(No Model.) 2 Sheets—Sheet 1.

W. S. GRAFTON.

MACHINE FOR JOINING AND ROLLING SHEETS OF METAL.

No. 517,116. Patented Mar. 27, 1894.

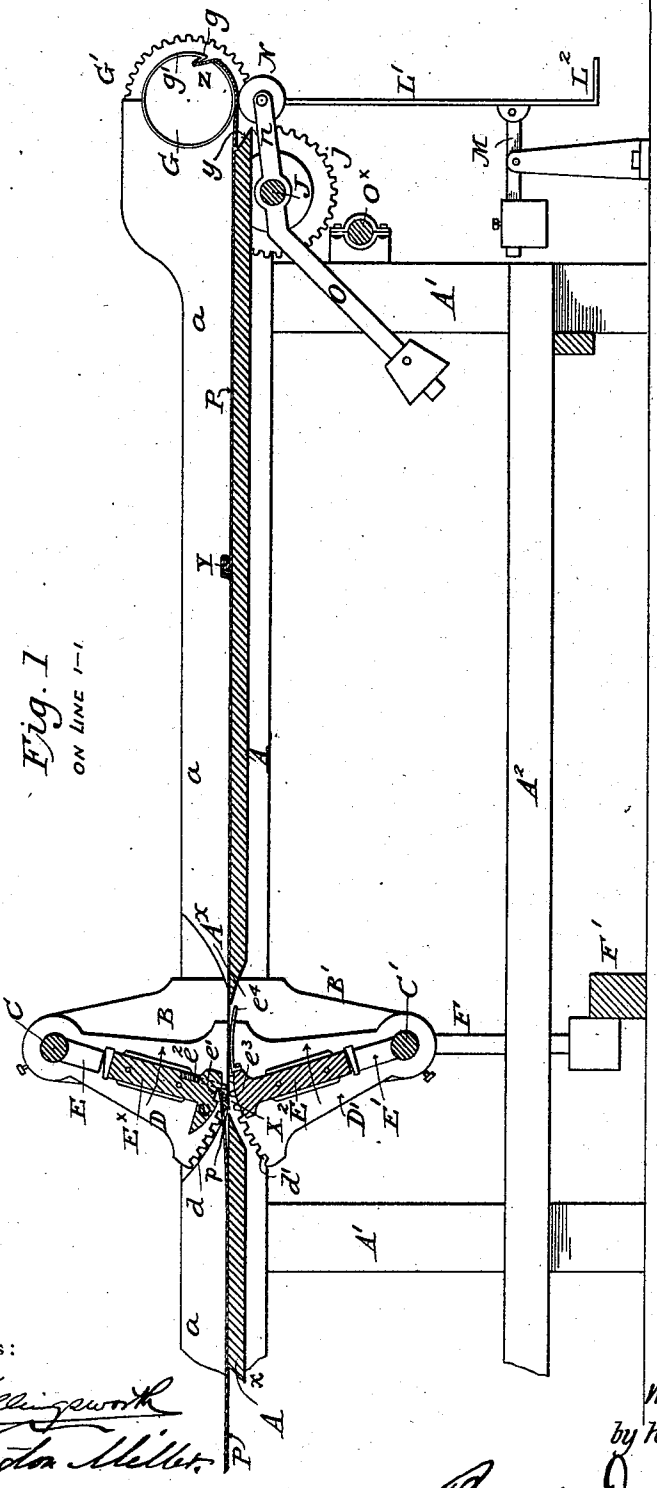

Fig. 1

ON LINE 1-1.

Witnesses:

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Inventor.

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(No Model.) 2 Sheets—Sheet 2.

W. S. GRAFTON.

MACHINE FOR JOINING AND ROLLING SHEETS OF METAL.

No. 517,116. Patented Mar. 27, 1894.

Fig. 2.

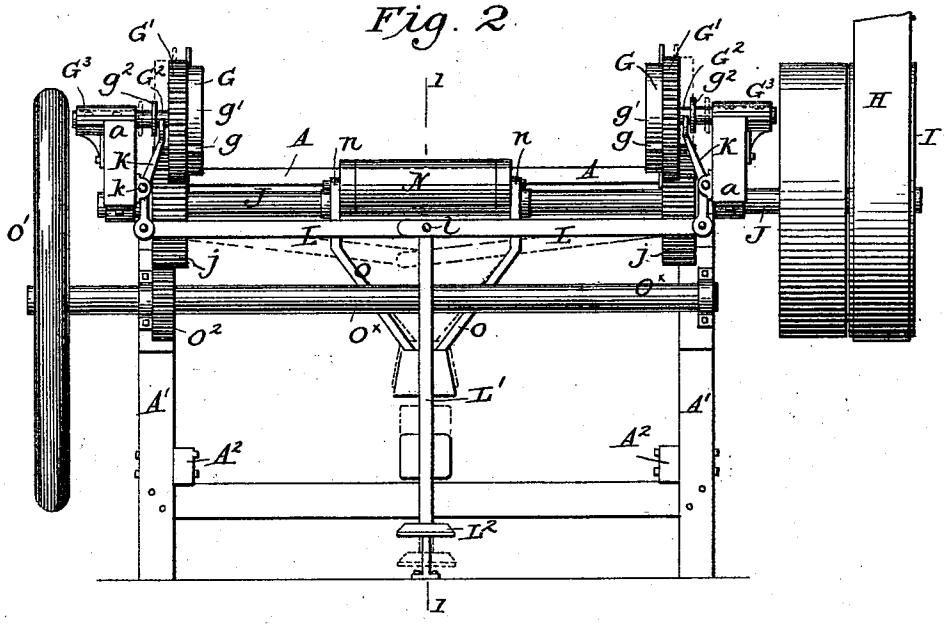
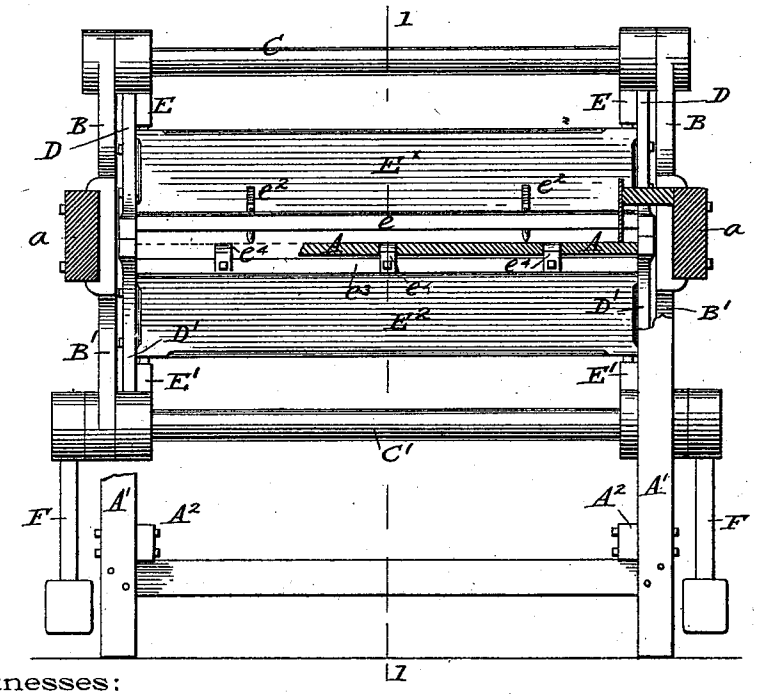


Fig. 3.



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UNITED STATES PATENT OFFICE.

WILLIAM S. GRAFTON, OF STEUBENVILLE, OHIO, ASSIGNOR TO THE WHEELING CORRUGATING COMPANY, OF WHEELING, WEST VIRGINIA.

MACHINE FOR JOINING AND ROLLING SHEETS OF METAL.

SPECIFICATION forming part of Letters Patent No. 517,116, dated March 27, 1894.

Application filed January 31, 1893. Serial No. 460,421. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM S. GRAFTON, a citizen of the United States, residing at Steubenville, in the county of Jefferson and State of Ohio, have invented certain new and useful Improvements in Machines for Joining and Rolling Sheets of Metal, of which the following is a specification.

The object of my invention is to unite sheets of metal and roll them up into a compact bundle ready for shipment.

My invention is especially designed to unite the roll roofing sheets securely and expeditiously and involves improved devices for securing together the hooked ends of successive sheets, rolling the sheets thus secured by means of rolling devices into a compact bundle, and improved means for separating the rolling devices from the bundle so that it may be discharged from the machine.

In the accompanying drawings,—Figure 1 is a longitudinal section of a machine embodying my improvements, on the line 1—1 of Figs 2 and 3. Fig. 2 is a rear elevation of the machine. Fig. 3 is a front view, partly in section, and with parts broken away.

A table or platform A, is provided at its longitudinal edges with upwardly projecting sides *a*, and has standards A′, which may be braced and strengthened by horizontal beams A^2. The drawings show the table A broken away at its front end *x*. The table is, in fact, extended some considerable distance in order that the incoming sheets may rest upon it. Uprights B, on opposite sides of the table at its front end support a rock shaft C, and hangers B′, beneath the uprights support a rock shaft C′. The shaft C, at each end, has secured to it, an arm D. This pair of arms is provided with segments of teeth *d* at their lower ends, gearing with segments of teeth *d′* on arms D′ secured to the shaft C′. The shaft C, carries a pair of arms E, to which is secured a cross head $E^\times$, having a curved or convex enlarged lower end or head *e*, provided with a recess or notch *e′*. Spring bolts e^2, are arranged to move vertically in the cross head $E^\times$. A pair of arms E′ secured to the shaft C′ is provided with a cross head E^2, which is provided with an enlarged convex head e^3, corresponding in form to the head of the cross head $E^\times$, and it carries one or more curved plates e^4, which project from its rear end. The shaft C′ is normally held in the position shown in the drawings by weighted arms F, the movement of which is limited by stops F′. It will be observed that the table A, is cut away at $A^\times$, between the arms E E′, in order that the arms D and D′ may mesh and move together, and that the cross heads of the arms E E′, may operate upon the metal sheets in the manner hereinafter described.

At the rear end of the table, I provide means for rolling the joined sheets of metal into compact form for shipment. This mechanism is constructed as follows. On opposite sides of the table, I provide rings G, each ring being provided with a notch or opening *g*, and a hook *g′*. These rings are connected with gear wheels G′, in fact the rings may be made by forming or securing to each gear wheel a flange, as indicated in Fig. 2. The gear wheel on each side is secured to a shaft G^2 provided with a collar g^2, and mounted in bearings G^3 in which the shaft is adapted to slide to a limited extent laterally toward and from the center of the table. The driving belt H, connected with any suitable prime mover passes over a pulley or pulleys I, on a transverse shaft J, mounted in suitable bearings and carrying gear wheels *j*, meshing with the gears G′, and of sufficient width to allow the gears G′ to have a lateral movement without disengagement. Levers K, pivoted at *k* to the frame of the table, have their upper ends arranged between the collars g^2, and the gear wheels G′, and their lower ends are pivotally connected with rods L, which, in turn, are pivotally connected at *l* below the center of the table to an upright rod L′, which is provided with a foot piece or treadle L^2. A weighted arm M, connected with the rod L′, normally holds it elevated so as to hold the rings in their innermost position, as indicated in full lines in Fig. 2. When the foot piece L^2 is depressed, the rods L are moved downwardly at their inner ends, as shown in dotted lines in Fig. 2, so as to cause the levers K, to engage with the collars g^2, and move the rings outwardly away from each other. A roller N, is carried by arms *n*, mounted on the shaft J, and connected with a weighted arm or arms

O, which normally hold the roller N, in an elevated position to press the sheets of metal closely against the flanged drums while being rolled. The rear end *y*, of the table is cut away or terminated as shown in Fig. 1, in order to allow the roller N, to rise into position to support the sheets while being rolled firmly against the rings. A transverse shaft $O^{\times}$, is mounted in suitable bearings in the supporting frame and carries a fly wheel or balance wheel O'. The shaft is provided with a cog wheel O^2, meshing with one of the gears *j*.

While I have described minutely the details of construction of the mechanism, I do not wish to limit myself to the specific form of the mechanism for compressing the hooked ends of the sheet, nor to the specific mechanism for rolling the joined sheets.

The subject-matter deemed novel and as within the scope of the invention is set forth in the claims.

The operation of the machine is as follows: The metallic sheets P, of the desired length before they are fed to the machine are formed with hooked ends *p*, at both front and rear, and these are made to engage as indicated at X, Fig. 1. Several of the sheets are united, as indicated at Y, Fig. 1, before the machine commences to operate, and the hooked end of the front sheet is caused to engage with the hooks *g'*, of the flanges G, as indicated at Z, Fig. 1. Power being now applied to the driving shaft, the sheets will be drawn forward and rolled around the flanges G. The arrangement is such that when the machine commences to operate, the hooked ends of two sheets are arranged between the heads of the cross heads $E^{\times}$ E^2, and project into the recess *e'*, of the head *d*, in front of the spring bolts e^2. As the sheets are drawn forward by the rolling devices, the hooked ends at Z engage with the spring bolts and cause the cross heads and the segmental arms to move with their shafts in the direction indicated by the arrows, causing the heads to come closer together and to compress the hooks and unite the sheets firmly, in the manner indicated at Y. The hooked ends of the sheets do not leave the spring-bolts until the compression is complete. They are released when the cross-heads have moved a sufficient distance to the right, as shown in Fig. 1. The curved plates e^4, serve to support the rear end of the sheet in front of the compressing heads, while the compression is taking place. As soon as the joint is formed, and it has passed by the compressors, the cross heads are automatically returned to their normal position, as indicated in Fig. 1 by means of the weighted arms F. The joined sheets, however, continue to be rolled on to the rolling devices, and the compressors are not operated again until the interlocking hooked ends of succeeding sheets come into engagement with the bolts e^2, but when this takes place, the compressors are operated in the manner before explained, and thus any desired number of sheets are successively joined. While being rolled on to the rings, the sheets are supported and guided to a sufficient extent by the weighted roller N. When the bundle is of sufficient size, it may be wired or bound in any suitable way, and may then be removed by depressing the foot piece or treadle L^2, which causes the flanged rings to move laterally away from each other, and thus separate themselves from the roll, which may be at once removed.

I claim as my invention—

1. The combination, substantially as hereinbefore set forth, with rolling devices to which the sheets to be rolled are connected, of compressing mechanism comprising cross heads mounted on rock shafts, and geared together to move simultaneously.

2. The combination, substantially as hereinbefore set forth, with rolling devices to which the sheets to be rolled are connected, of compressing mechanism comprising a compressing member below the sheets to be rolled and a cross head above the sheets to be rolled, and adapted to engage with the hooked ends of the sheets to be united, and power driven mechanism for moving the cross head longitudinally toward and from the rolling devices.

3. The combination, substantially as hereinbefore set forth, with rolling devices to which the sheets to be rolled are connected, of a compressing member below the sheets, and a movable compressing member above the sheets provided with a recess adapted to receive the ends of the sheets to be joined.

4. The combination, substantially as hereinbefore set forth, with rolling devices to which the sheets to be rolled are connected, of compressing mechanism comprising cross heads on opposite sides of the sheets to be joined, rock shafts on which the cross heads are mounted and gearing connecting the rock shafts to cause them to move simultaneously.

5. The herein described compressing or sheet-joining mechanism, comprising the cross heads provided with adjacent curved heads, rock shafts to which the cross heads are connected, and gearing connecting the rock shafts.

6. The herein described compressing or sheet-joining mechanism comprising cross heads provided with enlarged curved heads, one of which is provided with a recess as described, rock shafts to which the cross heads are connected, and arms provided with segments of teeth meshing together, whereby the cross heads are caused to move simultaneously.

7. The combination, substantially as hereinbefore set forth, with a compressing member below the sheets to be joined of a compressing member above the sheets, having a recessed head and provided with spring-bolts, for the purpose specified.

8. The combination of a cross head below the sheets to be joined, the rock shaft to which it is connected, means for returning the rock

shaft to its normal position, a cross head above the sheets to be joined, a rock shaft on which it is mounted, and gearing connecting the two rock shafts.

9. The rolling mechanism herein described, comprising a pair of rings having devices to engage with the end of the series of sheets to be rolled, power-driven mechanism for rotating the rings, and devices for moving both rings horizontally toward and from each other.

10. The rolling mechanism herein described comprising a pair of rings having devices to engage with the end of the series of sheets to be rolled, gear wheels connected with these rings, a power driven shaft, pinions thereon engaging with the gear wheels connected with the rings, a lever connected with one of the rings to move it horizontally, an operating rod for said lever, and a treadle for actuating the rod.

11. The combination, substantially as hereinbefore set forth, of the rings to which the sheets to be joined are connected, gear wheels connected with the rings, a driving shaft geared to said gear wheels, levers for moving the rings and their gear wheels laterally toward and from each other, operating rods for said levers, and means for operating said rods.

12. The combination, substantially as hereinbefore set forth, of the rings to which the sheets to be joined are connected, gear wheels connected with the rings, a driving shaft geared to said gear wheels, levers for moving the rings and their gear wheels laterally toward and from each other, operating rods for said levers, a treadle for operating said rods, and counter-balancing devices for moving the rings toward each other.

In testimony whereof I have hereunto subscribed my name.

WILLIAM S. GRAFTON.

Witnesses:

THOS. H. JONES,

LIEU J. MARSH.