(No Model.) 2 Sheets—Sheet 1.

F. A. WALSH.

MACHINE FOR MAKING SHEET METAL VESSELS.

No. 492,075. Patented Feb. 21, 1893.

Fig. 1.

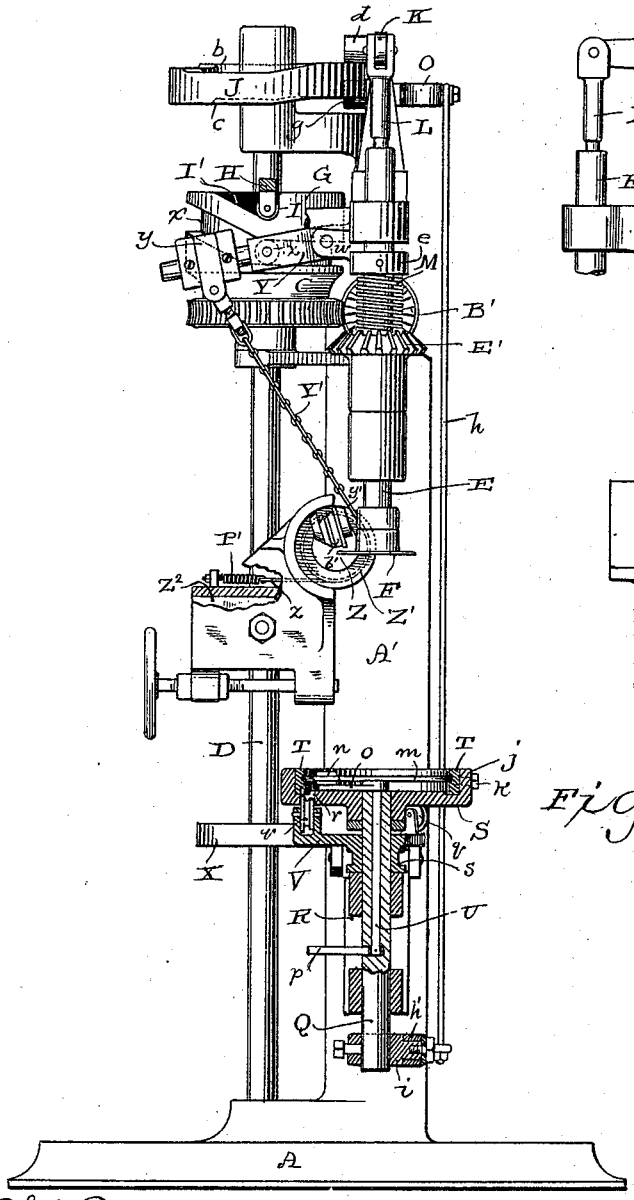


Fig. 2.

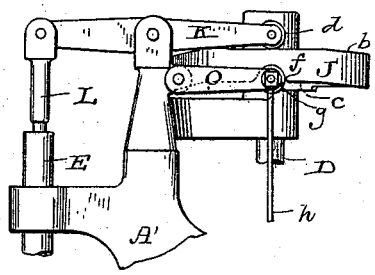
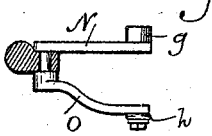


Fig. 4.



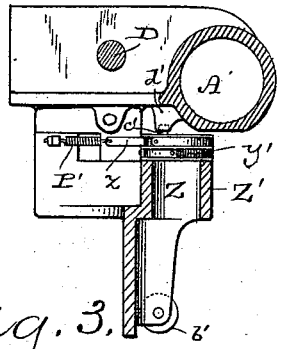


Fig. 3.

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(No Model.) 2 Sheets—Sheet 2.

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MACHINE FOR MAKING SHEET METAL VESSELS.

No. 492,075. Patented Feb. 21, 1893.

Fig. 5.

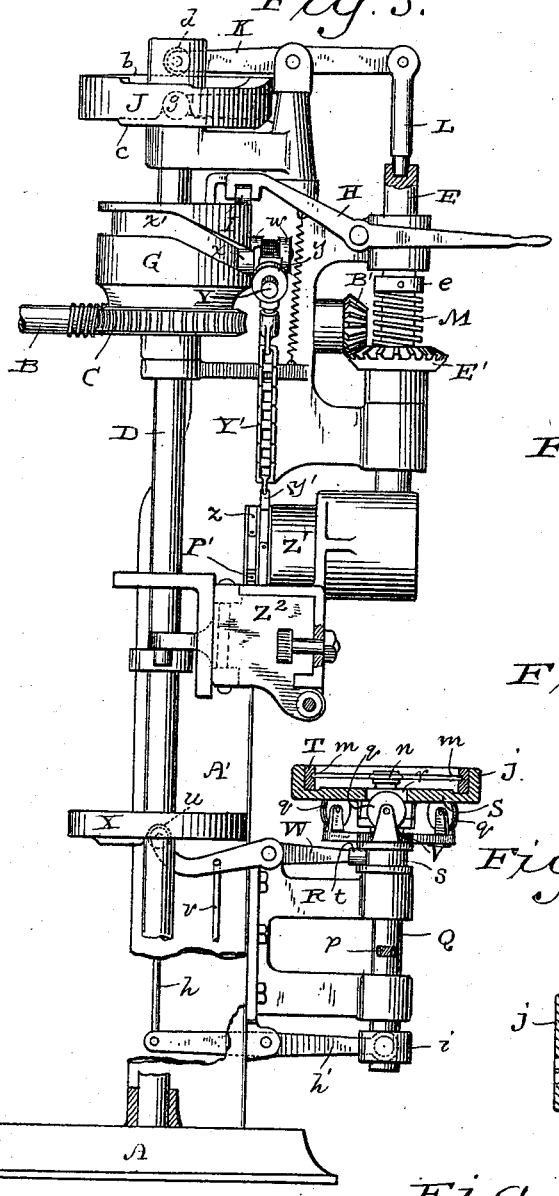


Fig. 6.

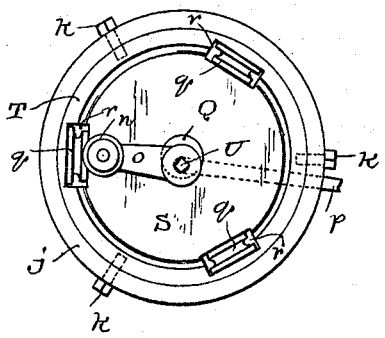


Fig. 7.

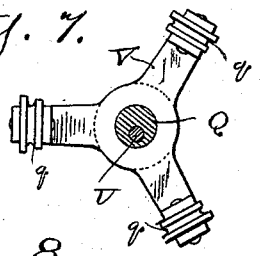


Fig. 8.

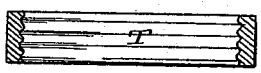


Fig. 9.

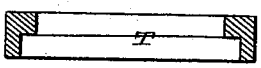
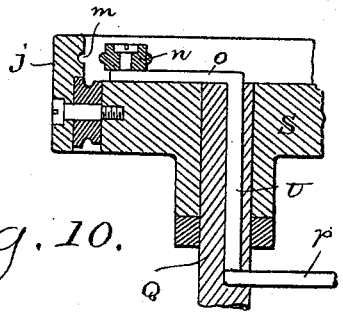


Fig. 10.



Witnesses
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Inventor
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UNITED STATES PATENT OFFICE.

FRANCIS A. WALSH, OF MILWAUKEE, WISCONSIN.

MACHINE FOR MAKING SHEET-METAL VESSELS.

SPECIFICATION forming part of Letters Patent No. 492,075, dated February 21, 1893.

Application filed July 22, 1889. Serial No. 318,202. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS A. WALSH, of Milwaukee, in the county of Milwaukee, and in the State Wisconsin, have invented certain new and useful Improvements in Machines for Making Sheet-Metal Vessels; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention relates to machines for making sheet metal vessels; and it consists in certain peculiarities of construction and combination of parts to be hereinafter described with reference to the accompanying drawings and subsequently claimed, the object of said invention being to improve the machines set forth in my patents No. 382,572, dated May 8, 1888, and No. 408,774, dated August 13, 1889.

In the drawings: Figure 1 represents a front elevation, partly in section, of a machine embodying my improvements, Fig. 2 a detail elevation of a double cam-mechanism that constitutes part of my invention, Fig. 3 a plan view partly in horizontal section illustrating my improved means for rocking the shaft that carries a seaming roll or rolls, Fig. 4 a plan view of a double lever or yoke employed in my improved machine, one fork of the lever being provided with a roulette for impingement against a cam-wheel, and the other fork having a rod connection with a lever-mechanism for raising and lowering the lower chuck of said machine. Fig. 5 a side elevation of the machine, partly in section, Fig. 6 a plan view of the preferred form of an improved chuck that forms part of my invention, Fig. 7 a similar view of a spider that carries a series of curling rolls, Figs. 8 and 9 detail sectional views of formers for detachable connection to my improved chuck, and Fig. 10 a vertical transverse section of a portion of another form of my improved chuck in connection with curling and beading rollers.

Referring by letter to the drawings A represents the base and A′ the standard of my improved machine. The standard is provided with bearings for a drive-shaft B that is geared to a worm-wheel C loose on a vertical shaft D that has its bearings in arms of said standard. The drive-shaft is provided with a pinion B′ arranged to mesh with a gear-wheel E′, the latter being feathered on a vertical spindle E as is common in that class of machines to which my invention relates. The spindle E has its bearings in arms of the standard A′ and to the lower end of this spindle I connect a chuck F, the latter being of any suitable construction.

Fast on the vertical shaft D is a cam-wheel G interiorly provided with a clutch-mechanism (not shown) similar to that set forth in my patents No. 321,263 of June 30, 1885, and No. 382,499 of May 8, 1888. By a downward movement of a spring-controlled lever H fulcrumed to an arm of the standard A′, the clutch-mechanism is operated to unite the cam-wheel G with the worm-wheel C, said lever being provided with a roulette I that normally engages a notch I′ in said cam-wheel.

Fast on the upper end of the shaft D is a wheel J having an upper cam-face *b* and lower cam-face *c*, these cam-faces being timed alike for a certain portion of their peripheries for the purpose to be hereinafter described. The upper cam-face *b* on the wheel J impinges against a roulette *d* on the inner end of a lever K fulcrumed to an arm of the standard A′, and pivotally connected to the outer end of this lever is a stem L that enters the recessed upper end of the live spindle E, the latter being provided with a collar *e* between which and the gear-wheel E′ is arranged a spiral spring M that serves to support said spindle and keep it up against the stem. The lower cam-face *c* on the wheel J is provided with a notch *f* to receive a roulette *g* on one fork N of another lever fulcrumed to an arm of the standard A, the other fork O of this lever being connected by a rod *h* and lever *h′* with a collar *i* on the lower portion of a spindle Q that has its bearings in a bracket R connected to said standard.

Loose on the upper end of the spindle Q is a chuck S, the face of which is for impingement against the rim of a sheet-metal body to be operated upon, and extended from this face is a flange *j* that comes approximately parallel to the wall of said sheet-metal body when the latter is positioned. As shown in Figs. 1, 5 and 6 a ring T is detachably secured to the inner side of the chuck-flange by set-screws *k*, or other suitable means.

The ring T shown in Figs. 1, 5 and 6 is pro-

vided with a die in the form of a beading-groove and at such distance from the chuck-face as to oppose the wall of a sheet-metal body positioned on said chuck at a point beyond the inner side of a head that may be seamed thereto by a subsequent operation, and opposed to said groove is a forming device in the shape of a beading roller *n* mounted on an arm *o* of a journal U, the latter being eccentrically arranged in the spindle Q and provided with another arm *p* by which it may be actuated automatically or by hand to bring said beading roller into engagement with the beading-groove *m* against the interposed wall of a chucked sheet-metal body whereby a bead is formed on said wall at a point beyond the inner side of a head that may be seamed thereto by a subsequent operation.

Instead of the ring T provided with a beading-groove, I may employ a ring having another form of die, such for instance as a screw-thread shown by Fig. 8, or a shoulder shown by Fig. 9, the beading roller *n* on the arm *o* of the journal U being substituted for another forming device designed to operate in conjunction with said die, and it is obvious that the die chuck may be arranged on the live spindle, if found desirable or necessary for certain classes of work.

While I have shown the detachable rings, each provided with a different die to operate in conjunction with an opposing forming device brought in and out of engagement therewith, I do not wish to be understood as limiting myself to this construction, for the reason that the die may be formed directly upon the inner side of the flange *j* on the chuck S, as shown in Fig. 10, this die as a part of said chuck either integral or detachable being one of the essential features of my invention.

As shown in Figs. 1 and 5 a spider V is slipped onto the spindle Q below the chuck S to rotate with the latter and journaled to the arms of this spider are curling rollers *q* that register with openings *r* in said chuck. The spider V has its hub provided with an annular groove *s* for engagement with a roulette *t* on one end of a lever W fulcrumed to the bracket R, the opposite end of this lever being also provided with a roulette *u* that is actuated by a cam X on the shaft D whereby said spider may be automatically raised and lowered at predetermined intervals for the purpose to be hereinafter described.

Attached to the lever W is a rod *v* for connection with a treadle (not shown) whereby the spider may be raised and lowered independent of the cam X, the latter being designed to operate when the machine is organized to automatically perform a succession of operations upon a chucked vessel.

Like in my patent No. 408,774, the curling rollers *q* may be journaled in the chuck S this construction being illustrated in Fig. 10, in connection with the beading mechanism above described.

Fulcrumed to lugs *w* on the standard A′ is a lever Y that carries a roulette *x* arranged to travel in a cam-groove *x′* in the periphery of the wheel G on the shaft D, and adjustably secured to the free end of the lever is a shackle *y* to which is swiveled a chain Y′ or other suitable flexible device that connects with a strap *y′* wound on the end of a shaft Z journaled in a pivotal bearing Z′ laterally adjustable on a block Z^2 pivotally secured to said standard, as set forth in my Patent No. 382,572, and another strap *z* is wound on said shaft to connect with a spiral spring P′ on said bearing as best illustrated in Fig. 3, the spring acting as a resistance to said lever. The shaft Z carries a seaming roller or rollers *b′* and is rocked by the lever flexibly connected, as above described, against the power of the spring P′, the latter and the strap *z* acting to return said shaft to its normal position at the proper time, this return movement being limited by means of a lug *c′* that comes against a shoulder *d′* on the standard A′ as is also best illustrated in Fig. 3.

In the operation of my improved machine as organized for automatically curling, beading and seaming, a vessel is placed bottom up between the chucks and the starting lever H acted to clutch the worm-wheel C and cam-wheel G whereby the vessel is chucked by the action of the lower cam face *c* on the wheel J. At the start, the cam X is timed to actuate the lever W whereby the spider V is raised up to bring the curling rollers *q* against the rim of the vessel, the chuck S being held against rotation while the operation of curling said rim takes place. At a predetermined time the spider drops back to bring the curling rollers below the upper surface of the chuck S, and the latter is released to rotate with the vessel. The journal U is now actuated to effect the beading operation and this being finished the seaming mechanism is brought into play to secure the bottom to the wall of the vessel, the necessary vertical movement of the latter being accomplished by the relative contour of the cam-faces *b c* on the wheel J, and like in my Patent No. 382,572 the pivotal block Z^2 is provided with an arm that extends through the bearing Z′ to come against a cam on the shaft D the latter cam being so timed as to swing said bearing on its pivot at predetermined intervals. By the time the notch *f* in the wheel J reaches the roulette *g* on the fork N of the double lever at the top of the shaft D, the seaming operation will be completed and the engagement of said roulette and notch will cause the chuck S to return to its normal position thereby releasing the vessel, the cam-wheel G being similarly timed to engage the roulette I on the lever H to automatically release the clutch-mechanism and stop the rotation of said shaft.

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

1. In a sheet-metal working machine, the

combination of a chuck having a face for impingement against the rim of a sheet-metal body to be operated upon, a flange extended from the chuck-face to come approximately parallel to the sheet-metal body when the latter is positioned, a die on the inner side of the flange at such distance from said chuck-face as to oppose the wall of said sheet-metal body at a point beyond the inner side of a head that may be seamed thereto by a subsequent operation, a forming device corresponding to the die and carried with the chuck to come within the perimeter of the aforesaid sheet-metal body, and suitable means for causing an engagement of the die and forming device against the interposed metal, substantially as set forth.

2. In a sheet-metal working machine, the combination of a chuck having a face for impingement against the rim of a sheet-metal body to be operated upon, a flange extended from the chuck-face approximately parallel to the sheet-metal body when the latter is positioned, a die detachably connected to the inner side of the flange and arranged at such distance from said chuck-face as to oppose the wall of said sheet-metal body at a point beyond the inner side of a head that may be seamed thereto by a subsequent operation, a forming device corresponding to the die and carried with the chuck to come within the perimeter of the aforesaid sheet-metal body and suitable means for causing an engagement of the die and forming device against the interposed metal, substantially as set forth.

3. In a sheet-metal working machine, the combination of a chuck formed with a flange that extends approximately parallel to the axis and is provided on its inner side with a beading-groove, a pivotal arm eccentrically connected to the chuck-spindle and a beading-roller mounted on the arm to come in and out of engagement with said groove, substantially as set forth.

4. In a sheet-metal working machine, the combination of a chuck having a face for impingement against the rim of a sheet-metal body to be operated upon, a flange extended from the chuck-face to come approximately parallel to the sheet-metal body when the latter is positioned, a die on the inner side of the flange at such distance from said chuck-face as to oppose the wall of said sheet-metal body, at a point beyond the inner side of a head that may be seamed thereto by a subsequent operation, a pivotal arm carried with the chuck within the perimeter of the aforesaid sheet-metal body, a forming device corresponding to the die and mounted on the arm, and suitable means for turning the arm on its pivot to cause an engagement of said die and forming device against interposed metal, substantially as set forth.

5. In a sheet-metal working machine, the combination of a chuck having a face for impingement against the rim of a sheet-metal body to be operated upon, a flange extended from the chuck-face to come approximately parallel to the sheet-metal body when the latter is positioned, a die on the inner side of the flange at such distance from said chuck face as to oppose the wall of said sheet-metal body at a point beyond the inner side of a head that may be seamed thereto by a subsequent operation, a journal eccentrically arranged in the chuck-spindle and provided with an arm at an approximate right angle to the axis of said chuck, a forming device corresponding to the die and carried on said arm of the journal, and suitable means for turning said journal in said spindle, substantially as set forth.

6. In a sheet-metal vessel making machine, the combination of driving and supporting chucks in opposition to each other, one of the chucks formed with a flange that extends therefrom approximately parallel to the axis and has the inner side thereof provided with a die, a forming device mounted within the perimeter of the flange at an approximate right angle to said axis, suitable mechanism for bringing the forming device in and out of engagement with said die against a chucked vessel, and curling rollers that register with openings in the flanged chuck and oppose the adjacent rim of said vessel, substantially as set forth.

7. In a machine for making sheet-metal vessels, a chuck having one or more openings therein, in combination with one or more curling rollers corresponding with the chuck openings, and suitable mechanism for sliding said rollers within said chuck-openings, substantially as set forth.

8. In a machine for making sheet-metal vessels, a revoluble chuck having openings therein, in combination with a spider slipped onto the chuck-spindle and rotated with the chuck, curling rollers journaled to the spider-arms to register with the chuck-openings, and suitable mechanism for sliding the spider on said chuck-spindle, substantially as set forth.

9. In a machine for making sheet-metal vessels, a chuck provided with openings, in combination with a rigid armed spider slipped onto the chuck-spindle and rotated with the chuck, curling rollers journaled to the spider-arms to register with the chuck-openings, and suitable mechanism for sliding the spider on said chuck-spindle, substantially as set forth.

10. In a machine for making sheet-metal vessels, the combination with driving and supporting chucks in opposition to each other, a revoluble shaft, a starting and stopping cam-wheel carried on the shaft, an auxiliary cam-wheel fast on said shaft and having two faces correspondingly timed, a lever connected to the spindle of the driving-chuck and opposed to one face of the latter cam-wheel, another lever opposed to the other face of said latter cam-wheel, and a rod connecting the latter lever with the spindle of the supporting chuck, substantially as set forth.

11. In a machine for making sheet-metal ves-

sels, the combination with driving and supporting chucks in opposition to each other, a revoluble shaft a starting and stopping cam-wheel carried on the shaft, an auxiliary cam-wheel fast on said shaft and having two faces timed alike for a certain portion of their peripheries and differentially timed for the remainder of said peripheries, a lever connected to the spindle of the driving-chuck and opposed to one face of the latter cam-wheel, another lever opposed to the other face of said latter cam-wheel, and a rod connecting the latter lever with the spindle of the supporting-chuck, substantially as set forth.

12. In a machine for making sheet-metal vessels, the combination with the chucking mechanism, of a rock-shaft, a seaming device carried thereon, a lever flexibly connected to the rock-shaft, and a resistance connected to said rock-shaft in opposition to the lever, substantially as set forth.

13. In a machine for making sheet-metal vessels, the combination of a rock-shaft having a pivotal cam-actuated bearing, a seaming device carried by the rock-shaft, an actuating-mechanism flexibly connected to said rock-shaft, a resistance connected to the rock-shaft in opposition to the actuating mechanism, and a stop for limiting the return movement of said bearing, substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand, at Milwaukee, in the county of Milwaukee and State of Wisconsin, in the presence of witnesses.

FRANCIS A. WALSH.

Witnesses:
N. E. OLIPHANT,
WM. KLUG.