

F. RICHARDSON.
RECIPROCATING DIE.

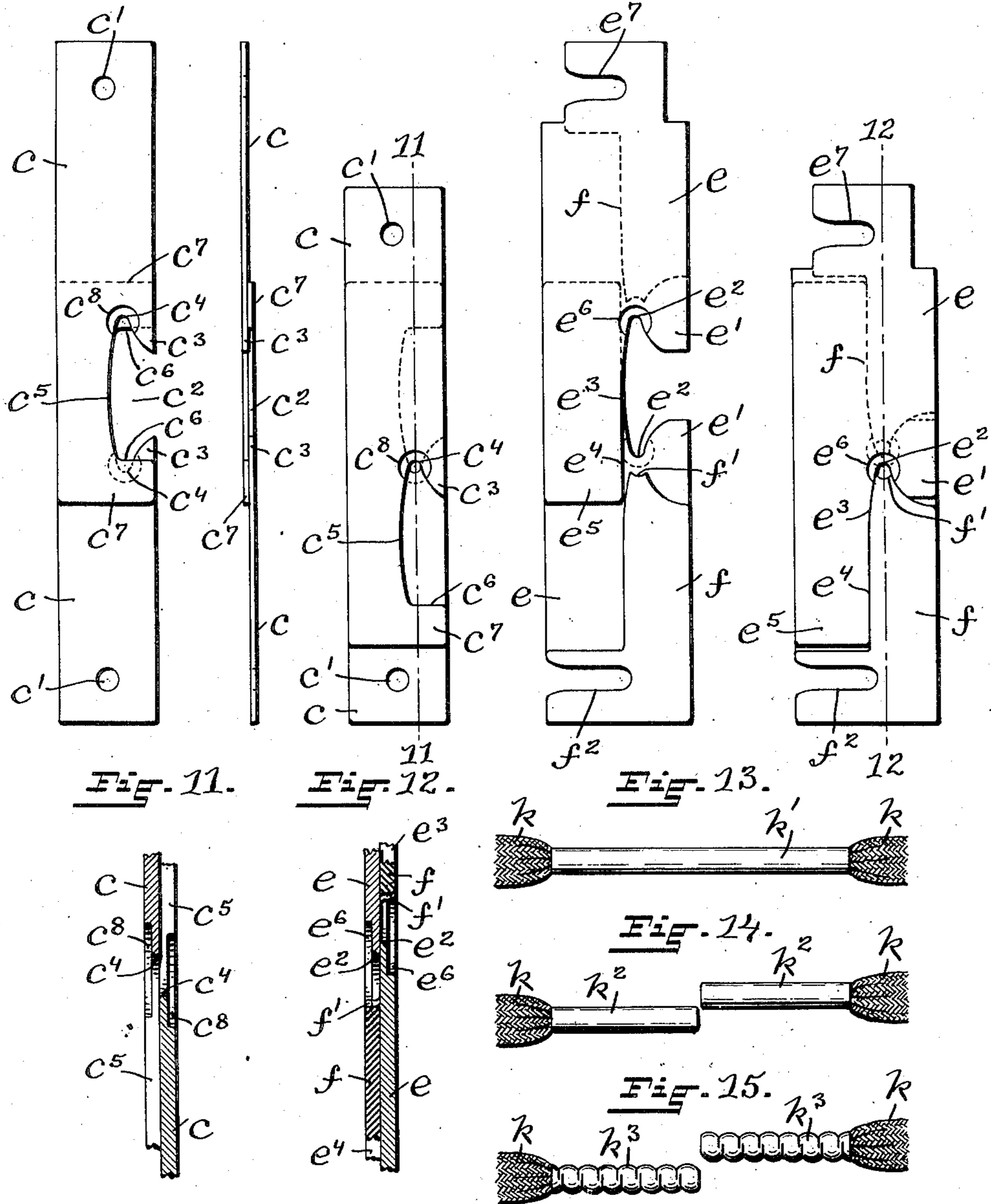
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3 SHEETS—SHEET 3.

963,394.

Fig. 6. Fig. 7. Fig. 8. Fig. 9. Fig. 10.



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RECIPROCATING DIE.

963,394.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, FREDERICK RICHARDSON, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented a new and useful Improvement in Reciprocating Dies, of which the following is a specification.

This invention has reference to an improvement in reciprocating dies adapted to cut and crimp a double tip in the process of manufacturing shoe or similar lacings.

The object of my invention is to facilitate the manufacture of my improved lacing tip, reference being had to Letters Patent of the United States 722,902, issued to me March 17, 1903, for an improvement in lacing tips.

A further object of my invention is to automatically release the tips from the die after the die has cut and crimped the tips.

My invention consists in the peculiar and novel construction of a reciprocating die comprising a fixed member and a reciprocating member, each member having a series of interlocking blades adapted to first cut a double tip centrally forming two tips, then crimp both tips, and then release the tips from the die in one operation of the die, as will be more fully set forth hereinafter.

Figure 1 is a vertical side view of my improved reciprocating die, showing the die in the open position. Fig. 2 is a vertical sectional view taken on line 2 2 of Fig. 1, looking at the front of the die and showing the die in the open position. Fig. 3 is a vertical sectional view taken on line 3 3 of Fig. 2, showing the die in the closed position. Fig. 4 is a transverse sectional view taken on line 4 4 of Fig. 1. Fig. 5 is a transverse sectional view taken on line 5 5 of Fig. 1, showing the means of securing the blades in the die. Fig. 6 is a detail view looking at the side of one series of crimping blades removed from the die and showing the same in the position they would assume with the die in the open position. Fig. 7 is an edge view looking at the front edge of Fig. 6. Fig. 8 is a side view similar to Fig. 6 showing the blades in the position they would assume when the die is closed. Fig. 9 is a side view of the cutting blades and the end forming blades removed from the die, showing the same in the position they would assume with the die in the open position. Fig. 10 is a side view similar to

Fig. 9, showing the cutting and end forming blades in the position they would assume with the die in the closed position. Fig. 11 is an enlarged detail sectional view taken on line 11 11 of Fig. 8, showing the construction of the crimping blades. Fig. 12 is an enlarged detail sectional view taken on line 12 12 of Fig. 10, showing the construction of the cutting and end forming blades. Figs. 13, 14 and 15 are enlarged detail views illustrating the operation of my improved die on a double lacing tip.

In the drawings, *a* indicates the fixed member, *b* the reciprocating member, *c c* the crimping blades in the fixed and the reciprocating members, *e e* the cutting blades, *f f* the end-forming blades, *g g*, the fastening bolts, *h* the lower anvil, and *i* the upper anvil for the cutting blades of my improved reciprocating die.

The fixed member *a* consists of a base *a'* having the hole *a²* and the opening *a³* for securing the member in the die press, the two upwardly-extending sides *a⁴ a⁴* in which are the edge openings *a⁵ a⁵* through which a lacing with a double tip, as shown in Fig. 13, is inserted in the die, and the transverse holes *a⁶ a⁶* adjacent the base for a fastening bolt *g*. A front plate composed of the two overlapping parts *a⁷* and *a⁸* is secured to the front edge of the sides *a⁴ a⁴* by the screws *a⁹ a⁹* through slots in the plates which allow for side adjustment of the plates, and this side adjustment is controlled by the screws *a¹⁰ a¹⁰* which extend inward from the edge of the plate or part *a⁷* and engage with the plate or part *a⁸*, as shown in Fig. 5. These plates have the central adjacent inner edges *a¹¹ a¹¹* spaced to receive the front edges of the cutting blades *e e*, as shown in Fig. 4, and the lower cut-away portion *a¹²* for the anvil *h*, as shown in Fig. 5. A back plate composed of the two overlapping parts *a¹⁴* and *a¹⁵* is secured to the rear edge of the sides *a⁴ a⁴* by the screws *a¹⁶ a¹⁶* through slots in the plates which allow for side adjustment of the parts and this side adjustment is controlled by the screws *a¹⁷ a¹⁷* which extend inward from the edge of the part *a¹⁴* and engage with the part *a¹⁵*, as shown in Fig. 5. These parts have the central adjacent inner edges *a¹⁸ a¹⁸* spaced to receive the rear edges of the cutting blades *e e*. A cutting blade *e*, an end forming blade *f*, and a double series of crimping blades *c c* are se-

cured in the fixed member *a* by the fastening bolt *g*, and the front and back plates, as shown in Figs. 1 and 2.

The reciprocating member *b* has a body portion *b'* with the upwardly-extending central lug *b²* and the two downwardly-extending side arms *b³* *b³* in which are the transverse holes *b⁴* *b⁴* for the fastening bolt *g*. A front plate *b⁵* is secured to the front edge of the arms *b³* *b³* by the screws *b⁶* *b⁶*, as shown in Fig. 1. This front plate has the screw-threaded vertical hole *b⁷* for the anvil *i* and the set screw *b⁸*. A back plate *b⁹* is secured to the rear edge of the arms *b³* *b³* by the screws *b¹⁰* *b¹⁰*. A cutting blade *e*, the end forming blade *f*, and a double series of crimping blades *c* *c* are secured in the reciprocating member *b* by the fastening bolt *g*, the front plate *b⁵* and the back plate *b⁹*, as shown in Figs. 1 and 2.

The series of crimping blades *c* *c* are each constructed of sheet steel in an elongated form shaped to fit in the members *a* and *b* to have the transverse hole *c'* adjacent the outer end and the edge opening *c²* adjacent the inner end. This edge opening extends into the blade and toward the outer end of the same, forming the projecting point *c³* merging into the semi-circular concave crimping portion *c⁴* from which extends a concave back portion *c⁵* which, merging into the outwardly-extending edge *c⁶*, forms the L-shaped inner end *c⁷* of the blade. A semi-circular dished portion *c⁸* is formed in the outer face of the blade concentric with the semi-circular concave portion *c⁴*, as shown in Fig. 6. By this construction a circular off-set opening is formed by the coinciding of the semi-circular concave portions *c⁴* *c⁴* of two of the blades when the die is closed, as shown in Figs. 3 and 8.

The cutting blades *e* *e* are each constructed of sheet steel in an elongated form similar to the crimping blades. These cutting blades are of a sufficient width to extend into the spaces formed by the inner edges *a¹¹* *a¹¹* of the overlapping parts *a⁷* and *a⁸* of the front plate and the space formed by the inner edges *a¹⁸* *a¹⁸* of the overlapping parts *a¹⁴* and *a¹⁵* of the back plate. The outer edge of each of the cutting blades is shaped to form an outwardly-curved projecting portion *e'* merging into the semi-circular concave cutting portion *e²* from which extends a concave back portion *e³* which, merging into the straight edge *e⁴*, forms the straight inner end *e⁵* of the cutting blade. A semi-circular dished portion *e⁶* is formed in the outer face of the blade concentric with the semi-circular concave cutting portion *e²*, as shown in Fig. 9. The cutting portion *e²* is beveled, as shown in Fig. 12, thereby giving a shearing action to the cutting blades in cutting the tip and lacing. A slot *e⁷* is formed in the outer end of the cutting

blade by which the blade is secured in the die by a fastening bolt *g* and easily removed from the die for sharpening or other purposes without disturbing the crimping blades.

The end forming blades *f* *f* are each shaped to have the semi-circular concave inner end *f'* for forming the end of the cut tip and the slot *f²* by which the forming blade is secured in the die. These forming blades are shaped to fit in the space formed by the cut-away portion of the cutting blades when the blades are closed, as shown in Fig. 10. The lower anvil *h* is supported in the base *a'* and is in screw-thread engagement with the same, as shown in Fig. 2. A cutting blade *e* is supported on the anvil at its outer end. The upper anvil *i* is supported in the front plate *b⁵* on the reciprocating member *b* in screw-thread engagement with the hole *b⁷* in the front plate, the inner end of the anvil engaging with the outer end of a cutting blade *e*. By turning the anvils *h* and *i* the cutting blades are adjusted relative to each other.

Each member of the die is composed of two series of interlocking crimping blades, one set of cutting blades and one set of end forming blades, the cutting blades and the end forming blades being placed centrally between the two series of crimping blades. The blades *c²* *c²* in one series of crimping blades are stepped or off-set from the openings *c²* *c²* in the other series of crimping blades, as shown in Figs. 1 and 2. The cutting edges *e²* *e²* of the cutting blades coincide with the openings *c²* in the series of crimping blades on the right hand side of the die. By tightening the adjusting screws *a¹⁰* *a¹⁰* and *a¹⁷* *a¹⁷* the inner face of the cutting blades are forced together, thereby insuring a clean cut through the tip and lacing.

In the operation of my improved die the member *b* is given a predetermined reciprocating motion in the die press. A lacing *k* having the double cylindrical tip *k'* is placed in the die (with the die in the open position) in a position for the cutting blades *e* *e* to cut the lacing tip *k'* centrally. On the closing movement of the die the tip is first cut centrally, forming the two tips *k²* *k²*, as shown in Fig. 14, and the tips *k²* *k²* simultaneously crimped by the double series of crimping blades *c* *c* on the extreme inward movement of the member *b*, and the ends of the tips rounded by the operation of the semi-circular concave ends *f'* *f'* on the end forming blades *f* *f* and the beveled face of the semi-circular concave cutting portion *e²* of the cutting blades *e* *e*, thus forming the finished crimped tips *k³* *k³*, as shown in Fig. 15. On the opening movement of the die the L-shaped ends *c⁷* *c⁷* on the crimping blades *c* *c* assume the position,

as shown in Figs. 1 and 6, thus drawing the crimped tips k^3 k^3 out of the semi-circular concave crimping portions c^4 c^4 of the crimping blades and the semi-circular concave cutting portion e^2 of the cutting blades, thus freeing the finished tips from the die.

Having thus described my invention, I claim as new and desire to secure by Letters Patent;—

1. A die composed of two members one of which is adapted to be reciprocated, both members formed of a series of interlocking blades, each member having crimpers practically alike and each adapted to partly encompass a lacing tip and form the crimps thereon.

2. A die composed of two members one of which is adapted to be reciprocated, both members formed of a series of interlocking blades and both having crimpers practically alike, each having a cutter adapted to cut a double lacing tip centrally and crimp the two tips thus formed.

3. A die composed of two members, one of which is adapted to be reciprocated, each member formed of a series of interlocking blades and each having crimpers off-set centrally adapted as cutters to sever a double lacing tip, the crimpers of each member crimping the tips thus formed.

4. In a die comprising a fixed member and a reciprocating member a series of interlocking blades recessed to crimp or bead a lacing tip and to automatically release the same by the opposite end of the blades on the upward movement of the reciprocating member.

5. A die composed of a fixed member and a reciprocating member, each member having a series of crimping blades and a cutting blade, means for removably securing the blades in the members of the die, and means for adjusting the cutting blades relative to each other, whereby a double lacing tip is cut centrally and the two tips thus formed crimped in one operation of the die, as described.

6. A die composed of a fixed member and a reciprocating member, each member having a series of crimping blades and a central cutting blade, means for removably securing the blades in the members of the die, means for adjusting the cutter blades lengthwise relative to each other, and means for forcing the inner faces of the cutting blades together, whereby a double lacing tip is cut centrally and the two tips thus formed crimped simultaneously in one operation of the die, as described.

7. A die composed of a fixed member and a reciprocating member, each member having a series of crimping blades and forming blades and a cutting blade, means for removably securing the blades in the members of the die, means for adjusting the cutting

blades lengthwise relative to each other, and means for forcing the inner faces of the cutting blades together, whereby a double lacing tip is cut centrally and the two tips thus formed crimped and the ends finished simultaneously in one operation of the die, as described.

8. A die composed of a fixed member a and a reciprocating member b each having two series of alternating interlocking crimping blades c c , each crimping blade having the edge opening c^2 and the L-shaped end c^7 one series of crimping blades having the edge openings c^2 c^2 off-set relative to the edge openings c^2 c^2 in the other series of crimping blades, a set of cutting blades placed intermediate the two series of crimping blades, end forming blades adjacent the cutting blades, means for adjusting the cutting blades lengthwise to each other, and means for forcing the inner faces of the cutting blades together, whereby a double lacing tip is cut centrally and the two tips thus formed crimped and the ends finished simultaneously and the tips released from the blades in one operation of the die, as described.

9. In a die comprising a fixed member a and a reciprocating member b , a series of crimping blades c c , each blade constructed to have an elongated form shaped to fit in the members a and b of the die and to have the transverse hole c' adjacent the outer end, the edge opening c^2 adjacent the inner end and extending into the blade toward the outer end of the same forming the projecting point c^3 merging into the semi-circular concave crimping portion c^4 from which extends the concave back portion c^5 which merging into the outwardly-extending edge c^6 forms the L-shaped inner end c^7 of the blade, and a semi-circular dished portion c^8 formed in the outer face of the blade concentric with the crimping portion, as described.

10. In a die comprising a fixed member a , and a reciprocating member b , a set of cutting blades e e , each constructed to have an elongated form shaped to fit in the members a and b of the die and to have the outer edge shaped to form the outwardly-curved projecting portion e' merging into the semi-circular concave cutting portion e^2 from which extends the concave back portion e^3 which merging into the straight edge e^4 forms the straight inner end e^5 of the cutting blade, a semi-circular dished portion e^6 formed in the outer face of the blade concentric with the cutting portion e^2 , a set of end forming blades f f , each blade constructed to have the semi-circular inner end f' for forming the end of a cut tip, the slot f^2 , and shaped to fit in the space formed by the cut-away portion of the cutting blades e e when the blades are closed, as described.

11. In a reciprocating die, the reciprocating member *b*, a double series of off-set crimping blades *c c*, the cutting blades *e e* placed intermediate the two series of crimping blades, the end forming blades *f f* adjacent the cutting blades, the bolts *g g* for securing the blades in the members of the die, the anvils *h* and *i*, means for adjusting the anvils, whereby the cutting blades are adjusted lengthwise relative to each other, and means for forcing the inner faces of the cutting blades *e e* together, whereby a double

lacing tip is cut centrally and the two tips thus formed crimped, the ends finished simultaneously and the tips released from the blades of the die in one operation of the die, as described. 15

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FREDERICK RICHARDSON.

Witnesses:

ADA E. HAGERTY,
J. A. MILLER.