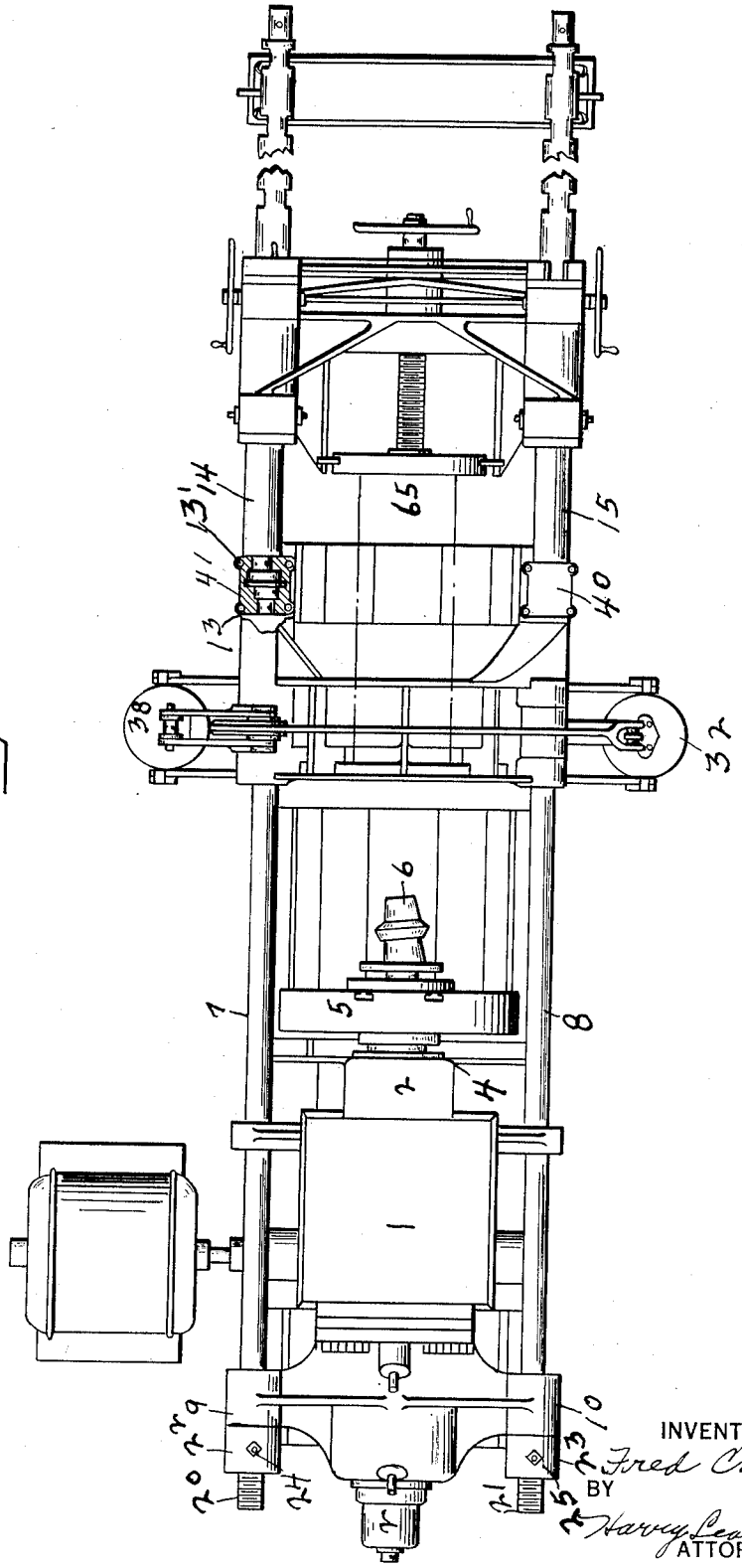
April 17, 1934. F. C. FANTZ 1,955,119

DIE CLAMP FOR MACHINES FOR FLANGING PIPES

Original Filed Aug. 13, 1930 2 Sheets-Sheet 1

Fig. 1.



INVENTOR
Fred C. Fantz
BY
Harvey Lea Dodson
ATTORNEY

April 17, 1934. F. C. FANTZ 1,955,119

DIE CLAMP FOR MACHINES FOR FLANGING PIPES

Original Filed Aug. 13, 1930 2 Sheets-Sheet 2

Fig. 2.

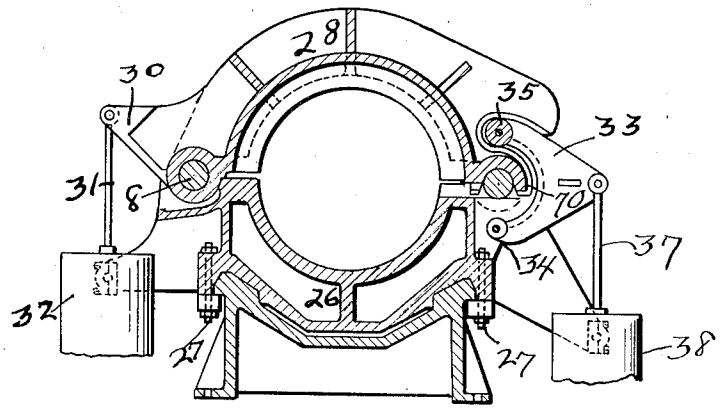


Fig. 3.

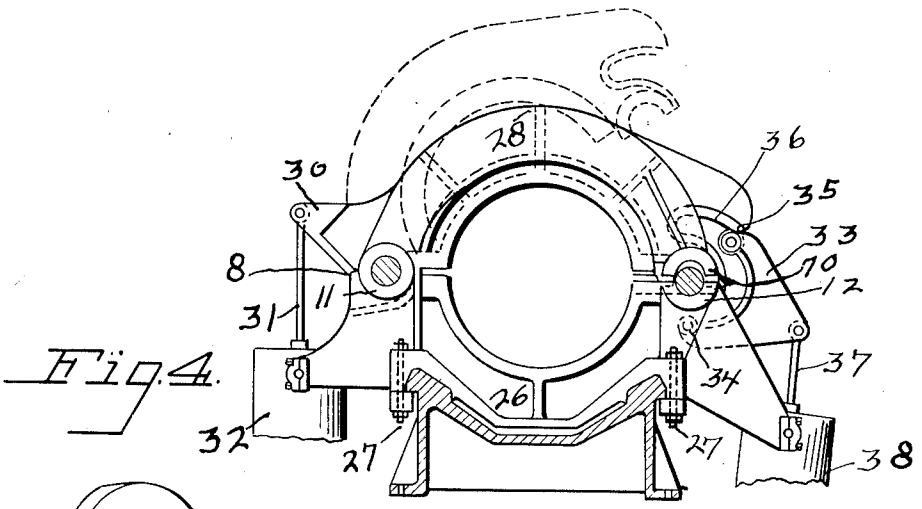
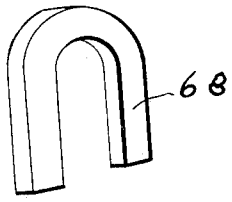


Fig. 4.



INVENTOR
Fred C. Fantz
BY
Harry Bea Dodson
ATTORNEY

Patented Apr. 17, 1934 1,955,119

UNITED STATES PATENT OFFICE

1,955,119

DIE CLAMP FOR MACHINES FOR FLANGING PIPES

Fred C. Fantz, Webster Groves, Mo., assignor to Midwest Piping & Supply Co. Inc., St. Louis, Mo., a corporation of Missouri

Original application August 13, 1930, Serial No. 474,921. Divided and this application March 25, 1931, Serial No. 525,134

7 Claims. (Cl. 78—14)

My invention relates to that type of machines described in my copending application, Serial No. 474,921 filed August 13, 1930 of which this is a division.

Machines of this character, which are designed primarily for what is termed jobbing work, and which are not at all production machines, have a totally different fact situation to meet than would be the case if it were a production machine designed to handle a large number of pipes of the same dimension at a single setting.

A machine constructed in accordance with my invention is intended to, and does, handle a large variety of lengths, styles and diameters of pipe. In machines of this character the flanging operation is performed in conjunction with a pair of dies carried by a clamp. It is important that these dies should be clamped very tightly in order to maintain a predetermined shape and dimensions, the tremendous pressure to which they are subjected during the working operations tend to cause them to open and change the shape and dimensions.

As is well known to persons skilled in the art the diameter of these tubes, particularly large sizes, varies considerably and if the dies are fitted to a tube of a certain diameter and the variation of the next tube was larger than the one to which the dies had been fitted, obviously they could not be used. Moreover these pipes have their diameter altered to a very considerable extent by the heating required for the purpose of forging the flange on the end of the pipe or tube, therefore it is not necessary for the dies to clamp the tube or pipe.

In flanging these pipes or tubes the time element is of the utmost importance; for example—it takes a considerable period of time to heat the pipe or tube to forging temperature which must be at least 1700° F. or over. Therefore the more nearly the work can be advanced towards completion during each heat, the more desirable the machine is and the more the time element can be lowered. For example, if it were desired to make a 4 inch gather on a tube, it is necessary for the operator to take a number of push ups on a single heat, for owing to the comparative thinness of the pipe, it is impossible to make a 4 inch gather in one operation as the wall will buckle and then can not be upset without folding. Moreover to attempt to make such a gather as that would largely increase the liability to produce cold shorts.

Because of these facts it is highly desirable to perform as many forging operations on the pipe as can be done while the temperature is within the forging range.

In order to make a push up, it is necessary to release the clamp holding the dies and then the pipe or tube is advanced by means of a tailstock the desired distance. Now if the clamp has to be thrown wide open, a very considerable period of time is required, all of which is permitting the heated end of the pipe or tube to cool below the proper forging temperature. In addition to this loss of time, unless the machine is stopped (entailing another loss of time) the flanging tool operating on the pipe is liable to lift the pipe out of the lower die and cause a great deal of delay and damage, whereas if the clamp can be opened a very little bit, just enough to permit the tailstock to advance the tube sufficiently for another operation, not only will the delay accompanying the opening of the clamp be avoided but also the possible danger or damage if the operator fails to stop the machine before opening the clamp.

Practice has shown that it is almost impossible to hold a clamp on a machine of this character in which the dies against which the flange of the pipe is being formed so that it will not weave and open a very considerable amount.

Another objection to machines with which I am familiar, as developed in practice, is that no provision is made whereby the dies may be adjusted toward or away from the spindle face plate. Even when attempts have been made in practice to partially open the clamp to permit the push up, i. e. the moving up of the pipe so that a second working can be had for the same heat, it was necessary to "spot" the lock in some manner so that the operator would know how much more he had to move it before he could open the clamp wide to return the pipe to the furnace or remove it if the forging operation were complete.

My invention has for its principal object to provide a clamp which holds the dies which may be adjusted toward or from the spindle face plate, this adjustment being most desirable for the purpose of taking care of various classes of work, some of which require longer operations, and others a greater distance between the clamp and the spindle.

My invention has for its further object, to provide a construction in which the tension rods pass through the clamp which holds the dies, and this, to all intents and purposes, overcomes the weaving.

My means of accomplishing the foregoing ob-

jects may be more readily understood by having reference to the accompanying drawings in which—

Fig. 1 is a top or plan view of my improved machine;

Fig. 2 is a cross section of my improved clamping device for holding the forming dies; and

Fig. 3 is a similar view showing the clamping device partially opened, its opened position being indicated in dotted lines.

Similar reference numerals refer to similar parts throughout the entire description.

As shown in the drawings, my device comprises a machine having a head stock 1, and bearings 2 for the spindle 4 of the machine, the face plate 5 is provided with a wabbler 6 such as is shown in my Patent No. 1,696,229.

The entire strain produced by the work on this machine is taken care of by two strain-bars or tension rods 7 and 8 and 14 and 15, the tension rods 7 and 8 are carried in supports 9 and 10 and 11 and 12. I provide collars 40 and 41 which are formed to connect the ends of the tension or tie rods 14 and 15 and 7 and 8 and are provided with sockets to receive heads formed on the ends of the rods 7 and 8 and 14 and 15, respectively, as clearly seen in Fig. 1. The rods 7 and 8 are provided with threaded ends 20 and 21 which project beyond the supports 9 and 10 and have mounted therein nuts 22 and 23 which are securely locked on the threads by means of set screws 24 and 25.

Suitable clamping means for holding the dies (not shown) in which the pipe is to be flanged is provided, this clamp is mounted upon the tension rods 7 and 8. The rods 7 and 8 extend through the main body of the clamp as clearly seen in Figs. 2 and 3. The ends of these rods are provided with heads 13 which are secured in sockets formed in the collars 40 and 41. Similar heads 13′ are formed on the ends of the rods 14 and 15, these heads being mounted in similar sockets formed in the collars 40 and 41. Since these tension rods 7 and 8 extend clear through the clamp in that manner the tendency to weave and produce a flange not at right angles to the axis of the pipe is practically avoided. The clamp consists of a lower half 26 which is secured to the bed of the machine by means of bolts 27 in the usual or standard manner. The upper half 28 of the clamp is pivoted in relation to its lower half 26, upon the rods 8 which serves as a hinge or pivot pin. This upper half 28 has an outwardly projecting lock 30 which is secured by means of a rod 31 to a double acting air-hoist 32. Means for holding the upper half 28 closed consists of a lock 33 pivotally mounted on a pivot 34 which is mounted in the lower half 26, the lock 33 has an outwardly extended portion which is secured by means of a link 37 to a double acting air-hoist 38.

The upper portion of the lock 33 carries a roller 35, which is fitted to a slot 36, formed on a different radius so that the roller exerts a wedging effect formed in this slot is the outer end of the upper half 28 of the clamp. As clearly seen from Figs. 2 and 3, the lower portion of the slot 36 terminates at a point 70, so that when the lock 33 is swung to open the clamp a slight distance, as indicated in Fig. 3, to permit longitudinal movement of the pipe 65 where that is desirable, it will be in a position to permit the upper half 28 of the clamp to swing upon the tension rod 8, so that any necessity for spotting the lock 33 is avoided, for as soon as the lock 33 has been swung sufficiently to lift the upper half 28 of the clamp partially so as to permit longitudinal movement of the pipe 65, it is in position to be swung wide open without any additional movement of the lock.

The pipe clamp is secured to the bed plate 13, by means of bolts 27. By loosening these bolts 27, the clamp can be moved toward or from the face plate 5, pushing the tension rods 7 and 8 through the supports 9 and 10, and if they project beyond the threaded ends 20 and 21 of these rods 7 and 8, so that the nuts 22 and 23 cannot take up the slack, I provide a number of U-shaped or horse-shoe-shaped, members or take-up blocks 68, clearly shown in Fig. 4. These blocks are of varying dimensions as to thickness, so as to permit the take-up of the projecting portion of the tension rods 7 and 8, to permit the tightening of he nuts 22 and 23 to securely hold the head of the machine in place.

From the foregoing description it will be apparent that I have provided a construction which accomplishes all of the objects hereinbefore described and although I have described with some minuteness the specific details of construction illustrated, these details are furnished solely because such construction adapts itself conveniently to manufacturing purposes but it is by no means essential and is illustrated and described merely to show the preferred form of construction and not with a view of any way limiting my invention to such specific details except as such limitations may appear in the hereinafter appended claims.

Having described my invention what I regard as new, and desire to secure by Letters Patent of the United States, is:

1. In a machine of the type described, a die-holding clamp, comprising an upper half and a stationary lower half, the upper half being pivotally secured to one side of the lower half, means to swing the upper half upon said pivot, there being a slot formed in the forward end of the upper half, a lock to lock said halves together when closed, said lock being pivotally secured to the lower half, a roller on the upper portion of said lock which engages the wall of said slot, the walls of said slot being so contoured with respect to the path of movement of said roller that movement in one direction will lock the clamp and in the opposite direction will partially open the same.

2. In a machine of the type described, a work clamp, formed of upper and lower halves pivotally secured together there being an arcuate slot formed in the forward end of the upper half, fluid-actuated means to open and close said clamp, and fluid actuated means to lock said halves in closed position, said locking mechanism swinging on a pivot upon a different radius than the arcuate slot in the upper half of the clamp, and means actuated by said lock which when moved to unlocked position separates said halves slightly.

3. In a machine of the type described, a work clamp formed of upper and lower halves pivotally secured together, a double-acting fluid cylinder, means to connect a point on said upper half adjacent said pivot to the piston in said fluid cylinder, there being an arcuate slot formed in the forward end of the upper half, the lower wall of said slot terminating in advance of the upper wall, a lock pivotally secured to the lower half, fluid actuated means to swing said lock upon said pivot, a roller on said lock which engages said slot the walls of said slot being so contoured with respect to the path of movement of said roller that movement in one direction will

lock the clamp and in the opposite direction will partially open the same.

4. In a machine of the type described, a work clamp, formed of upper and lower halves pivotally secured together, a double-acting fluid cylinder, means to connect a point on said upper half adjacent said pivot to the piston in said fluid cylinder, there being an arcuate slot formed in the forward end of said upper half, the lower wall of said slot terminating in advance of the upper wall, a lock pivotally secured to the lower half, upon a different radius than said slot, fluid actuated means to swing said lock upon said pivot, a roller on said lock which engages said slot, which, when moved in one direction operates to partially separate said halves and when moved in the opposite direction is adapted to clamp them together.

5. In a machine of the type described, tension rods supported on the head of the machine, a die holding clamp through which said rods pass, said clamp comprising upper and lower halves, the upper half being pivoted to one side of the lower half, fluid actuated means to swing the upper half upon said pivot, the forward end of the upper half of said clamp having an outwardly extending portion, there being an arcuate slot formed therein, a pivoted lock for said jaws the pivot being in a vertical line passing through the center of one of said rods, a roller secured to said lock in arrangement whereby the swinging of said lock on said pivot in one direction will cause the roller to engage the upper wall of said slot and to partially open said clamp while its movement in the opposite direction will lock the halves together the walls of said slot being so contoured with respect to the path of movement of said roller that movement in one direction will lock the clamp and in the opposite direction will partialy open the same.

6. In a machine of the type described, a die holding clamp comprising upper and lower halves, the upper half being pivoted to one side of the lower half, fluid actuated means to swing the upper half upon said pivot, the forward end of the upper half of said clamp having an outwardly extending portion, there being arcuate slots formed therein, a pivoted lock for said jaws, a roller secured to said lock in position to register with said slot, the lower wall of said slot terminating at a point where the roller will clear it when it is engaged, the upper wall of said slot in moving to its unlocked position, the walls of said slot being so contoured with respect to the path of movement of said roller that movement in one direction will lock the clamp and in the opposite direction will partially open the same.

7. In a machine of the type described, a die holding clamp comprising upper and lower halves, the upper half being pivoted to one side of the lower half, fluid actuated means to swing the upper half upon said pivot, the forward end of the upper half of said clamp having an outwardly extending portion, there being an arcuate slot formed therein, a pivoted lock for said jaws, a roller secured to said lock in position to register with said slot, the lower wall of said slot terminating at a point where the roller will clear it when it is engaged, the upper wall of said slot in moving to its unlocked position, and fluid actuated means to operate said lock, the walls of said slot being so contoured with respect to the path of movement of said roller that movement in one direction will lock the clamp and in the opposite direction will partially open the same.

FRED C. FANTZ.