

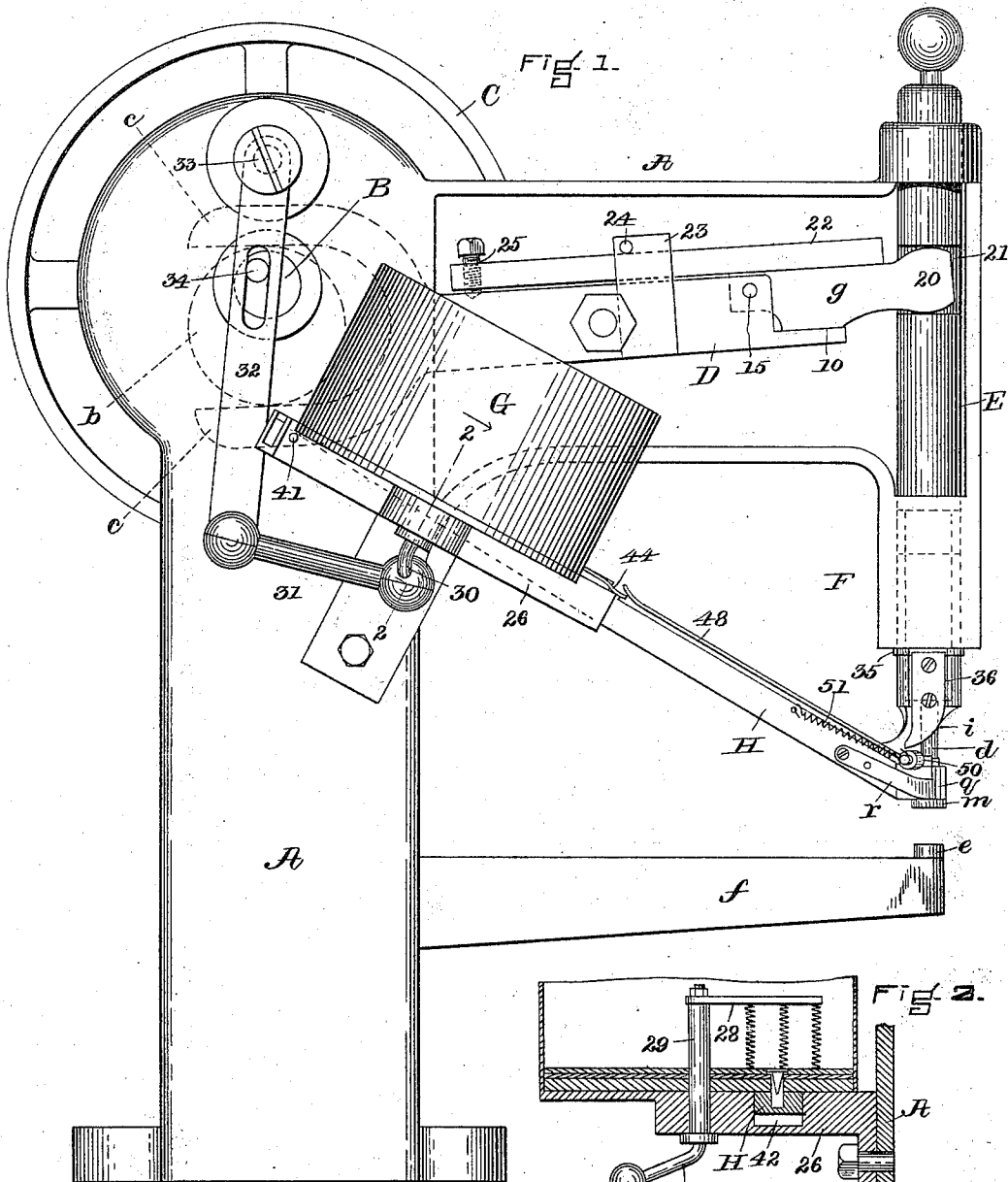
(No Model.)

3 Sheets—Sheet 1.

H. S. CROMBIE.
RIVET SETTING MACHINE.

No. 577,615.

Patented Feb. 23, 1897.



WITNESSES.

A. D. Brown.
Charles H. Jones

INVENTOR.

Herbert S. Crombie
by J. B. Eschmacker
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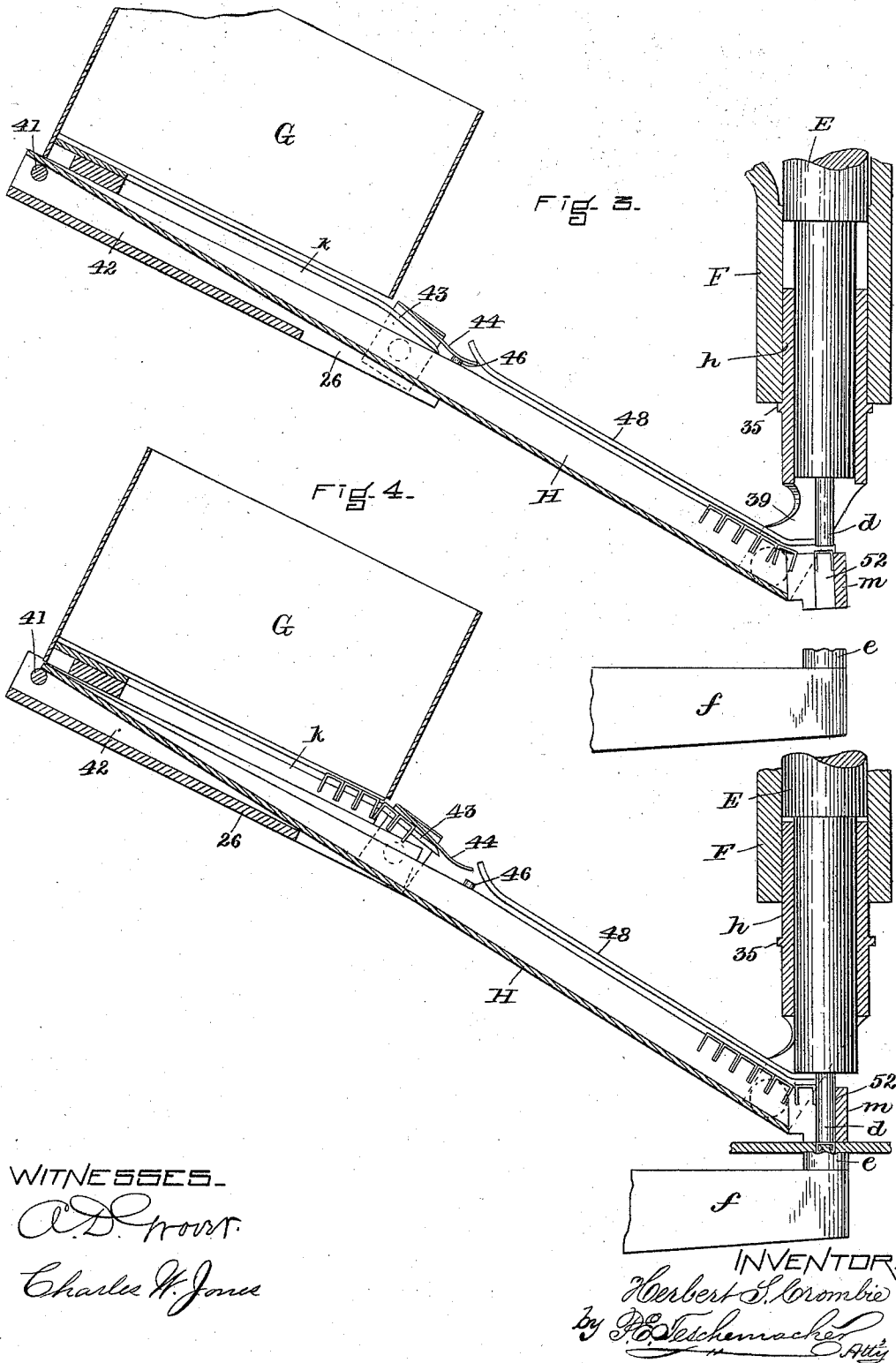
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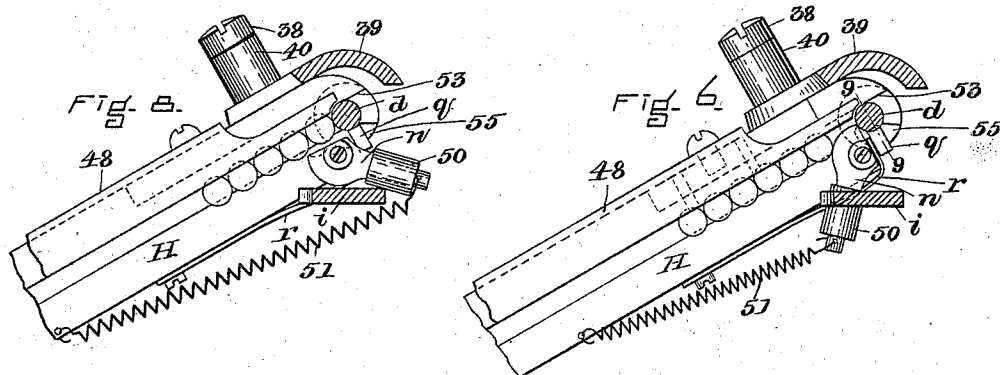
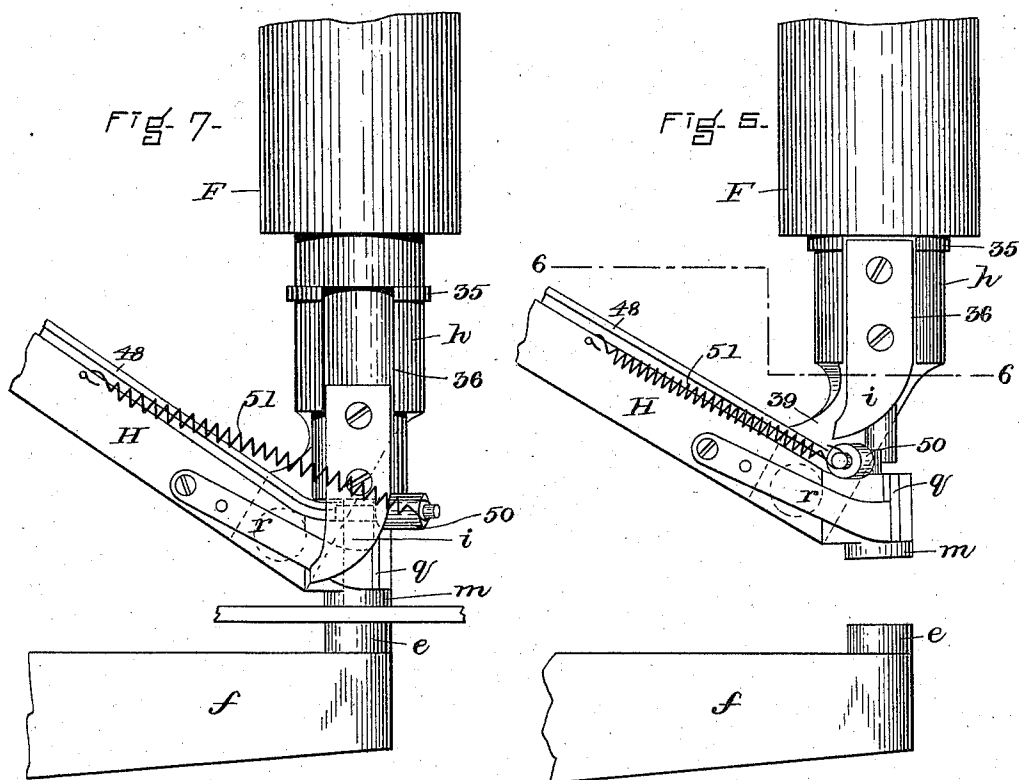
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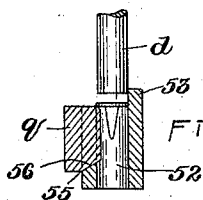
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UNITED STATES PATENT OFFICE.

HERBERT S. CROMBIE, OF WALTHAM, MASSACHUSETTS.

RIVET-SETTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 577,615, dated February 23, 1897.

Application filed May 29, 1896. Serial No. 593,866. (No model.)

To all whom it may concern:

Be it known that I, HERBERT S. CROMBIE, a citizen of the United States, residing at Waltham, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Rivet-Setting Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making
10 part of this specification, in which—

Figure 1 is a side elevation of my improved rivet-setting machine. Fig. 2 is a sectional detail on the line 2 2 of Fig. 1. Fig. 3 is a vertical section taken through the center of the hopper and raceway and the lower portion of the plunger-bar and punch and parts connected therewith. Fig. 4 is a similar section showing the parts in a different position. Fig. 5 is an enlarged side elevation of the
15 lower portion of the raceway and parts adjacent thereto. Fig. 6 is a horizontal section on the line 6 6 of Fig. 5. Fig. 7 is an elevation similar to that shown in Fig. 5, with the parts in a different position. Fig. 8 is a section similar to that shown in Fig. 6, with the parts in the position which they occupy in Fig. 7. Fig. 9 is a vertical section on the line
20 9 9 of Fig. 6.

My invention relates particularly to that
30 class of rivet-setting machines in which headed rivets provided with legs are forced through and the legs turned back or clenched upon the under side of the material to be riveted. To simplify and improve the construction of machines of this character and
35 render them stronger, more durable, and effective, and less liable to derangement than heretofore is the object of my invention, which consists in certain novel features and combinations of parts, as hereinafter fully
40 described, and specifically pointed out in the claims.

In the said drawings, A represents the framework of the machine, in suitable bearings in which runs the driving-shaft B, carrying the driving-pulley C and an eccentric
45 *b*, which operates upon the forks *c* of the rocker-arm D, which is connected with the plunger-bar E, which reciprocates in the head F and carries the punch or upper riveting-
50 die *d*, which coöperates with the lower sta-

tionary die *e*, removably secured to the outer end of an arm *f*, projecting from the frame A. The rocker-arm D is connected to the plunger-bar E by means of a short piece or
55 bar *g*, one end of which is pivoted to the arm D at 15, the opposite rounded end 20 fitting within a notch or recess 21 in the side of the plunger-bar. The bar *g* rests on a shoulder or projection 10 at the outer end of the
60 arm D, whereby the upward movement of the latter is positively communicated to the plunger-bar, and said bar *g* is normally held down on the rocker-arm in the position shown in Fig. 1 by a spring bar or lever 22, which
65 passes between a pair of ears 23, projecting up from the arm D, and beneath a fulcrum-pin 24, passing through said ears, the inner end of the spring-bar being provided with a set-screw 25, whereby the degree of pressure
70 of said bar upon the piece *g* may be varied as desired, and by this construction a simple and effective yielding connection is provided, whereby the plunger-bar and punch in their
75 descent are enabled to accommodate themselves to the varying thicknesses of the material to be riveted.

The hopper G for containing the rivets is secured to an inclined support 26, bolted to the frame A, and within this hopper is placed
80 a stirrer-arm 28, Fig. 2, having a series of brushes composed, preferably, of spring-wire, as shown, which act on the rivets and cause them to pass to the point from which they escape into the raceway, said arm 28 being
85 secured to an oscillating shaft 29, carrying at its lower end a crank-arm 30, Figs. 1 and 2, connected by a rod 31, provided with universal joints, to a lever 32, fulcrumed at 33 and vibrated by means of a crank-pin 34, projecting from the end of the driving-shaft B
90 and working within a slot in the said lever.

h is a sleeve which encircles and slides upon the lower portion of the plunger-bar E and also slides freely within the head F, said
95 sleeve having a flange or collar 35, which on the ascent of the plunger-bar is brought into contact with the bottom of the head, as shown in Figs. 1 and 3. To the lower end of the plunger-bar is secured a cam-plate *i*, to
100 be hereinafter referred to, which projects through an open slot 36 in the side of the

sleeve *h* and serves by contact with the top of the slot 36 to raise the said sleeve *h* as the plunger-bar ascends.

H is the raceway, the lower end of which is pivoted by means of a screw 38 to a projection 39, extending down from and forming a portion of the sleeve *h*, said projection 39 having a hub 40, Figs. 6 and 8, through which passes the screw 38. The upper end of the raceway is supported by and slides upon a transverse pin 41, extending across a groove 42 in the support 26, within which the raceway is fitted, as shown in Figs. 3 and 4, and thus as the plunger-bar *E* is reciprocated by the means described the raceway is moved up and down and at the same time slid backward and forward on its supporting-pin 41 for a purpose to be hereinafter described.

At the bottom of the hopper *G* and in line with the raceway is a narrow slot *k* for the reception of the legs or shanks of the rivets, which slide down through said slot to the lower edge of the hopper and thence out between a pair of guide-plates 43, where their further progress is interrupted by a spring-stop 44, which extends over the heads of the rivets and is secured to the support 26, said stop, when the raceway is carried down by the plunger-bar, as shown in Fig. 4, holding back the rivets and preventing them from passing into the raceway until the latter is raised into a position to receive them, as shown in Fig. 3, the upward-and-backward movement of the raceway bringing a pin or projection 46 thereon into contact with the lower end of the stop 44 and thereby raising it into the position shown in Fig. 3, when the rivets will be free to slide down into the raceway, the spring-stop 44 acting as a cover at this point to prevent the rivets from being tipped up or thrown out of their proper position.

The raceway is provided with a covering-plate 48, which is fastened thereto in such a manner as to leave a space for the free passage of the heads of the rivets as they slide down the raceway to the end or nose-piece *m*, which forms a presser-foot which is brought down upon the material to be riveted on the descent of the plunger-bar, the latter, with the punch, yielding, as before described, to accommodate material of varying thicknesses.

I will now describe the escapement by which the rivets in the raceway are delivered one by one into a position beneath the punch or riveting-die *d*.

n is an escapement-finger pivoted to the nose-piece or end of the raceway, as shown in Figs. 6 and 8, and carrying at its outer end an antifriction-roll 50, which is acted upon to swing the finger by the curved or cam-shaped side of the plate *i*, secured to the plunger-bar *E*. The finger *n* is normally held by a spring 51 in the position shown in Figs. 5 and 6, with its curved back against the lower rivet in the raceway, thereby holding back

the entire line of rivets therein. As the plunger-bar and punch descend the raceway falls by its own weight onto the material to be riveted, carrying with it the sleeve *h*; and as the punch passes down through the vertical passage or opening 52 in the nose-piece to drive down a rivet the cam-plate *i*, acting on the roll 50, swings the finger *n* against the resistance of the spring 51 into the position shown in Fig. 8, when the rivets will slide down until the lower or foremost one is stopped by contact with the punch, where it remains until the punch is raised clear of the nose-piece.

As the plunger-bar ascends to withdraw the punch from the nose-piece the cam-plate passes out of contact with the roll 50, when the escapement-finger *n* will be swung around by its spring 51, causing its straight side, which is provided with a recess, (shown dotted,) to strike the lower rivet and carry it forward over the opening 52 in the nose-piece and directly beneath the riveting-punch *d*, the front wall of the opening 52 forming a stop for the rivet. A portion of the nose-piece at the end of the raceway is elevated on one side of the opening 52, as shown at 53, Figs. 6, 8, and 9, forming a guide for the rivet as it is moved forward by the escapement-finger *n*, thereby insuring its being brought directly over said opening 52 in a proper position to be acted upon by the punch. The recess (shown dotted) in the end of the finger *n* enables it to fit the curvature of the rivet-head and insures the rivet being properly carried forward by the said finger. The plunger-bar and raceway now descend, when the punch will strike the head of the rivet and force it through the opening 52 of the nose-piece, thus driving the legs of the rivet through the material into contact with the lower die *e*, whereby they are turned back or clenched upon the under side of the material, as shown in Fig. 4, after which the operation continues as before.

The diameter of the vertical opening 52 in the nose-piece is sufficient to permit of the passage of the head of the rivet, and in order to prevent the rivet from dropping through said opening when pushed thereover by the finger *n* I provide a yielding stop consisting of a block *q*, secured to the end of a spring *r*, fastened to the side of the raceway, said block, which is slightly beveled at its upper edge, fitting into an opening 55 in the side of the nose-piece, which communicates with the opening 52 and extends into the latter sufficiently to support the head of the rivet, as shown in Fig. 9, the beveled upper edge of the block enabling the rivet, when carried down by the punch, to force the block outward against the resistance of the spring *r*, which returns said block to its original position when the punch is withdrawn.

The lower portion of the block *q* is beveled, as shown at 56, Fig. 9, and fits a correspond-

ing bevel at the bottom of the opening 55, in which it fits, whereby the downward pressure exerted on the block by the punch will cause it to be moved outward equally at the bottom 5 and top, thereby avoiding the twisting of the spring and the tipping of the block.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a rivet-setting machine, the combination with the reciprocating plunger-bar carrying the punch and provided with a sliding sleeve encircling its lower end, of a raceway pivoted to said sleeve and adapted to move up and down as the plunger-bar is reciprocated, substantially as described.

2. In a rivet-setting machine, the combination with the hopper for containing the rivets, of the reciprocating plunger-bar carrying the punch and provided with a sliding sleeve encircling its lower end, and a raceway leading from the hopper and pivoted at its lower end to said sleeve and having a movement up and down therewith and also in the direction of its length on a suitable support as the said plunger-bar is reciprocated, substantially as described.

3. In a rivet-setting machine, the combination with the plunger-bar and punch and the raceway having an aperture at its lower end for the passage of the punch and rivet driven thereby, of a spring-operated stop-block beveled at its upper edge and projecting into said aperture to support the rivet therein before it is struck by the punch and adapted to be forced outwardly by the pressure of the rivet as it is forced down, said stop-block being beveled at its lower edge to fit a corresponding bevel at the bottom of the opening

in which it is placed, whereby downward pressure on the block will cause it to move outwardly with its inner face in a vertical plane, substantially as described.

4. In a rivet-setting machine, the combination with the hopper for containing the rivets, and a raceway leading therefrom and pivotally connected at its lower end to a sliding sleeve encircling the lower end of the reciprocating punch-carrying plunger-bar, and having a movement up and down and also in the direction of its length on a suitable support as the said plunger-bar is reciprocated, of a spring-stop secured to a stationary support and projecting over the raceway into a position to intercept the rivets, and a projection on the raceway adapted to lift the stop as the raceway is raised and moved backward and thereby release the rivets and permit them to pass down the raceway, substantially as described.

5. In a rivet-setting machine, the combination with the punch-carrying plunger-bar and its actuating rocker-arm, of the connecting-bar *g* engaging said plunger-bar and pivoted at its opposite end to the rocker-arm and resting on a shoulder or projection thereon, and a spring-lever bearing upon the connecting-bar *g* and provided with a set-screw for regulating its pressure upon said bar *g*, substantially as and for the purpose set forth.

Witness my hand this 27th day of May, A. D. 1896.

HERBERT S. CROMBIE.

In presence of—

P. E. TESCHEMACHER,
B. L. MARDEN.