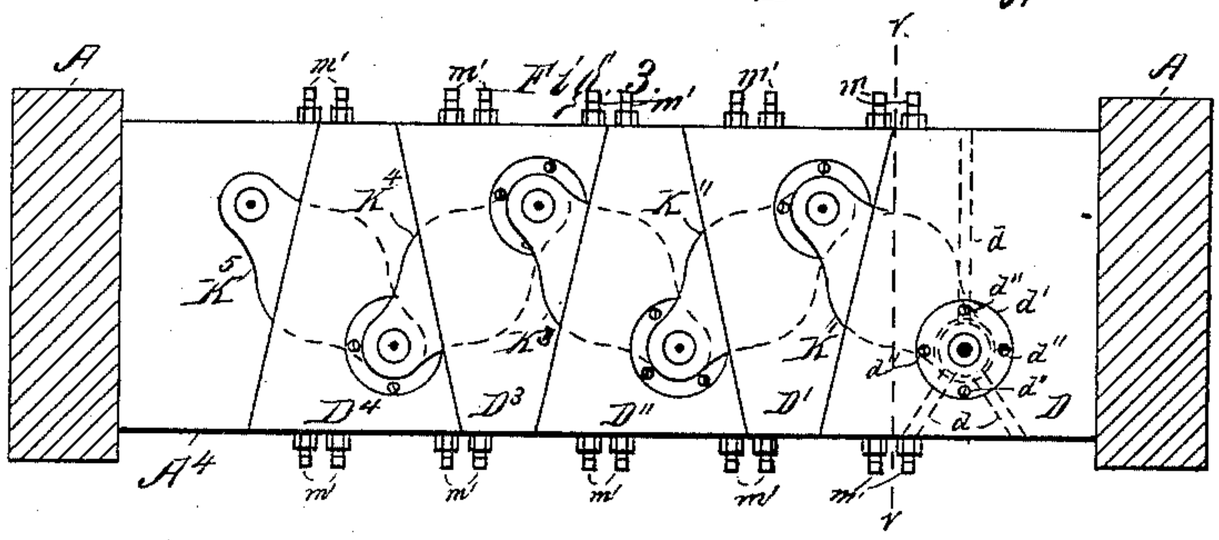


Fig. 4.

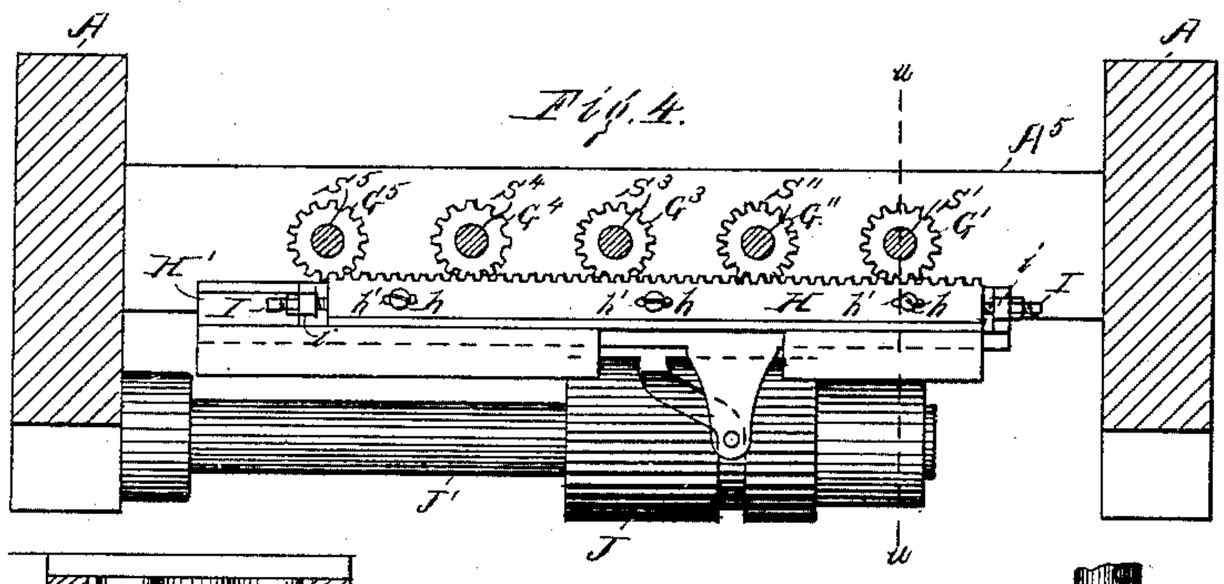


Fig. 6.

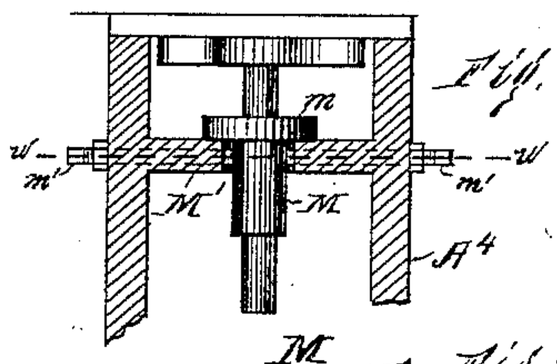


Fig. 7.

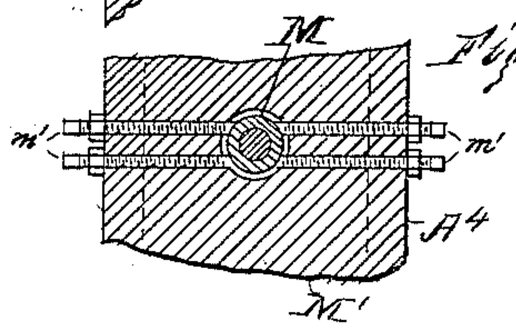
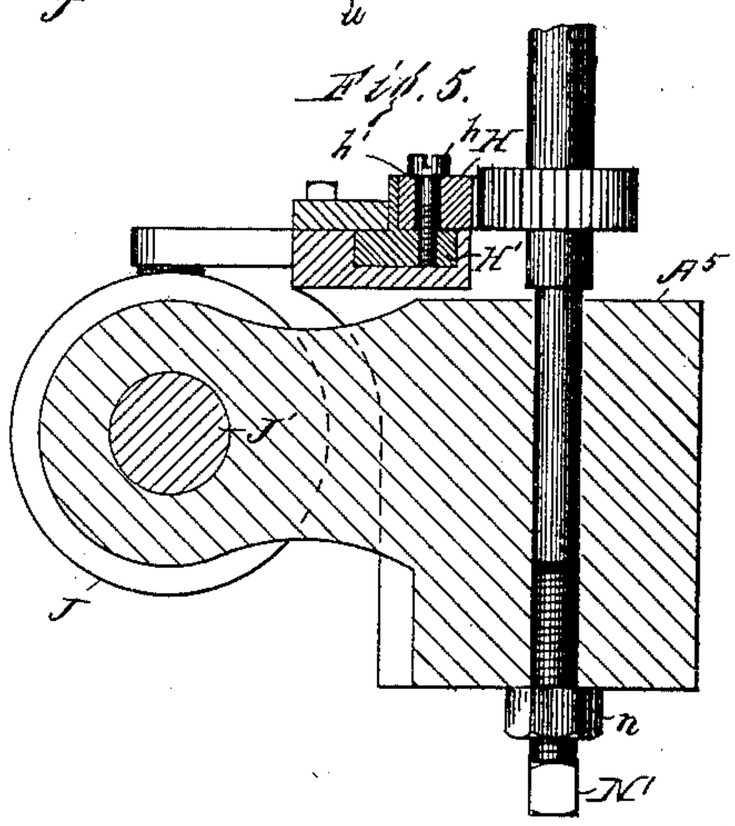


Fig. 5.



Witnesses—
Kirkley Hyer.
Gertrude M. Day.

Inventor—
Rollin White.
By His Attorneys,
A. M. Moore and H. R. White.

UNITED STATES PATENT OFFICE.

ROLLIN WHITE, OF LOWELL, MASSACHUSETTS.

MACHINE FOR DRAWING CARTRIDGE-SHELLS.

SPECIFICATION forming part of Letters Patent No. 353,190, dated November 23, 1886.

Application filed May 17, 1886. Serial No. 202,469. (No model.)

To all whom it may concern:

Be it known that I, ROLLIN WHITE, a citizen of the United States, residing at Lowell, in the county of Middlesex and Commonwealth of Massachusetts, have invented a new and useful Improvement in Machines for Drawing Cartridge-Shells and Similar Articles Drawn from Metal, of which the following is a specification.

My invention relates to an improved construction and arrangement of the drawing-dies and their corresponding punches, whereby they can be more easily adjusted.

In machines for drawing cartridge-blanks and similar articles drawn from metal, where the partially-drawn blanks are conveyed from die to die by automatically-moving carriers, much difficulty is experienced in bringing the line of the axes of the contiguous dies in either a stationary die or in another carrier in exactly the required line one with the other, and if any change is necessary in any two dies all the other dies or carriers on one or both sides of the one first altered must be changed. I obviate this defect by arranging the dies and their corresponding punches in a zigzag line, whereby any carrier, with its dies, can be brought into the required line with the next die without changing the position of more than two carriers, and frequently requiring the change of but one.

In the accompanying drawings, Figure 1 is a side elevation of my improved machine; Fig. 2, a top view of head, the stationary die-plates, and side pieces or uprights on the line *x x* in Fig. 1, the uprights being in cross-section; Fig. 3, a top view on the line *y y* in Fig. 1, showing the carriers and stationary die-plates, the uprights only being in cross-section; Fig. 4, a top view on the line *z z* in Fig. 1, showing the manner of operating the shafts; Fig. 5, a section elevation on the line *u u* in Fig. 4; Fig. 6, a view on the line *v v* in Fig. 3, showing the upper end of the carrier-spindle, the upper journal-box, carrier, stationary die-plate, and the die-rail, the die being in cross-section; Fig. 7, a top view on the line *w w* in Fig. 6.

In the accompanying drawings, the letter A refers to the frame of a machine, which consists of two uprights connected at the top by a cross-girt and at the bottom by the base. The main shaft A′ is provided with suitable bearings in the frame, and is rotated by the driving-pulley A^2. The required number of punches P P′ P^2 P^3 P^4 P^5 are secured in the head, which slides in vertical ways *a a a a*, secured to the inner side of the uprights by screws *a′ a′ a′ a′*. A reciprocating motion is given to the head B by means of the eccentrics *c c*, secured to the main shaft A′ through the eccentric-straps *c′ c′*, eccentric-rods c^2 c^2, and the wrist-pins *b b*.

In operating the machine the first operation is to feed, either by hand or by any well-known feeding device, cupped disks of metal or "cups" between the first punch, P, and the die D. The descent of the head B, carrying with it the punches, causes the first punch, P, to force the disk down through the die D and into the carrier K′. The die D has a downwardly slightly decreasing taper, so that as the disk is forced downward it is reduced in diameter and elongated.

The carrier K′ is mounted on a vertical shaft, S′, and after the punch P is withdrawn by the upward motion of the head the carrier is caused to make about half a revolution by means of the movement of the rack H, which takes into a gear or mutilated gear, G′, secured to the shaft S′. (See Figs. 4 and 5.)

The rack H is adjustably secured to the bar H′ by vertical screws *h*, which pass through longitudinal slots *h′* and into screw-threaded holes in the bar H′, so that when the screws are turned down their heads will bear upon the upper surface of said rack and hold it in place on the bar. When the holding-screws are loosened the rack may be adjusted longitudinally by means of the longitudinal screws I I, which turn in screw-threaded holes in the ears *i i* at the ends of the bar H′ and thrust against the ends of the rack. The bar H′, having the rack H secured thereto, as described, has a reciprocating longitudinal motion imparted to it by the cam J, which is secured to the cam-shaft J′. The cam-shaft J′ is provided with a gear, J^2, which engages with a pinion, A^3, on the main shaft A′. The arrangement of the gears J^2 and the pinion A^3 is such that two revolutions of the main shaft are required to make one full revolution of the cam, and the

form of the groove of the cam is such that the bar H′ moves forward as the head B descends, remaining at rest while the punches are in the dies and returning as the head again descends.

The carrier may be of any preferred form and contain any number of dies. In the drawings they are represented as of an oblong form, and containing two dies.

By the movement of the rack H the carrier K′, containing in one of its dies the cupped disk, as before described, is brought over the die-opening in the stationary die D′, and the descent of the head B causes the punch P′ to drive the cupped disk out of the carrier K′ into and through the stationary die in the die-holder D′ and into the carrier K^2. At the same time another disk is cut by the punch P and forced into the other die of the carrier K′.

The die-carrier K^2 is supported on a shaft provided with a gear, G^2, which engages with the rack H, and is operated in the same manner as the carrier K′, already described, the only difference in the two carriers being that the dies in the carrier K^2 are somewhat smaller than the dies in the carrier K′, so that the cupped disk is reduced in its diameter and elongated.

The cupped disk, which after passing the stationary die-plate D′ becomes a "blank," is driven in the manner above described through the stationary dies and carriers, being reduced in diameter and elongated as it passes through each die until it has been reduced to the required size, and is discharged from the last carrier or stationary die into any convenient receptacle.

By referring to Figs. 1 and 2 it will be seen that the stationary dies and the carriers are arranged in steps, one below the other, there being only about the thickness of the carrier between two stationary dies, and that the carriers are constructed with a die in each end, so that at every descent of the head B a new disk is forced into the die D, and at each descent, after all the carriers are full of blanks, a blank is driven out of one end of a carrier and another blank received in the other end and a blank discharged.

The lower ends of the shafts S′ S^2 S^3 S^4 S^5 fit into boxes in the cross-piece A^5, the bottoms of these boxes being preferably fitted with a strip of Babbitt metal, against which thrusts vertical screws N′ N^2 N^3 N^4 N^5, turning in screw-threaded holes in the cross-piece, and provided with check-nuts *n*. By means of these screws the vertical position of the carriers may be easily adjusted. The upper parts of the carrier-shafts are provided with boxes M. These boxes M are inserted in holes in the cross-girts M′, between the die-rails, the holes being somewhat larger than the body of the box, the box being prevented from dropping through by the enlarged collar *m*. Three or more screws, *m′*, (four being shown in the drawings,) turning in screw-threaded holes in the die-rail, thrust against the boxes M, for the purpose of adjusting them in a horizontal direction. The dies in the stationary die-plates are all adjustably secured therein, the adjustment being accomplished by means of three or more screws, *d d d*, turning radially to the axes of the dies in screw-threaded holes in the die-plates, and thrusting against the die.

I prefer to secure the dies in the die-plates by counterboring about the opening in the plate which receives the die, and letting in a plate, *d′*, which may be secured therein by screws *d″ d″ d″*. The dies may be secured in the die-carriers in the same manner, or they may be in one piece therewith, as shown in the drawings.

The punches P P′ P^2 P^3 P^4 P^5 are secured in externally screw-threaded sockets *p*, said sockets being provided with nuts *p′ p′* and check-nuts *p″ p″* above and below the socket-rail B′ on the head B. The holes in the socket-rail which receive the sockets are made somewhat larger than the sockets, so that the sockets may be moved about to allow the punch contained therein to be adjusted to its corresponding die. When the punch is properly adjusted, or to aid in its adjustment, three or more screws, *b′ b′ b′*, turning radially to the sockets in screw-threaded holes in the socket-rail and thrusting against the socket, may be used.

Should the dies in any of the carriers not come in the required line with the die in a stationary die-plate, the position of the stationary die may be somewhat altered by means of the three adjusting-screws *d d d*, and the position of the dies in the carrier may be made to conform to the die in the stationary plate by adjusting the position of the box M, in which the upper end of the carrier-shaft turns. Thus the axes of the contiguous dies may be made to conform one to the other. If, for example, the dies of the carrier K^3 should not exactly line with the die in the stationary die-plate D^3, a rod fitting the die-openings could be thrust through the carrier K′, through the stationary die D′, and into one of the dies of the carrier K^3, thus keeping the axes of these three dies in line. The free end of the carrier K^3 may now be moved through a segment of a circle by moving the box M, in which the upper part of the carrier-shaft S^3 turns. If this motion should not be sufficient to bring the dies contained therein into the required line, one end of the carrier K^4 may be secured, as the carrier K^3 was secured, by thrusting a rod through the die contained therein, through the die in the stationary die-plate D^4, and into the die in the carrier K^5. The free ends of the carriers K^3 and K^4 may now be moved through segments of circles, having the confined ends as centers, by changing the position of their respective boxes until the axes of their dies come in the required line one with the other. The position of the die in the stationary die-plate may now be changed, by means of the adjusting-screws *d d d*, to conform to the dies in the

carriers. When all the dies are properly adjusted, their corresponding punches may be brought into line therewith by means of the screws *b b b*.

It will be evident that were the stationary dies dispensed with and only movable die-plates or carriers used the manner of adjusting would be substantially the same.

In this construction the stationary die-plates D, D′, D″, D³, and D⁴ would be dispensed with and the thickness of the carriers preferably increased, so that there would be little or no space between the lower side of one and the upper side of the one below it.

I claim as my invention—

1. The combination and arrangement of a series of dies and a series of punches in zigzag lines, whereby any die with its corresponding punch may be adjusted independently of the other dies and punches of the series, and one or more carriers for conveying the partially-drawn blanks from die to die, substantially as shown and described.

2. The combination and arrangement of a series of dies and a series of punches in zigzag lines, whereby any die and its corresponding punch may be adjusted independently of the other dies and punches of the series, and carriers adapted to convey blanks from die to die of such series, substantially as herein shown and described.

3. The combination of a series of stationary die-plates containing dies, said dies being arranged in zigzag lines, and carriers having one or more perforations for the purpose of conveying the partially-drawn blanks from one stationary die to another, as and for the purpose specified.

4. The combination of the intermittently-moving carrier, its shaft, and the journal-box adjustable laterally, substantially as shown and described.

5. In an automatic machine for drawing blanks, two or more carriers provided with shafts, said shafts turning in boxes having a lateral adjustment, in combination with a series of dies and a series of punches arranged in zigzag lines, as and for the purpose specified.

6. The combination of a series of punches and a series of dies, one or more carriers supported on shafts provided with gears, a rack engaging with said gears secured to a bar having a reciprocating motion, and said bar, said rack being so secured to said bar that it may be moved to adjust it to the required motion of the carriers, substantially as described.

7. The combination of a series of punches and a series of dies, the carriers supported on carrier-shafts, said shafts provided with gears, and a rack adapted to engage with said gears and having an intermittent vibratory motion imparted to it, whereby the carriers are oscillated to and fro, substantially as shown and described.

8. The combination of a series of punches and a series of dies arranged in zigzag lines, carriers adapted to convey the partially-drawn blanks from die to die, said carriers being supported on carrier-shafts having an intermittent oscillating motion communicated to them through an intermittently-moving rack which engages with gears secured to said shafts, the rack, the carrier-shafts and their gears, and a cam adapted to move said rack only when the punches are raised out of the dies, substantially as shown and described.

ROLLIN WHITE.

Witnesses:
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HERBERT R. WHITE.