2 Sheets—Sheet 1.

J. G. BAKER.

CORRUGATING MACHINE.

No. 40,897. Patented Dec. 15, 1863.

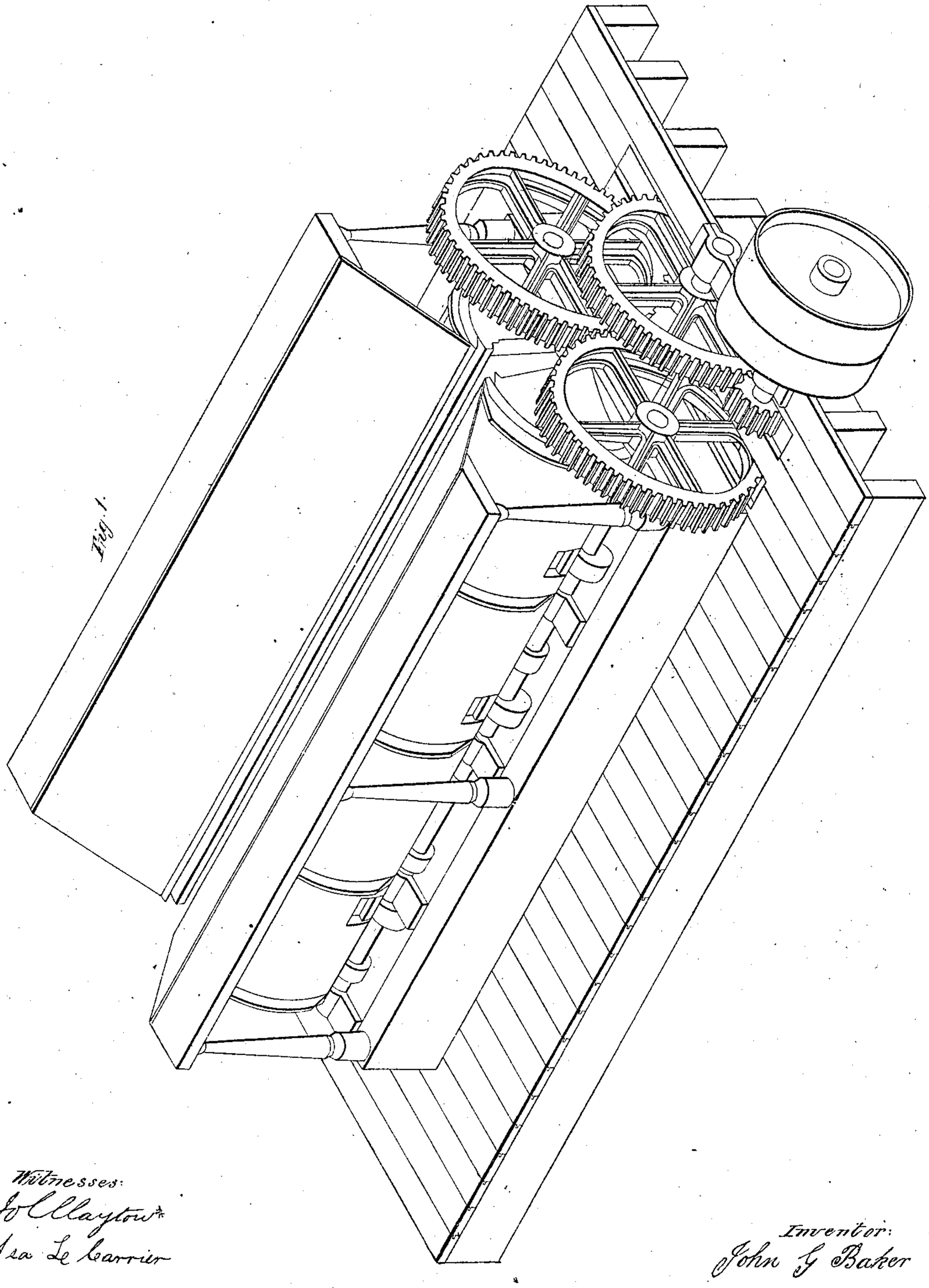

Fig. 1.

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John G Baker

2 Sheets—Sheet 2.

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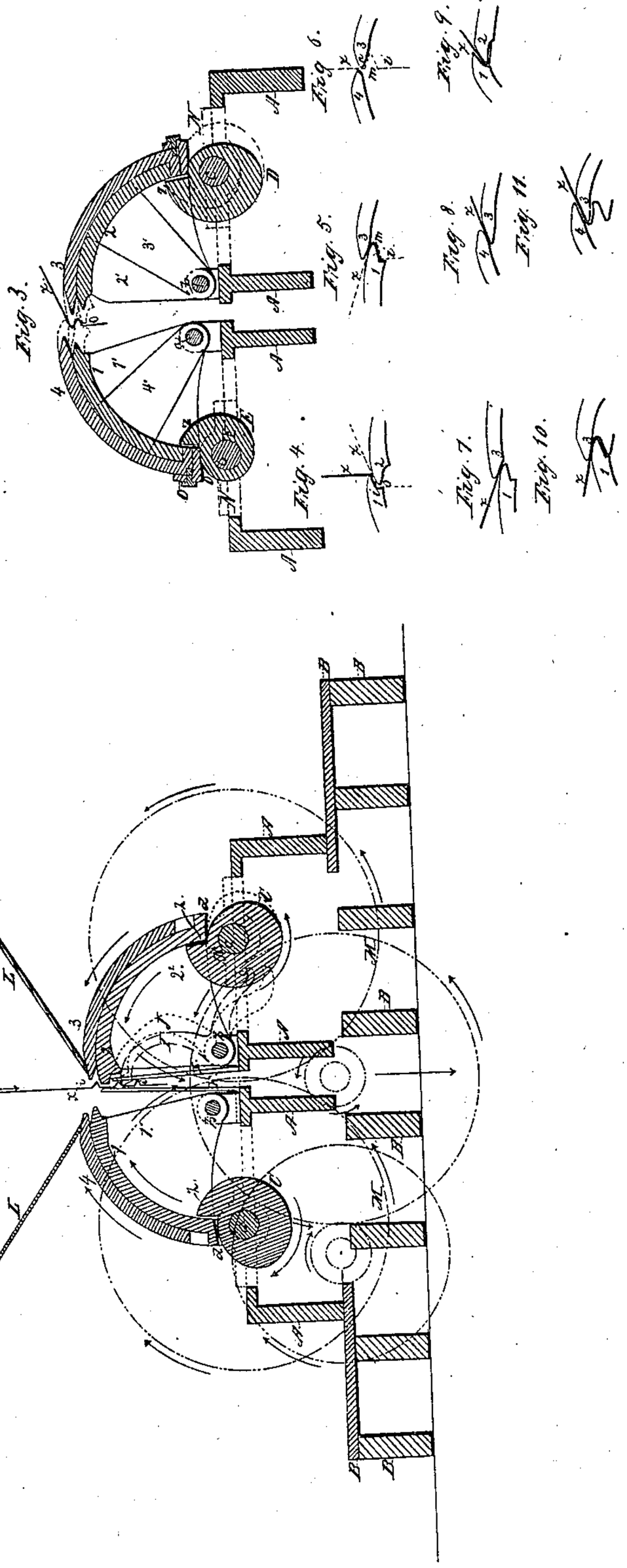

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UNITED STATES PATENT OFFICE.

JOHN G. BAKER, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR TO SAMUEL SEELY, OF NEW YORK, N. Y.

IMPROVEMENT IN CORRUGATING-MACHINES.

Specification forming part of Letters Patent No. **40,897**, dated December 15, 1863; antedated December 6, 1863.

To all whom it may concern:

Be it known that I, JOHN G. BAKER, of Washington city and county, in the District of Columbia, have invented certain new and Useful Machinery for Corrugating Sheet Metals; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the characters of reference thereon marked.

In the drawings similar characters refer to like parts.

To enable others to make and use my invention, I will describe its construction and operation.

Figure 1 is a view of a complete machine in isometrical projection. Fig. 2 is a transverse vertical section showing the cams which operate the under jaws or dies, and the dies as used for corrugating metal with a plane or ridge between the corrugations. Fig. 3 is a transverse vertical section showing the cams which operate the upper die-jaws, and also showing arrangement of dies for making the simple wave-line corrugations. Figs. 4 to 11, inclusive, are details showing the operation in forming one bend at a time of the corrugation, as will hereinafter fully appear.

The nature of my invention consists in corrugating sheet metal, &c., between alternating die-jaws, or their equivalents, in such a manner as to form but one bend or angle of the corrugation at a time, and also in feeding the sheet to be corrugated by its own weight.

A is the frame-work of cast-iron, and made sufficiently strong to resist the outward lateral pressure resulting from the resistance of the corrugating-sheet. B is the flooring upon which it rests.

1, 2, 3, and 4 are the cast-iron die-jaws, of a sufficient length to embrace the entire width of a sheet of metal. These jaws are cast in cylindrical quadrants, and are provided with heavy radiating arms 1′, 2′, 3′, and 4′, the arms of the upper jaws 3, and 4, passing through suitable slots in the faces of the lower jaws, 1 and 2. (See Fig. 3.) These jaws are arranged in pairs—that is, jaws 1 and 4 fit and move closely over or under each other, being turned concentrically from their common pivot *a*. The die-jaws 2 and 3, pivoted at *b*, are similarly arranged.

C are a series of cams on axles *c*, which operate against the lower edges, *d*, of the die-jaws 1 and 2, throwing them upward and forward in a curve. D are a similar series of smaller or slower cams on one of the axles *c*, and operate in like manner against the lower edge of die-jaw 3. E are a similar series of still smaller cams on the other axle *c*, and similarly operate against the lower edge of die-jaw 4. It will be seen that by this arrangement or procession of cams the die jaws 1 and 2 are first moved forward simultaneously by the double set of cams C, then the die-jaw 3 is operated by the smaller cams, D, and then the die-jaw 4 by the smallest cams, E.

I and J (in blue lines, Fig. 2) are a series of spring-dogs on one of the axles *c*. They are operated by means of the rod *e* upon the cams. The heads of dogs I are somewhat lower than those of dogs J, and the lower ends of dogs J are somewhat lower than the lower ends of the dogs I.

K are braces which serve to guide the sheets of metal and to afford the requisite resistance to the dogs.

L is the table; M, the gearing, (shown in red lines in Fig. 2;) N, the journal boxes of the axles *c*, on which are the main spur-wheels and the cams C D E.

O are steel shoes, which are attached to the lower edge of die-jaw 4 at the points operated upon by the cams E. These shoes are used only when making the wave line corrugation. By means of these shoes O, I can make either the ridged corrugation, as shown in Figs. 2 and 6, or the wave-line corrugation, as shown in Figs. 3 and 11.

The operation of the dogs (which are hooked out of the way when forming the wave-corrugation) is as follows: The lower edge of the sheet of metal is inserted between the die-jaws, and rests upon the heads of the upper dogs, J. As the cams revolve, the rod *e* strikes against the lower bent ends of dogs J and moves their heads from under the sheet, thus permitting the sheet to fall until it rests upon dogs I. The jaws now form the corrugation, as will be hereinafter described. When the first corru-

gation has been formed, the jaws separate and the lower dogs, I, are drawn back so as to permit the sheet to fall by its own weight until it rests upon the upper dogs, J. These dogs J are then soon made to release it and permit it (the sheet) to fall down until its first corrugation rests upon the lower dogs, I. By this device the weight of the sheet of metal causes it to fall down, while the dogs catch it, and release it, and catch it again, holding in suitable position for the formation of succeeding corrugations. The heads of these dogs should be made adjustable so as to give greater or less width between the corrugations.

When I wish to form the ridged corrugations, as shown in Fig. 2, the sheet of metal *x* to be corrugated is fed down from the table L between the die-jaws until it rests upon the dogs I. In the mean time power is applied to the driving pulley, which revolves the spur-gearing M and the cams 1. As the cams revolve, cams C, having the boldest profile, operate before the other cams and strike against the lower edges, *d*, of the die-jaws 1 and 2, raising them upward and carrying them forward in a curve until they clasp the sheet of metal at *o*, the die-jaw 1 passing over and beyond the die-jaw 2, thus bending the sheet of metal over the die of jaw 2, as at *i*, and forming the first angle or bend of the corrugation, as shown in Fig. 4. The series of cams D then operate in like manner upon die-jaw 3, making it bend the sheet in the opposite direction over the now stationary die-jaw 1, and forming the second bend, *m*, of the corrugation, as is shown in Fig. 5. The series of cams E now operate in like manner upon die-jaw 4, causing it to bend the sheet again in an opposite direction up against the now stationary die jaw 3, thus forming the third and last bend, *n*, of a ridged corrugation, as is shown in Fig. 6. The first corrugation now being formed, the highest points of all the cams are brought into the same lines, so that the weight of the die-jaws will make each pair of them simultaneously separate from each other, slip off from the cams, and fall down and rest upon the journals of of their axles, as at *z*.

When I wish to form the plain or wave corrugation, (shown in Figs. 3 and 11,) I attach the steel shoes O to the lower edge of the jaw 4, (see Fig. 3,) so that when the cams E operate against the die jaw they will throw it farther forward, so as to make it pass over and beyond the die of jaw 3, as in Fig. 11, instead of coming up against it, as in Fig. 6, when I make the ridged corrugation.

In forming the wave corrugation, I first bring the jaws 1 and 2 together. The edge of the sheet of metal is then set upon them, as seen by the blue line in Fig. 4. The jaw 3 then closes down upon the sheet, holding it as shown in Fig. 7. The jaw 4 then forces the sheet in the opposite direction and over the die of jaw 3, thus forming the first bend of the corrugation, as shown in Fig. 8. As the jaws now separate and fall down, as above described, the sheet falls with them in such a position that when the jaws 1 and 2 come together the jaw 2 will enter the bend of the first corrugation just made, forcing it up against jaw 1, as shown in Fig. 9. Jaw 3 now forms the first bend of the second corrugation, as is shown in Fig. 10. Jaw 4 then forces the sheet in the opposite direction over jaw 3, thus forming the second bend of the second corrugation, as is shown in Fig. 11. The jaws now separate, and when they come together again jaw 2 will enter the corrugation just left by jaw 3. The process is thus continued until the whole sheet is corrugated. When it is wished to change the pitch or shape of the corrugations, I remove the dies of the die-jaws and substitute others in their places of the desired form; or, if preferred, there may be cast several sets of die-jaws of the various shapes desired.

In my invention I possess the advantages of being able to corrugate sheet metals with one-half (or less) the power required in any other machine, and at the same time avoid all injury to the metal from stretching or straining it, like the machines which form more than one bend at a time.

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

1. Corrugating sheet metals, &c., between alternating die-jaws, or their equivalents, in such a manner as to form but one bend or angle in the sheet at a time.

2. The die-jaws 1, 2, 3, and 4, constructed and operating substantially as described.

3. The dogs I and J, constructed and operating substantially as described.

4. Feeding the sheet of metal by its own gravity, in combination with the corrugating-jaws, or their equivalents, substantially as described.

5. The shoes O, constructed and operating substantially as described, for the purpose of making either waved or ridged corrugations with the same set of dies or die jaws.

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