(No Model.) 5 Sheets—Sheet 1.

F. A. WALSH.

SEAMING MACHINE FOR SHEET METAL VESSELS.

No. 382,499. Patented May 8, 1888.

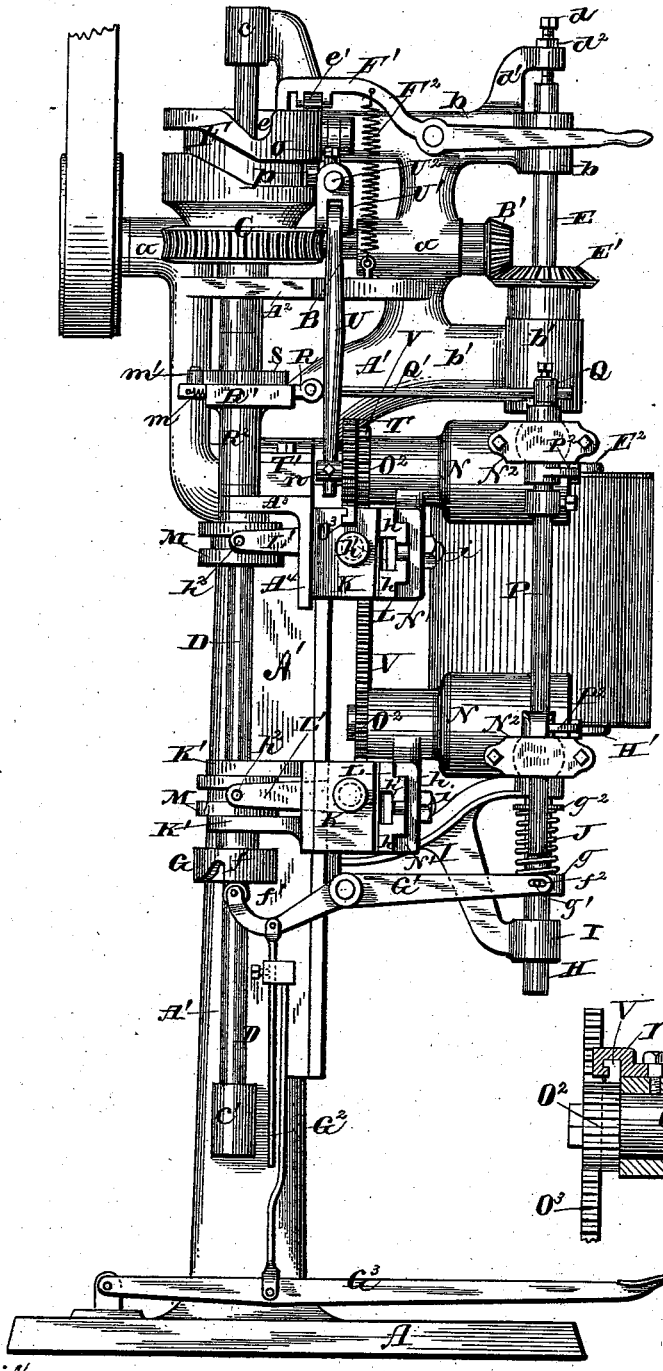

Fig. 1.

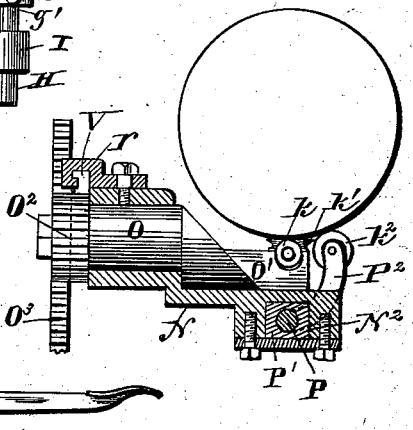

Fig. 2.

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(No Model.) 5 Sheets—Sheet 2.

F. A. WALSH.

SEAMING MACHINE FOR SHEET METAL VESSELS.

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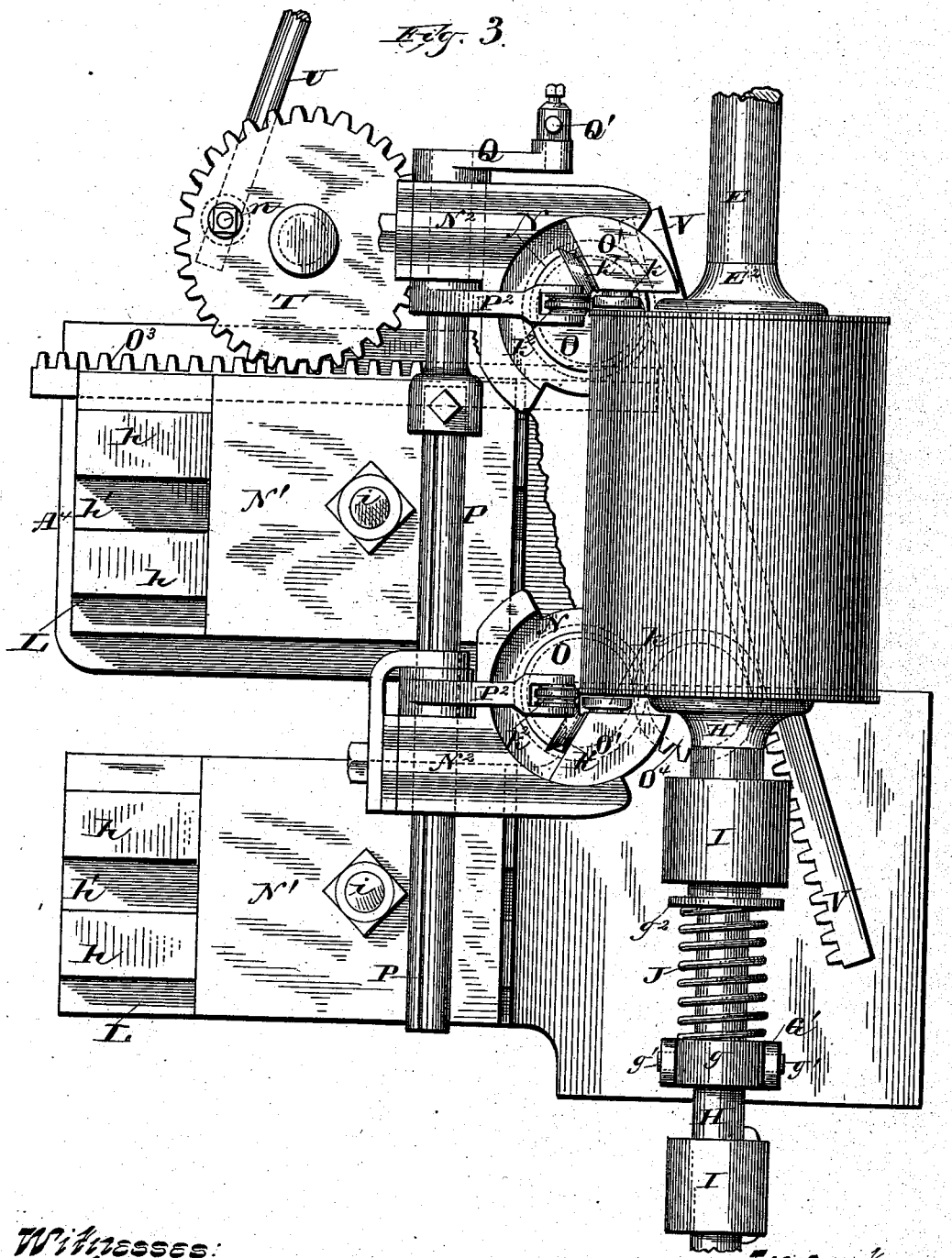
Fig. 3.



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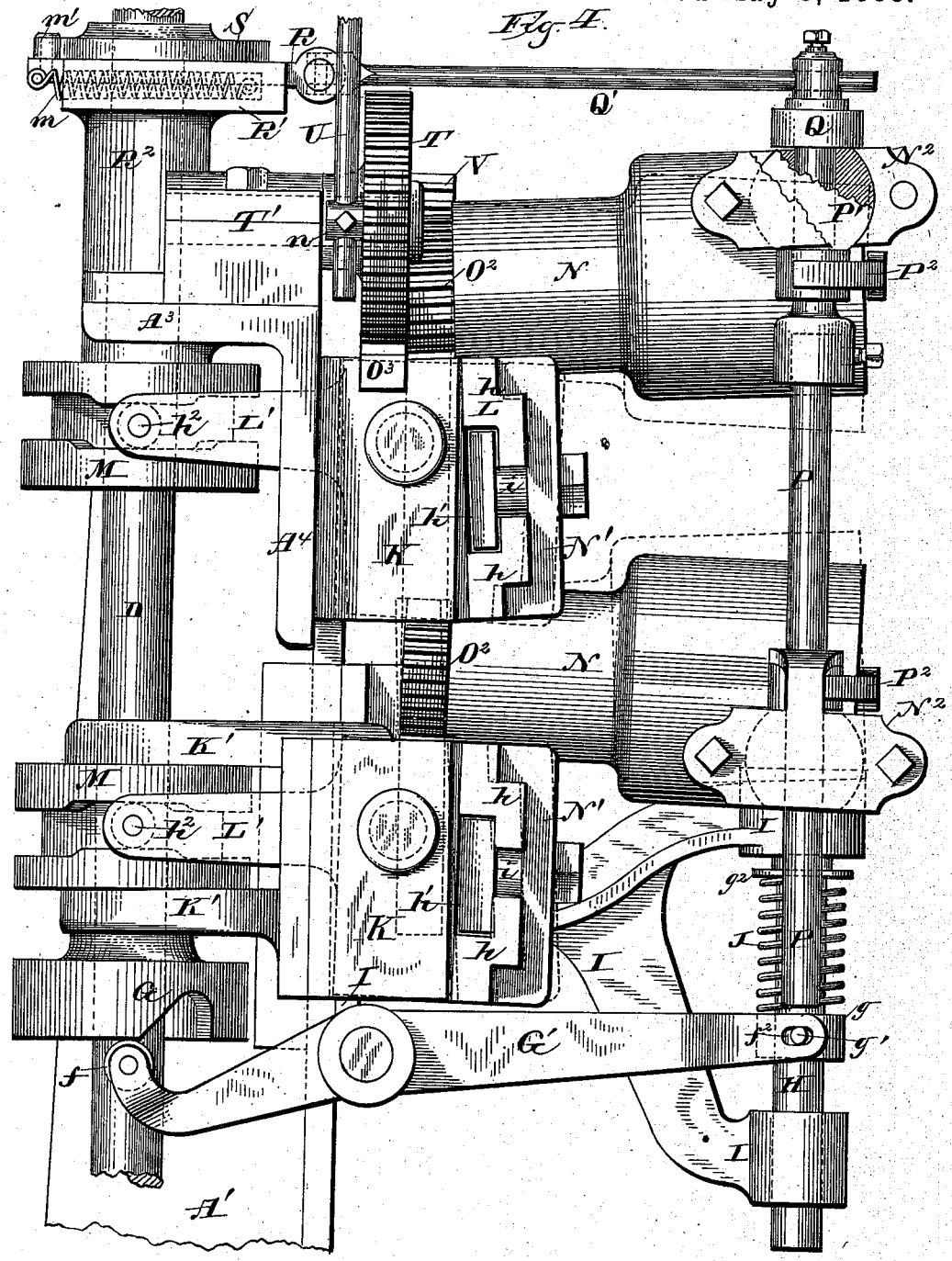
(No Model.) 5 Sheets—Sheet 3.

F. A. WALSH.

SEAMING MACHINE FOR SHEET METAL VESSELS.

No. 382,499. Patented May 8, 1888.

Fig. 4.



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(No Model.) 5 Sheets—Sheet 4.

F. A. WALSH.

SEAMING MACHINE FOR SHEET METAL VESSELS.

No. 382,499. Patented May 8, 1888.

Fig. 6.

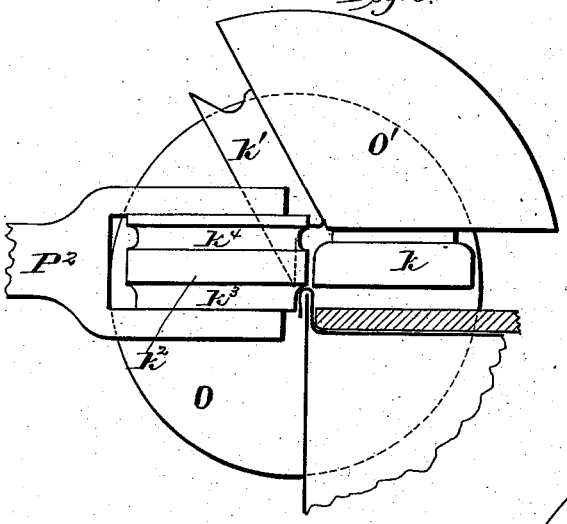


Fig. 5.

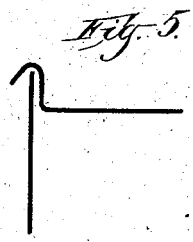


Fig. 7.

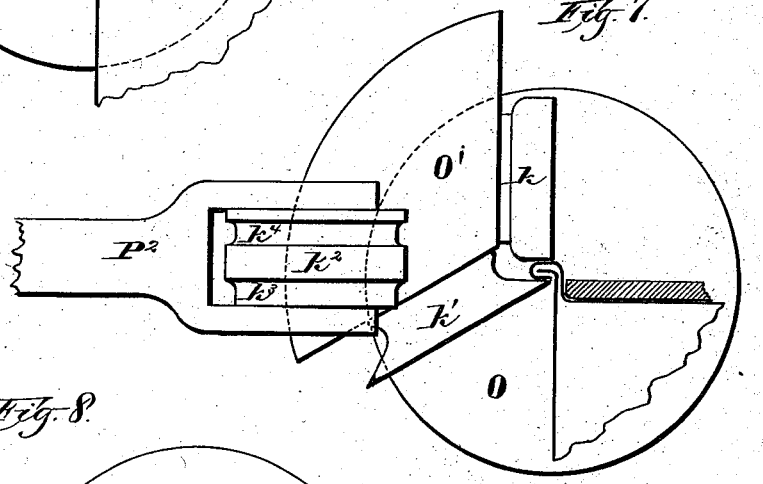
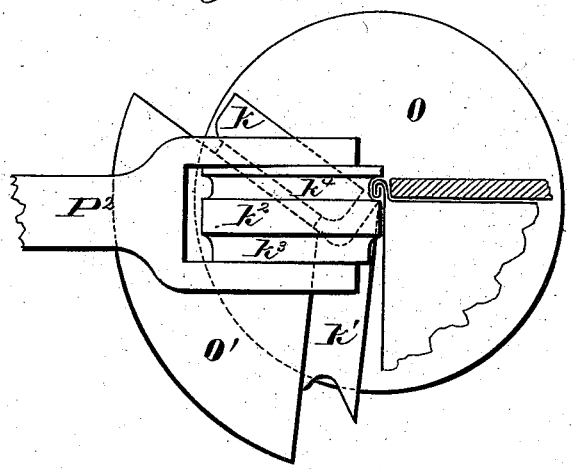


Fig. 8.



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(No Model.) 5 Sheets—Sheet 5.

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SEAMING MACHINE FOR SHEET METAL VESSELS.

No. 382,499. Patented May 8, 1888.

Fig. 9.

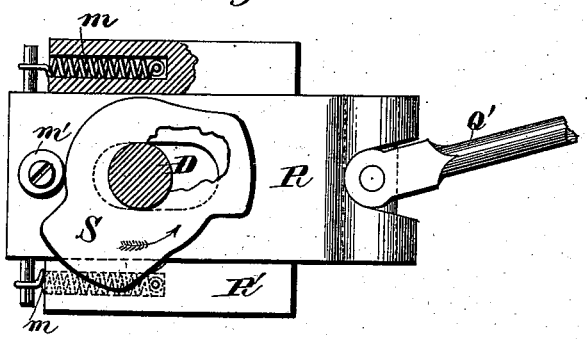


Fig. 10.

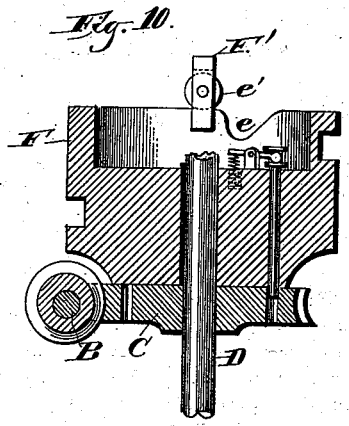


Fig. 11.

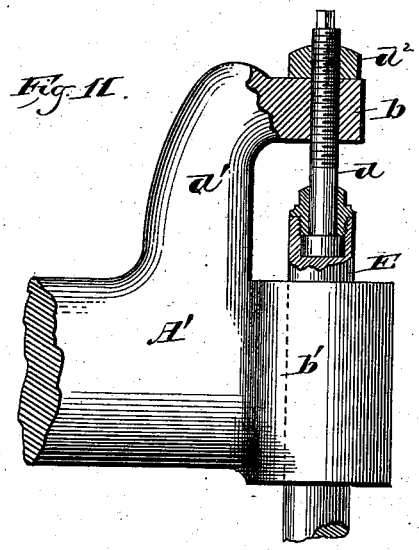


Fig. 12.

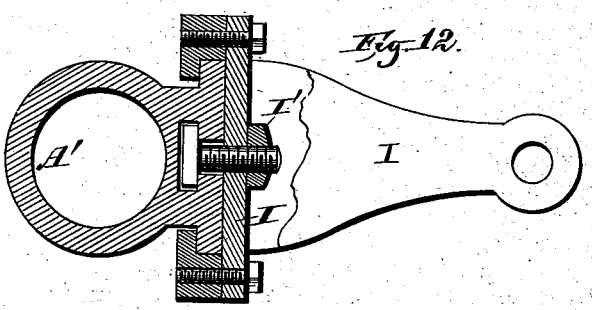
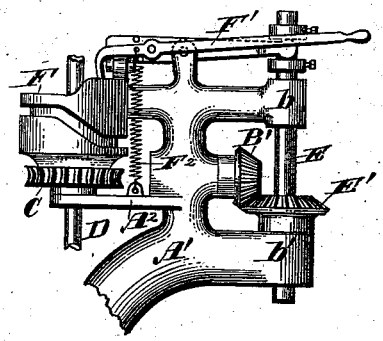


Fig. 13.



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UNITED STATES PATENT OFFICE.

FRANCIS A. WALSH, OF MILWAUKEE, WISCONSIN.

SEAMING-MACHINE FOR SHEET-METAL VESSELS.

SPECIFICATION forming part of Letters Patent No. 382,499, dated May 8, 1888.

Application filed January 3, 1887. Serial No. 223,200. (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 of Wisconsin, have invented certain new and useful Improvements in Machines for Working the Seams of 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 seaming sheet-metal vessels, being an improvement on my Patents No. 271,668, dated February 6, 1883, and No. 277,962, dated May 22, 1883; 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.

In the drawings, Figure 1 represents a side elevation of a machine constructed according to my invention; Fig. 2, a horizontal sectional view illustrating a rock-shaft, its bearing, and the seaming rolls or formers in operative position with relation to a sheet-metal vessel; Fig. 3, a front elevation of a portion of my machine; Fig. 4, a side elevation illustrating in full and dotted lines the different positions of the heads during the operation of forming the seam; Fig. 5, a sectional view of one end of a vessel body and cover as constructed before being worked on by my machine; Fig. 6, a detail view of the seaming mechanism with relation to a vessel during the first stage of forming the seam; Fig. 7, a similar view during the second stage; Fig. 8, a like view showing the third and last stage or the completion of the seam; Fig. 9, a detail of one of the cams and a sliding plate actuated by the same; Fig. 10, a detail sectional view showing a clutch mechanism employed in my machine; Fig. 11, a detail view showing the means for vertically adjusting the upper chuck-spindle; Fig. 12, a horizontal section showing the main standard, a bracket, and means for adjustably uniting said parts; and Fig. 13, a modification.

Referring by letter to the drawings, A represents the base, and A′ the main standard, of my machine provided with bearings *a*, for a horizontal driving-shaft, B, geared to a worm-wheel, C, loose on a vertical shaft, D, and provided at its inner end with a bevel gear-wheel, B′, that meshes with a similar wheel, E′, splined on a vertical spindle, E, the latter having its bearings in arms *b b′* of the main standard and carrying a detachable chuck, E^2, on its lower end.

Thus far the parts just described are somewhat similar to corresponding parts shown in my Patent No. 277,962, but differ therefrom, as follows: The vertical shaft D has its upper end loose in a bracket, *c*, projecting from the arm *b* of the standard, and is carried down to nearly the base A of the machine, where it is stepped in a bearing, *c′*, projecting from said standard, the latter being also provided with shelves A^2 A^3, through which said shaft passes, and at the same time the vertical spindle E has its upper end suitably secured to a set-screw, *d*, as shown in detail, Fig. 11, that operates in a bracket, *d′*, forming part of the arm *b* of the standard, this set-screw being provided with a jam-nut, d^2.

By means of the screw *d* the spindle E may be vertically adjusted to compensate for such slight variations as at times occur in the length of the chuck-collars or thickness of their faces, thereby enabling me to always have the chucks extend far enough into the countersinks of the vessel-tops to expose a sufficient amount of metal for the making of a proper seam.

Fast on the vertical shaft D is a cam-wheel, F, interiorly provided with a clutch mechanism, as illustrated in detail by Fig. 10, this mechanism being similar to that shown and described in my Patent No. 321,263, dated June 30, 1885, and therefore only briefly referred to in the present instance, said clutch mechanism serving to unite the cam-wheel with the worm-wheel C when the lever F′, fulcrumed to the arm *b* of the standard A′, is drawn down, said lever being connected by a spring, F^2, with the shelf A^2 on the standard. By thus actuating the lever F′ the roulette *e′* on its inner end is brought out of the notch *e* in the cam-wheel F, to thereby set the seaming mechanism in operation, as will be hereinafter more fully described.

The lower portion of the vertical shaft D is provided with a wheel, G, feathered thereto and having a cam-notch, *f*, that engages a roulette, *f′*, on a lever, G′, fulcrumed to a bracket, I, and connected by an adjustable rod, G^2, with a foot-lever, G^3, fulcrumed to the base A of the machine. The outer end of the lever G′ is pro-

vided with a slot, f^2, that engages a stud, g', on a collar, g, of a vertical spindle, H, in line with the one E, and carrying at its upper end a detachable chuck, H', said spindle H having its bearings in the bracket I, feathered to the main standard, so as to be vertically adjustable thereon, said bracket being held in its adjusted position by a set bolt and nut, I', as illustrated in detail, Fig. 12. A loose collar, g^2, is arranged on the spindle H immediately below its upper bearing, and between this latter collar and the stationary one g is located a spiral spring, J; but, if found desirable, this spring may be omitted, as its only function is to give the lower chuck, H', a spring-bearing against the vessels operated upon by my machine.

The shelf A^3 on the standard has a vertical depending portion, A^4, that has cast therewith or bolted thereto a box, K, in which is fulcrumed a block, L, provided at its front with an extension having right-angular shoulders h and a ⊢-shaped slot, h', the rear of this block having projected therefrom an arm, L', provided with a suitable stud, h^2, or roulette, to engage a cam-wheel, M, feathered on the vertical shaft D.

Secured to the block L, by means of a ⊢-shaped bolt, i, so as to be laterally adjustable thereon, is the vertical depending flange N' of a bearing, N, for a shaft, O, the latter being preferably cut away at the front to form a triangular piece, O', to the plane faces of which are secured rolls or formers k k', the latter being either stationary or movable, as may be found most desirable.

The bearing N at its extreme front is provided with a chamber, N^2, for a loose disk, P', that forms a bearing for a vertical shaft, P, the latter having feathered thereon an arm, P^2, to which is operatively connected a roll or former, k^2. In some instances the bearing P' may be fixed, and I do not therefore limit myself to a loose disk. It will also be understood that the shaft P may be journaled independent of the heads, or I may omit said shaft and the arm connected thereto.

Fast on the upper end of the vertical shaft P is a crank-arm, Q, connected by a rod, Q', with a sliding plate, R, operative in a guide-piece, R', having a depending sleeve, R^2, that surrounds the vertical shaft D. The guide-piece R' is chambered on each side to receive springs m, each having one end thereof secured to said guide-piece and the other end fast to the sliding plate R, as best illustrated by full and dotted lines, Fig. 4, and said sliding plate is provided with a lug or roulette, m', that comes in the path of a cam, S, on the vertical shaft D, this arrangement of parts serving to operate the crank-arm Q at the proper time and cause the roll or former k^2 to do its work.

The inner end of the shaft O carries a toothed pinion, O^2, that meshes with a horizontal rack, O^3, operatively arranged in the box K on the right-angular shelf A^3. Said rack in turn meshes with a pinion, T, journaled in a bearing, T', on said shelf, and provided with a stud, n, to which is made fast the lower end of a vertical rod, U, that is detachably connected by a shackle, U', and set-screw o with a lever-arm, U^2, fulcrumed to the upper arm, b, of the standard A', and said lever-arm is provided with a stud or roulette, p, that engages the cam-groove in the wheel F.

The bearing N, shaft O, and the several parts immediately connected therewith constitute what I term a "head," and hereinafter this term will be at times employed to designate said aggregation of parts.

It will be understood that the pinion O^2 is connected to the shaft O in such a manner that it may be loosened therefrom when the head is laterally adjusted, thus preventing the shaft O from being rocked during such operation, or when adjusting the head for work on straight or flaring bodies. Thus far I have only described a single head, the latter, in connection with the other operative parts, being all that is necessary in a machine for seaming but one end or cover piece to the body of a sheet-metal vessel.

Where it is desirable to seam both the top and bottom pieces to the vessel-body at one operation, I provide another head similar in general construction to the one already described, and likewise connected to a cam-wheel on the vertical shaft D.

It will be noticed that the box K, to which the lower head is fulcrumed, has arms K', that loosely fit the shaft D and move thereon with the adjacent cams, M G, when it is desirable to vertically adjust this latter head on said shaft. In order to operate both heads at one time, I double the width of the pinion O^2 on the shaft O belonging to the upper head and have it mesh with a vertically-disposed rack, V, that has a guide, r, secured to the shaft-bearing N of said upper head, and to the lower head I journal an intermediate toothed pinion, O^4, that communicates motion to the pinion on the shaft of the lower one of said heads. The vertical shaft P is carried down and connected to the lower head by the same means employed for connecting it with the upper head, and an arm carrying a roll or former, k^2, is made fast to said shaft.

In the operation of my invention I will describe the machine as constructed to seam both the top and bottom ends to a vessel-body, such a machine being illustrated in the drawings.

A vessel-body with its top and bottom pieces in position thereon, as shown by Fig. 5, is placed on the lower chuck, H', and the foot-lever G^3 depressed to draw the roulette f' out of the notch f in the cam G on the vertical shaft D and at the same time to bring the vessel up against the chuck E^2, the latter being continuously run by its gear-connection with the driving-shaft B. The frictional contact of the vessel and chuck E^2 causes said vessel, with its chuck H', to be revolved at a comparatively high rate of speed without being affected by the seaming mechanism until the lever F' is drawn

down by the operator to permit the cam-wheel F to clutch the worm-wheel C and thereby set in motion the vertical shaft D and the several parts connected therewith, the roulette e' being drawn out of the notch e in said cam-wheel at the same time. The cam S on the vertical shaft D has such a profile that the grooves k^3 in the formers k^2 belonging to the respective heads are held for a time against the flanges of the top and bottom pieces that come over on the outside of the vessel-body, thereby bending these flanges down against said vessel-body to form a single seam, as illustrated by the enlarged detail view, Fig. 6. By the time a single seam has been completed the roulette m' on the sliding plate R will be drawn by the springs m into a depression of the cam S and said sliding plate thereby moved forward in the guide-piece R′ by the contraction of said springs, and by the rod-and-crank connection Q′ Q the vertical shaft P will be turned in its bearings to bring the rolls or formers k^2 away from the seams, and simultaneously the heads will be tilted by the profile of the cams M (best shown in Fig. 4) to bring the rolls or formers $k\,k'$ into position astride said seams, the plane faces or enlarged central portion of the rolls or formers k^2 being in the meantime held against the seams to close them tight against the body of the vessel. In case the shaft P and its arms P^2 should be omitted the bending down of the flanges on the cover-pieces and finishing of the single seams would be accomplished by the rolls or formers $k\,k'$, the movement of the shaft O being suitably timed for this operation.

The operations just described are simultaneous, and by the time of their completion the groove in the cam-wheel F, acting on the stud or roulette p, causes the lever-arm U^2 to depress the rod U and thereby set in motion the pinion T, the latter operating the rack O^3, that in turn actuates the shaft O of the upper head through the medium of the pinion-connection O^2. At the same time this pinion O^2 actuates the vertically-disposed rack V, that in turn, through the medium of the gear above described, communicates motion to the shaft in the lower head, the intervals between the teeth in said rack being sufficiently wide to permit the tilting of the heads.

By the construction and arrangement of parts just specified the shafts O are rocked in an outward direction to bring the rolls or formers $k\,k'$, together with the seams, into the position shown by Fig. 7, this rocking motion being continued until said heads are brought to the position shown in Fig. 8. By this time the rolls or formers $k\,k'$ have passed out of contact with the seams, and the rolls or formers k^2 have been brought back by the second action of the cam S, so that their grooves k^4 are brought against said seams to bend the latter close against the vessel-body and thereby finish the double seams.

In some instances the grooves $k^3\,k^4$ may be omitted from the rolls or formers k^2, and these latter parts given a flat face, especially when it is not desirable to make bead-like seams; and in case the shaft P and its arms P^2 are omitted the shaft O will be given a movement to cause the rolls or formers k' to finish the double seams. The groove in the cam-wheel F, operating on the stud or roulette p, causes the pinion and rack gear to operate in a reverse direction to that already described, thereby rocking back the heads, while at the same time said heads tilt back to their first position.

All the above-described operation takes place while the vertical shaft D is making one revolution, the vessel being revolved at a comparatively high rate of speed, as before stated. By the time the shaft D has completed its revolution the lever F′ is drawn down by the spring F^2, to disengage the clutch mechanism that connects the cam-wheel F with the worm-wheel C, the roulette e' on said lever enters the notch e in said cam-wheel, and at the same instant the roulette f' on the lever G′ enters the notch f in the cam G, thus causing the spindle H to drop and carry therewith the lower chuck, H′, whereby the finished vessel is stopped from rotating and can be removed by the operator, or is thrown away from the machine.

From the time the vessel-body with its loose covers is brought in contact with the upper chuck, E^2, and the starting-lever F′ drawn down, the entire operation of seaming is automatically performed and said vessel likewise released upon the completion of such operation.

It will be noticed that the mechanism for elevating the lower chuck, H′, is entirely independent of the seaming mechanism, and consequently the vessel may be revolved for any length of time before or after the said seaming mechanism is brought into operation, it being only necessary to depress and hold down the foot-lever G^3 in order to accomplish the elevation of said chuck and keep the roulette f' out of the notch f in the cam G until it is desirable to stop the revolution of said vessel.

The feature of my machine just described is particularly desirable when said machine is employed for seaming tops onto filled vessels, as it often happens that some of the contents will escape, and hence said vessels can be more readily cleansed while being revolved.

My machine as thus far described is more particularly designed for double-seaming the top or bottom pieces, or both, to vessel-bodies; but said machine may be adapted for other uses in the art of making sheet-metal vessels.

If desirable to have the upper head only operate upon the vessel, the vertically-disposed rack V may be detached, so as to cut off motion from the lower head, and in case it may not be necessary to have both heads rock, to perform the seaming-operation and still utilize the rolls or formers k^2, I simply release the shackle U′ from the lever-arm U^2, thereby preventing the horizontal rack O from being actuated.

For seaming heavy stock, or at any time it may be necessary, I propose to duplicate the parts Q Q′, R R′, and S, and connect them directly to the shaft P, or that portion thereof belonging to the lower head.

I have shown the spindle E as normally stationary in a vertical direction; but it is obvious that I may spline the same to the gear-wheel E′, and connect said spindle by a pivoted yoke to the upper portion of the standard A′, and at the same time give the top face of the cam-wheel F a profile similar to that of the cams M, and impinge this cam-face against a stud or roulette forming part of the yoke, as illustrated by Fig. 13, this construction being somewhat similar to that shown and described in my Patent No. 277,962, dated May 22, 1883. In such a construction the lower seaming-head would not be employed, while the upper head would be rigidly connected to its box K, and the arm L, belonging to said head, as well as the cam M relative thereto on the shaft D, omitted.

By the construction just described a vertical movement would be given to the chucked vessel at predetermined intervals during the operation of seaming, to bring said vessel into the various positions relative to the rolls or formers belonging to the upper head.

The arrangement of parts latterly set forth serves the same purpose as that shown in the drawings, and more particularly described in the foregoing specification, the only difference being that predetermined vertical movements are given the vessel, instead of tilting the heads, to accomplish the same result.

In case my machine is constructed as last described the spring J is employed to cause the lower spindle, H, with its chuck H′, to move with the vessel in a vertical direction; or, if found more desirable, the spring may be omitted and the cam-wheel G given such a profile on its lower face as will cause the lever G′ to rise and fall at predetermined intervals.

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

1. In a machine for working the seams of sheet-metal vessels, the combination of a non-reciprocating revolving chuck, a movable chuck opposing the one first named, a fulcrumed bearing, a shaft arranged in the bearing, rolls or formers carried on the shaft, and suitable mechanism for actuating the movable chuck, tilting the bearing, and rocking said shaft at predetermined intervals, substantially as set forth.

2. In a machine for working the seams of sheet metal vessels, two fulcrumed bearings, a shaft arranged in each bearing, rolls or formers carried on each shaft, and suitable mechanism for simultaneously tilting the bearings and rocking the shafts at predetermined intervals, substantially as set forth.

3. In a machine for working the seams of sheet-metal vessels, the combination of a continuously-revolving chuck, a normally-stationary chuck arranged in opposition to the one first named and provided with a loosely-journaled spindle, a lever pivoted to the frame of the machine and connected at one end to the spindle, a shaft geared to a driving mechanism, and a cam carried by the shaft and so positioned as to impinge against the end of said lever opposite that connected with said spindle, whereby the spindle and its chuck are raised and lowered at predetermined intervals, substantially as set forth.

4. In a machine for working the seams of sheet-metal vessels, the combination of a continuously-revolving chuck, a normally-stationary chuck in opposition to the one first named and provided with a loosely-journaled spindle, a lever pivoted to the frame of the machine and connected at one end to the spindle, a shaft geared to a driving mechanism, a cam carried by the shaft and so positioned as to impinge against the end of the lever opposite that connected with said spindle, and a treadle mechanism for actuating said lever independent of the cam, substantially as set forth.

5. In a machine for working the seams of sheet-metal vessels, the combination of a continuously-revolving chuck, a normally-stationary chuck in opposition to the one first named and provided with a loosely-journaled spindle, a spring arranged on the spindle, a lever pivoted to the frame of the machine and connected at one end to said spindle in opposition to the spring, a shaft geared to a driving mechanism, and a cam carried by the shaft and so positioned as to impinge against the end of the lever opposite that connected with said spindle, substantially as set forth.

6. In a machine for working the seams of sheet-metal vessels, the combination of a main standard, a bracket suitably connected to the standard, a chuck having its spindle loosely journaled in the bracket, a lever fulcrumed to the bracket and operatively united at one end to the chuck-spindle, a shaft having a loose gear-connection with a driving mechanism, a cam fast on the shaft, a clutch mechanism for uniting the cam and gear, a notched wheel arranged on said shaft to impinge against the other end of the chuck-lever, and a chuck in opposition to the one first named, substantially as set forth.

7. In a machine for working the seams of sheet-metal vessels, a head comprising a suitable block, a bearing secured to the block, a shaft arranged in the bearing and provided with rolls or formers, a suitably-arranged shaft carrying an arm provided with a roll or former, and suitable means for imparting a partial revolution to the last-named shaft at predetermined intervals, substantially as and for the purpose set forth.

8. In a machine for working the seams of sheet-metal vessels, a head comprising a fulcrumed block, a bearing secured to the block, a shaft arranged in the bearing and provided with rolls or formers, a suitably-arranged shaft

carrying an arm provided with a roll or former, and suitable means for tilting the head and for actuating the shafts at predetermined intervals, substantially as and for the purpose set forth.

9. In a machine for working the seams of sheet-metal vessels, the combination of a main standard provided with a suitable box, a head comprising a block fulcrumed to the box, a bearing secured to the block, and a shaft arranged in the bearing and provided with rolls or formers, a rack operative in said box, a pinion on said shaft arranged to engage the rack, and means, substantially as described, for actuating said rack, as and for the purpose set forth.

10. In a machine for working the seams of sheet-metal vessels, the combination of a main standard provided with a suitable box, a head comprising a block fulcrumed to the box, a bearing secured to the block, and a shaft arranged in the bearing and provided with rolls or formers, a rack operative in said box, a pinion on said shaft arranged to engage the rack, a suitably-arranged shaft carrying an arm provided with a roll or former, and suitable means for tilting the head, operating the rack, and actuating the last-named shaft at predetermined intervals, substantially as and for the purpose set forth.

11. In a machine for working the seams of sheet-metal vessels, the combination of a main standard, a head comprising a block fulcrumed to the standard, a bearing adjustably united to the block, and a rock-shaft arranged in the bearing and provided with rolls or formers, a suitably-arranged shaft carrying an arm provided with a roll or former, and suitable means for actuating the shafts at predetermined intervals, substantially as and for the purpose set forth.

12. In a machine for working the seams of sheet-metal vessels, the combination of a main standard provided with a suitable box, a head comprising a block fulcrumed to the box, a bearing secured to the block, and a shaft arranged in the bearing and provided with rolls or formers, a rack operative in said box, a pinion on said shaft arranged to engage the rack, another pinion engaging said rack, a rod having its lower end wristed to the latter pinion, a lever-arm fulcrumed to said standard and united with the rod, a suitably-arranged shaft carrying an arm provided with a roll or former, and suitable means for tilting the head and actuating the lever-arm and last-named shaft, substantially as and for the purpose set forth.

13. In a machine for working the seams of sheet-metal vessels, the combination of a main standard, a head comprising a block suitably secured to the standard, a bearing united to the block, and a rock-shaft arranged in the bearing and provided with rolls or formers, a suitably-arranged shaft carrying an arm provided with a roll or former, a sliding plate operatively connected by a rod with the last-named shaft, and suitable means for actuating the rock shaft and sliding plate at predetermined intervals, substantially as and for the purpose set forth.

14. In a machine for working the seams of sheet-metal vessels, the combination of a main standard, a head comprising a block suitably secured to the standard and provided with a ⊢-shaped slot and shoulders, a bearing having a flange fitted to slide on said shoulders and secured to the block by a ⊢-bolt, a rock-shaft arranged in the bearing and provided with rolls or formers, a suitably-arranged shaft carrying an arm provided with a roll or former, and suitable means for actuating the shafts at predetermined intervals, substantially as and for the purpose set forth.

15. In a machine for working the seams of sheet-metal vessels, the combination of a main standard, two heads, each comprising a block suitably secured to the standard, a bearing united to the block, a rock-shaft arranged in the bearing and provided with rolls or formers, a suitably-arranged shaft carrying arms provided with rolls or formers, and suitable means for simultaneously operating both rock-shafts and actuating the arm-shaft at predetermined intervals, substantially as and for the purpose set forth.

16. In a machine for working the seams of sheet-metal vessels, the combination of a main standard, two heads, each comprising a block suitably secured to the standard, a bearing united to the block and provided with a chamber, a rock-shaft arranged in the bearing and provided with rolls or formers, and a disk loosely arranged in the chamber, a shaft journaled in the disks and carrying arms provided with rolls or formers, and suitable means for simultaneously operating both rock-shafts and actuating the arm-shaft at predetermined intervals, substantially as and for the purpose set forth.

17. In a machine for working the seams of sheet-metal vessels, the combination of a main standard, two heads, each comprising a block suitably secured to the standard, a bearing united to the block, and a shaft arranged in the bearing and provided with rolls or formers, a pinion on each shaft, a horizontal rack arranged to engage the pinion of one shaft, a vertically-disposed rack, also arranged to engage this pinion, an intermediate pinion arranged to engage the latter rack and the pinion on the other shaft, a suitably-arranged shaft carrying arms provided with rolls or formers, and suitable means for actuating the horizontal rack and the last-named shaft at predetermined intervals, substantially as and for the purpose set forth.

18. In a machine for working the seams of sheet-metal vessels, the combination of a main standard, two heads suitably secured to the standard, to be laterally adjustable with relation thereto, and one of said heads vertically adjustable on said standard, each head having a shaft arranged in a bearing and provided with rolls or formers, a pinion on each shaft,

a horizontal rack arranged to engage the pinion on one shaft, a vertically-disposed shaft arranged to engage this pinion, an intermediate pinion arranged to engage the latter rack and the pinion on the other shaft, a suitably-arranged shaft carrying arms provided with rolls or formers, and suitable means for actuating the horizontal rack and last-named shaft at predetermined intervals, substantially as and for the purpose set forth.

19. In a machine for working the seams of sheet-metal vessels, the combination of a main standard, a shaft having its bearings on the standard, a head fulcrumed to said standard and provided with an arm, a rock-shaft journaled in the head and provided with rolls or formers, a chucking mechanism, and cams arranged on said shaft to engage the arms on the head and actuate said chucking mechanism, substantially as set forth.

20. In a machine for working the seams of sheet-metal vessels, the combination of a main standard, a shaft having its bearings on the standard and provided with a series of cams, a chuck normally held in one position and continuously revolved, a sliding chuck in opposition to the one first named and normally non-revoluble, a lever mechanism arranged to actuate the latter chuck independent of the seaming mechanism, suitable heads fulcrumed to said standard and provided with arms to engage the cams on the shaft, and rock-shafts carrying rolls or formers, another shaft journaled to the heads and carrying arms provided with rolls or formers, a spring sliding plate operatively connected to the latter shaft, a cam on the former shaft arranged to actuate the sliding plate at predetermined intervals, and suitable means for starting and automatically stopping the revolution of said former-shaft, imparting a simultaneous movement to both rock-shafts and automatically unchucking the vessel, substantially as and for the purpose set forth.

21. In a machine for working the seams of sheet-metal vessels, the combination of a main standard provided with a suitable box, a head comprising a block fulcrumed to the box, a bearing secured to the block, and a shaft arranged in the bearing and provided with rolls or formers, a rack operative in said box, a pinion on said shaft arranged to engage the rack, and suitable means for tilting the head and operating the rack, substantially as and for the purpose set forth.

22. In a machine for working the seams of sheet-metal vessels, the combination of a main standard provided with a suitable box, a head comprising a block fulcrumed to the box, a bearing secured to the block, and a shaft arranged in the bearing and provided with rolls or formers, a rack operative in said box, a pinion on said shaft arranged to engage the rack, another pinion engaging said rack, a rod having its lower end wristed to the latter pinion, a lever-arm fulcrumed to said standard and united to the rod, and suitable means for tilting the head and actuating the lever-arm, substantially as and for the purpose set forth.

23. In a machine for working the seams of sheet-metal vessels, the combination of a main standard, a head comprising a block suitably secured to the standard and provided with a ⊢-shaped slot and shoulders, a bearing having a flange fitted to slide on said shoulders and secured by a ⊢-bolt, a rock-shaft arranged in the bearing and provided with rolls or formers, and suitable means for actuating the shaft at predetermined intervals, substantially as and for the purpose set forth.

24. In a machine for working the seams of sheet-metal vessels, the combination of a main standard, two heads, each comprising a block suitably secured to the standard, a bearing united to the block, and a rock-shaft arranged in the bearing and provided with rolls or formers, and suitable means for simultaneously operating both rock-shafts at predetermined intervals, substantially as and for the purpose set forth.

25. In a machine for working the seams of sheet-metal vessels, the combination of a main standard, two heads, each comprising a block suitably secured to the standard, a bearing united to the block, and a shaft arranged in the bearing and provided with rolls or formers, a pinion on each shaft, a horizontal rack arranged to engage the pinion of one shaft, a vertically-disposed rack, also arranged to engage this pinion, an intermediate pinion arranged to engage the latter rack and a pinion on the other shaft, and suitable means for actuating the horizontal rack at predetermined intervals, substantially as and for the purpose set forth.

26. In a machine for working the seams of sheet-metal vessels, the combination of a main standard, two heads suitably secured to the standard, to be laterally adjustable with relation thereto, and one of said heads vertically adjustable on said standard, each head having a shaft arranged in a bearing and provided with rolls or formers, and a pinion on each shaft, a horizontal rack arranged to engage the pinion on one shaft, a vertically-disposed shaft arranged to engage this pinion, an intermediate pinion arranged to engage the latter rack and the pinion on the other shaft, and suitable means for actuating the horizontal rack, substantially as and for the purpose set forth.

27. In a machine for working the seams of sheet-metal vessels, the combination of a main standard, a shaft having its bearings on the standard and provided with a series of cams, a chuck normally held in one position and continuously revolved, a sliding chuck in opposition to the one first named and normally non-revoluble, a lever mechanism arranged to actuate the latter chuck independent of the seaming mechanism, suitable heads fulcrumed to said standard and provided with arms to engage cams on the shaft and rock-shafts carrying rolls or formers, and suitable means for

starting and automatically stopping the revolution of the former-shaft, imparting a simultaneous movement to both rock-shafts and automatically unchucking the vessel, substantially as and for the purpose set forth.

28. In a machine for working the seams of sheet-metal vessels, the combination of a chucking mechanism, a seaming mechanism, and a revoluble shaft provided with a series of cams arranged at intervals thereon to directly actuate said mechanisms, substantially as set forth.

29. In a machine for working the seams of sheet-metal vessels, the combination of a chucking mechanism, a seaming mechanism, and a revoluble shaft provided with a series of cams arranged at intervals thereon to directly actuate said mechanisms, and so timed that a vessel is chucked, seamed, and released by one revolution of the shaft, 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 two witnesses.

FRANCIS A. WALSH.

Witnesses:
N. E. OLIPHANT,
MAURICE F. FREAR.