(No Model.) 2 Sheets—Sheet 1.

H. W. SHEPARD.

FLANGING MACHINE.

No. 314,615. Patented Mar. 31, 1885.

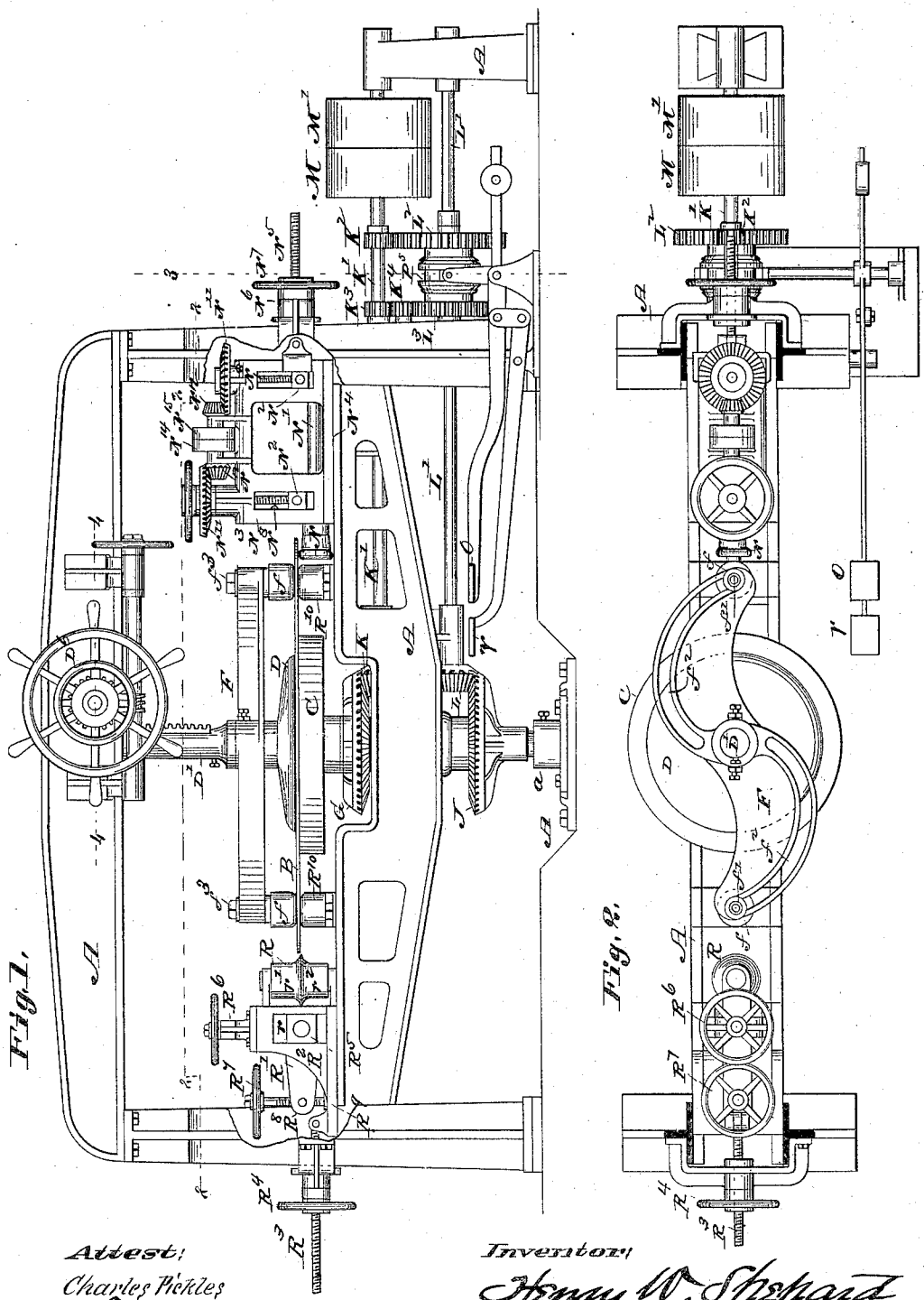


Fig. 1.

Fig. 2.

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(No Model.)

2 Sheets—Sheet 2.

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Fig. 3.

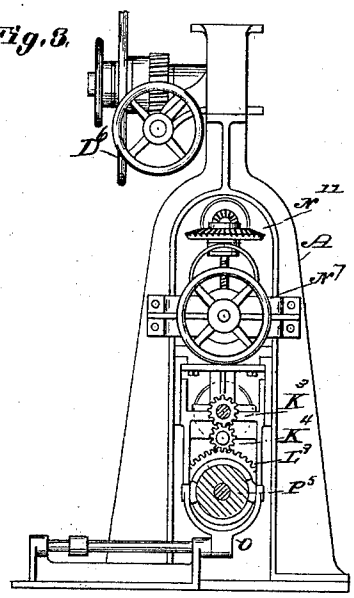


Fig. 4.

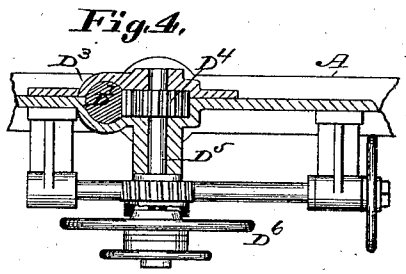


Fig. 5.

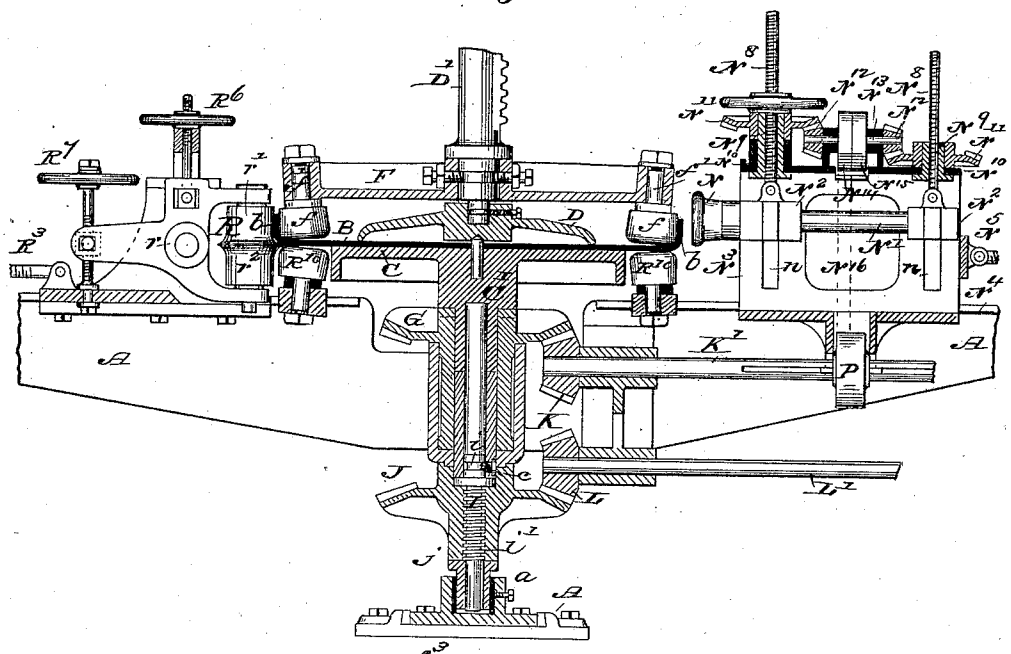
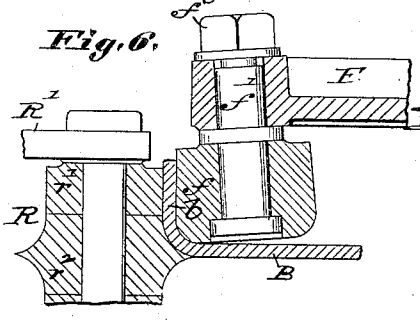


Fig. 6.



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UNITED STATES PATENT OFFICE.

HENRY W. SHEPARD, OF ST. LOUIS, MISSOURI, ASSIGNOR OF ONE-HALF TO ALBERT B. BOWMAN, OF SAME PLACE.

FLANGING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 314,615, dated March 31, 1885.

Application filed October 16, 1884. (No model.)

To all whom it may concern:

Be it known that I, HENRY W. SHEPARD, of St. Louis, Missouri, have made a new and useful Improvement in Flanging-Machines, of which the following is a full, clear, and exact description.

I have heretofore, September 2, 1884, jointly with another party, patented an improvement in flanging-machines. The present construction is in a measure related thereto, in that substantially the same means are employed for supporting, clamping, and rotating the sheet being flanged. The machine referred to, however, is for forming flanges in the interior of the sheet—such as around flue-openings—while the present machine is for flanging the sheet at its periphery.

The improvement relates to the means for upturning the flange, and to the means for finishing the flange.

The mechanism employed for carrying out the improvement is illustrated in the drawings hereto annexed and made part of this specification, in which—

Figure 1 is a front elevation of the improved machine; Fig. 2, a horizontal section on the line 2 2 of Fig. 1; Fig. 3, a vertical section on the line 3 3 of Fig. 1; Fig. 4, a horizontal section on the line 4 4 of Fig. 1; Fig. 5, a central vertical transverse section on an enlarged scale of the central portion of the machine; and Fig. 6 a detail on an enlarged scale, being a vertical section of that portion of the mechanism which is employed in finishing the flange.

The same letters of reference denote the same parts.

A, Figs. 1, 2, 3, 4, 5, represents the frame of the machine.

B, Figs. 1, 5, 6, represents the plate being flanged. It is supported upon the table C and is held down thereon by the clamp D, which, so far as holding the plate down is concerned, corresponds to the part termed the "die" in the former construction. The table is attached to the spindle C', which in turn is held in and adapted to be rotated with the beveled gear G. The spindle can also be raised and lowered in the gear G, the spindle, at its lower end, resting on the worm-shaft I, which extends upward into a socket in the spindle, and is grooved at *i* to receive the pin *c*, enabling the spindle to be rotated, and at the same time keep in engagement with the worm-shaft. The worm *i'* of the shaft I is in engagement with the gear J. The hub *j* of this gear is stepped in the bearing *a* in the frame of the machine. The gear G is rotated by means of the gear K upon the shaft K'. The gear J is rotated by means of the gear L upon the shaft L'. The shafts K' L' are held in suitable bearings in the frame of the machine. The power is applied to the shaft K' by means of the pulleys M M' in the customary manner. The shaft K' is provided with the pinions K^2 K^3. The shaft L' is provided with the gears L^2 L^3. The pinion K^2 engages with the gear L^2, and the intermediate gear, K^4, serves to connect the pinion K^3 with the gear L^3, as shown in Fig. 1.

In operating the machine the attendant depresses the pedal V, which in turn, and through the pedal O, serves to shift the clutch P^5 into engagement with the gear L^2, and thereby to connect the gear L^2 with the shaft L'. This sets both of the gears G and J in operation. The rotation of the gear G causes the spindle C' and table C to rotate, and the rotation of the gear J causes the worm-shaft I to rise and lift the spindle and table a short distance, and sufficiently to enable the plate being flanged to be in position for being clamped upon the table.

The clamp D is journaled on the lower end of the arm D'. The arm and rack are adapted to work upward and downward through a suitable bearing, D^3, in the frame of the machine, the rack being operated by means of the pinion D^4 upon the shaft D^5, Fig. 4. By means of the wheel D^6 upon the shaft D^5 the shaft D^5 can be rotated, the arm D' lowered, and the clamp brought to a bearing upon the plate being flanged.

The mechanism as thus far described being mainly similar to that exhibited in the flanging-machine above referred to, it is not deemed necessary to enter further into its details, and the description of the improved features of the machine will now be proceeded with.

F, Figs. 1 and 2, represents a cross-arm at-

tached at its center to the upright arm D′. It is extended horizontally above the clamp D, and is furnished with appliances which, in connection with an appliance operating from beneath the plate, are adapted to form the desired flange thereon—that is to say, the appliances on the arm F constitute bearings against which in the formation of the flange the edge of the plate is pressed, and the appliance beneath the plate serves to upturn the edge against the upper appliances.

The mechanism for carrying out this feature of the improvement more particularly described is as follows: At each end of the arm F a roller, *f*, is journaled on a spindle, *f′*, which in turn is held in a nearly upright position in the arm F. The distance the rollers *f f* are apart is the internal diameter of the plate when flanged, and to provide for flanging plates of different diameters the rollers are made adjustable upon the arm F, so that they can be closed to and opened apart from each other. To this end, and as the most desirable method, the arm F is slotted at f^2 f^2, Fig. 2, and the roller-spindles are adapted to be held in the slots f^2 f^2, respectively, and adjusted therein at any desired distance from the arm D′. The arm F along each slot may be suitably graduated so that the two roller-spindles may be rapidly adjusted evenly upon the arm, and when adjusted the spindles are tightened in place by means of the nuts f^3. The arm F is fast upon the upright arm D′. The clamp D rotates on the arm D′ with the plate and table.

The device for upturning the flange against the roller *f* consists as follows:

N represents a roller upon the shaft N′, Figs. 1, 2, 5, which in turn is journaled in the blocks N^2 N^2. These blocks are held and by means of the blocks working in the slots *n n* therein are made vertically adjustable in what may be termed a "carriage," N^3, for this last-named part is adapted to move the shaft N′ and roller N longitudinally toward and from the center of the machine, to which end the carriage slides upon the ways N^4 N^4, and is provided with a screw, N^5, which works in a fixed bearing, N^6, and is furnished with a handle, N^7, by operating which the carriage can be moved in and out upon the ways N^4 N^4, as indicated by two positions shown, respectively, in Figs. 1 and 5. The carriage also supports the mechanism for raising and lowering the shaft N′.

N^8 N^8 represent screws attached to the blocks N^2 N^2, and extending upward through nuts such as N^9, which are held in bearings N^{10} N^{10} in the carriage, and are provided with the bevel-gears N^{11} N^{11}, which engage, respectively, with the pinions N^{12} N^{12} on the shaft N^{13}. This last-named shaft is adapted to turn in bearings in the carriage, and is provided with a fast and loose pulley, N^{14} N^{15}. A belt, N^{16}, (indicated by dotted lines, Fig. 5,) transmits the motion of the pulley P upon the shaft K^7 to the pulleys N^{14} N^{15}. This causes the nuts N^9 to rotate and the shaft N′ and roller N to be elevated or depressed, according to the direction in which the nuts are rotated.

To operate the machine, the carriage, the shaft N′, and the other parts are brought into the position of Fig. 1. The table C, carrying the plate B, is rotated, and the mechanism for elevating the shaft N′ and roller N is set in motion. As the roller rises it encounters the edge *b* of the plate, and causes it to be upturned against the rollers *f f*, as shown in Figs. 5, 6. The plate during the operation is rubbed past the rollers *f f*, and to relieve the friction between the bottom of the roller and the top of the plate the roller-spindle is inclined, as shown in Fig. 6, so that only the outer corner of the bottom of the roller encounters the plate until the flange is upturned. After the flange has thus been upturned the roller N is withdrawn out of the way, and the finishing device is brought into operation. This consists of an upright roller, R, Figs. 1, 2, 5, which at its surface is shaped to conform to the flange, and which is adapted to be adjusted so as to be brought against the outer side of the flange and accurately placed, so that, in connection with the rollers *f f*, the proper finish can be imparted to the flange. To this end the roller R is journaled at its end in an arm, R′, which in turn at *r* is journaled in a frame, R^2. The frame R^2 by means of the screw R^3 and nut R^4 can be moved from and toward the center of the machine, as indicated by the positions shown, respectively, in Figs. 1 and 5. The boxes R^5, in which the arm R′ is immediately journaled, can be raised and lowered in the frame by means of the screw R^6, and the arm can be tilted in the boxes by means of the screw R^7, which passes down through a nut, R^8, in the outer end of the arm, and at its lower end engages at R^9 in the frame R^2.

During the finishing operation the plate, by means of the mechanism already described, is rotated to carry the flange *b* between the rollers *f* and R. The roller R is preferably extended vertically to form a double roller, r' r^2, for the following purpose: Sometimes in flanging it is desirable to turn the flange downward instead of upward, as shown. In such case the rollers R^{10} R^{10}, Figs. 1 and 5, are used in place of the rollers *f f*. The rollers are suitably adjusted and held in ways (not shown) in the frame A, so as to form a support for the flange *b* when turned downward, and the lower end, r^2, of the roller R is operated in connection with the rollers R^{10}. The rollers R^{10} can also be used in conjunction with the rollers *f f* in furnishing an additional support for the plate B as the flange *b* is turned. After the finishing operation has been completed the roller R is withdrawn and the parts adjusted to receive a second plate.

I claim—

1. The combination of the rotating table C

and clamp D, the arm F, provided with the rollers *f f*, and the vertically-adjustable roller N, substantially as described.

2. The combination of the rotating table C and clamp D, the arm F, provided with the rollers *f f*, and the roller N, said roller being adapted to be moved upward and downward, and being upheld by a support adapted to be moved toward and from the sheet being flanged.

3. The combination of the frame A, the carriage N^3, the shaft N′, the roller N, the boxes N^2 N^2, the screws N^8 N^8, the nuts N^9 N^9, the gears N^{11} N^{12}, the shaft N^{13}, the pulleys N^{14} N^{15} P, and the shaft K′, substantially as described.

4. The combination of the arm F and the roller *f*, said roller being attached to the inclined spindle *f′*, as and for the purpose described.

5. The combination of the stationary arm F, the roller *f*, the rotating table C, and clamp D, as and for the purpose described.

6. The combination of the stationary arm F, and roller *f*, the rotating table C, and clamp D, and the roller R, substantially as described.

7. The combination of the arm F, the roller *f*, the rotating table C, and clamp D, the frame A, and the roller R^{10}, substantially as described.

8. The combination of the frame A, the roller R^{10}, the table C, the clamp D, and the roller r^2, substantially as described.

9. The combination of the vertically-adjustable roller R, the table C, the clamp D, the arm F, and the roller *f*, substantially as described.

10. The combination of the rotating table C and clamp D, the stationary arm F and roller *f*, the roller N, and the roller R, substantially as described.

11. The combination of the frame A, the roller R, the arm R′, and the frame R^2, substantially as described.

12. The combination of the frame A, the frame R^2, the roller R, the arm R′, and the screws R^3, R^6, and R^7, as and for the purpose described.

Witness my hand.

HENRY W. SHEPARD.

Witnesses:
C. D. MOODY,
J. W. HOKE.