(No Model.) 2 Sheets—Sheet 1.

J. B. WEST.

MACHINE FOR SETTING TIRES.

No. 520,817. Patented June 5, 1894.

Fig. 1.

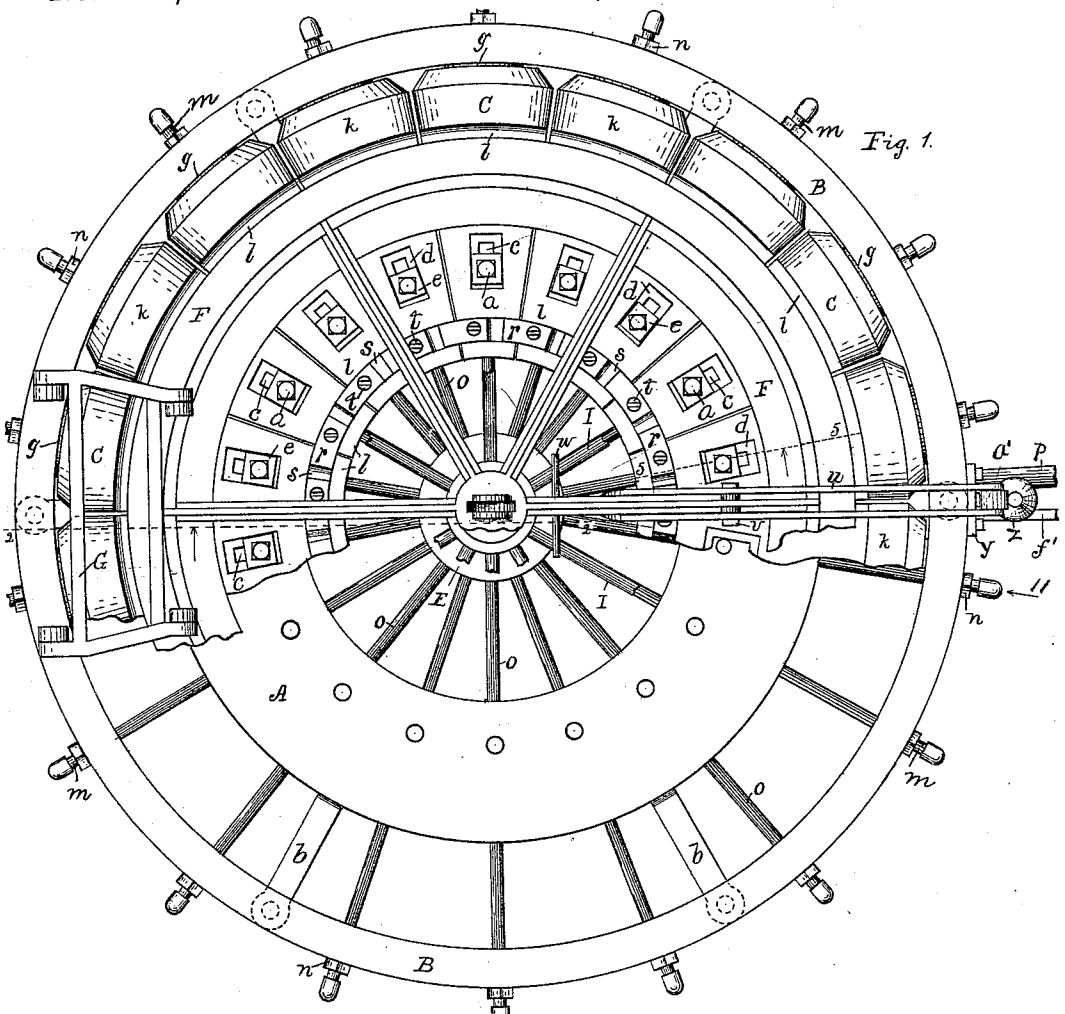
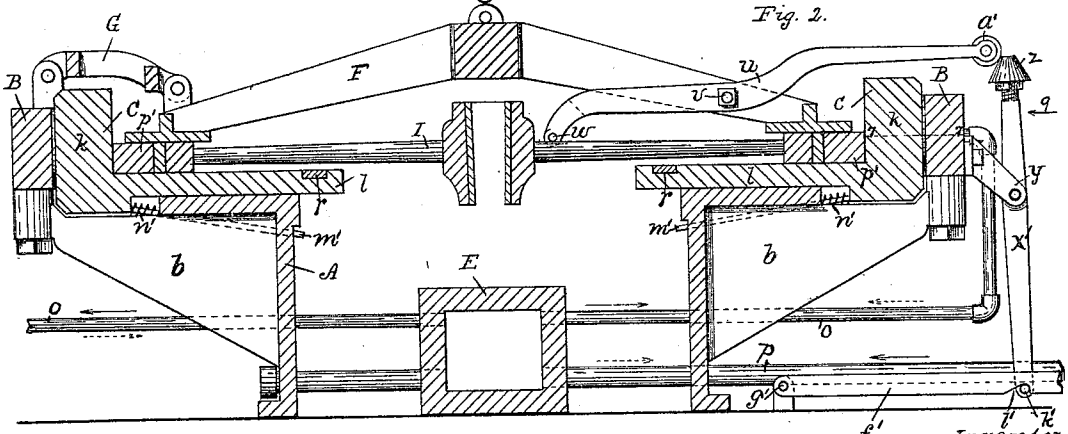


Fig. 2.



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(No Model.) 2 Sheets—Sheet 2.

J. B. WEST.

MACHINE FOR SETTING TIRES.

No. 520,817. Patented June 5, 1894.

Fig. 3.

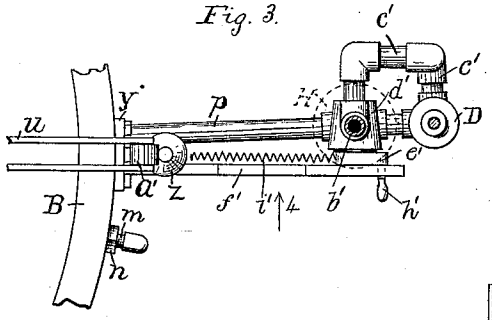


Fig. 5.

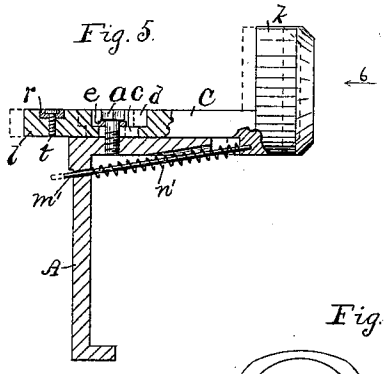


Fig. 6.

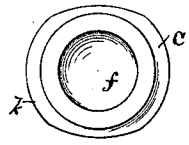


Fig. 11.

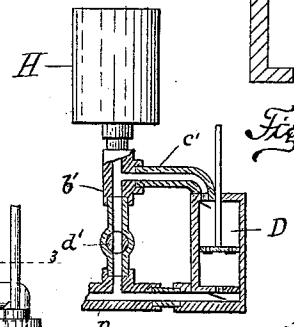


Fig. 4.

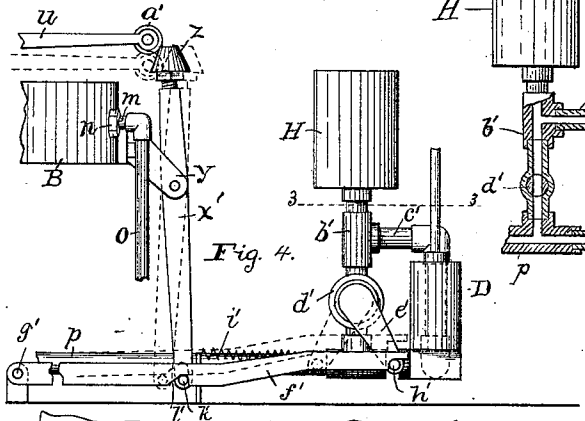


Fig. 8.

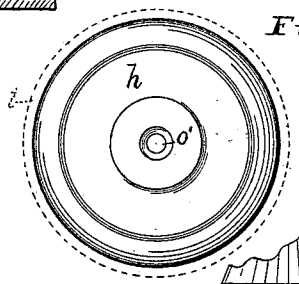
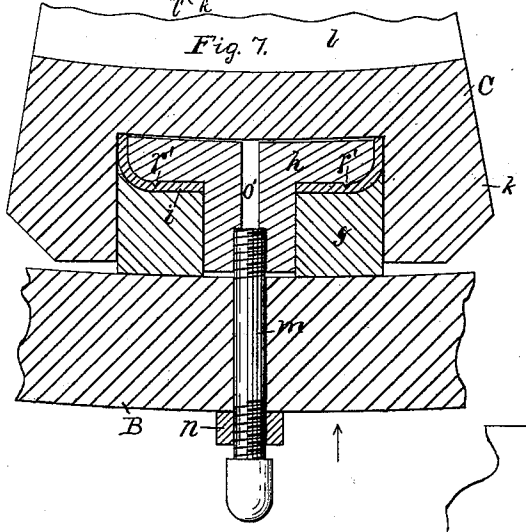


Fig. 7.



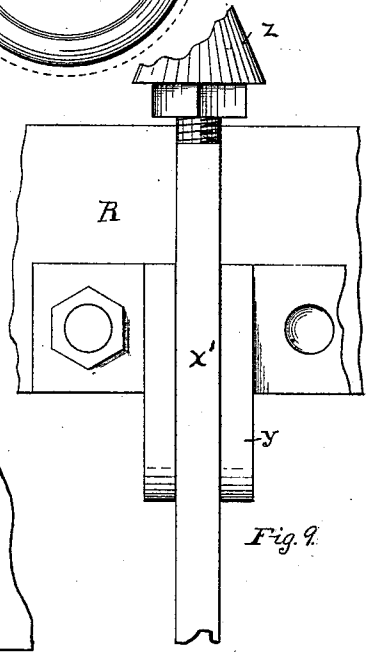


Fig. 9.

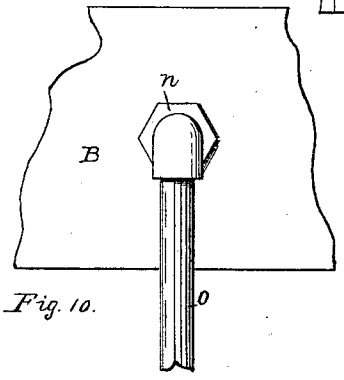


Fig. 10.

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UNITED STATES PATENT OFFICE.

JONATHAN B. WEST, OF ROCHESTER, NEW YORK.

MACHINE FOR SETTING TIRES.

SPECIFICATION forming part of Letters Patent No. 520,817, dated June 5, 1894.

Application filed May 20, 1893. Serial No. 474,881. (No model.)

To all whom it may concern:

Be it known that I, JONATHAN B. WEST, of Rochester, in the county of Monroe and State of New York, have invented a new and useful Improvement in Machines for Setting Tires, which improvement is fully set forth in the following specification and shown in the accompanying drawings.

My invention is a machine for setting tires while cold, on heavy wagon wheels by means of a pressure brought to bear upon the convex surface of the tire, a series of fluid compressing cylinders being arranged for the purpose in a circle around the outside of the tire. The invention is hereinafter fully described and more particularly pointed out in the claims.

Referring to the drawings Figure 1 is a plan of the machine, parts being broken away and omitted. Fig. 2 is a vertical section taken on the dotted line 2 2 in Fig. 1. Fig. 3 is a plan showing the pump and other combined parts, parts being horizontally sectioned on the dotted line 3 3 in Fig. 4. Fig. 4 is a side elevation of the pump and other parts seen as indicated by arrow 4 in Fig. 3. Fig. 5 is a side elevation of a compressing cylinder and associated parts partly in vertical section on the dotted line 5 5 in Fig. 1 and viewed as indicated by the arrow pointed thereon, the cylinder being shown in two positions by full and dotted lines. Fig. 6 is a view of a cylinder seen as indicated by arrow 6 in Fig. 5. Fig. 7 is a horizontal section of a cylinder and associated parts taken as on the dotted line 7 7 in Fig. 2, viewed from above. Fig. 8 is a view of the inner part of a piston, seen as indicated by arrow in Fig. 7. Fig. 9 is a side elevation of a portion of the ring and other parts seen as indicated by arrow 9 in Fig. 2. Fig. 10 is a side elevation of a portion of the ring and pipe connection seen as indicated by arrow 11 in Fig. 1 and Fig 11 is a broken sectional view of the pump. Figs. 7 to 10 inclusive are drawn to scales larger than that of the other figures.

Referring to the parts shown A, Figs. 1 and 2, is a circular iron frame formed with radial arms *b*, which are secured to and support, a strong horizontal iron or steel continuous base ring B. Within this ring and upon the frame, is arranged in a circle a series of similar sectoral compressing cylinders C, as shown. These cylinders are each formed with a hollow conical head *k*, and flat part or plate *l*, the latter collectively forming a floor upon which to receive the wagon wheel, I, to be operated upon. The cylinders are arranged to slide through short distances in radial directions upon their bearings upon the frame and they are held in place by threaded studs *a*, Figs. 1 and 5, rigid in the frame. The studs pass through radial slots *c*, in the parts *l* of the cylinders, which construction admits of the radial motions of the cylinders just mentioned. The slots are in depressed parts, *d*, formed in the cylinders to hold sliding blocks, *e*, under the heads of the studs.

The cylindrical cavities *f*, Fig. 6, in the cylinders C are radial and made shallow, and each is occupied by a radial duplex piston composed of an outer part *g*, Fig. 7, and an inner part *h*, the said parts having faces which lie opposite each other, and between these faces is a ring *i*, of suitable packing material.

The wheel I and tire to be operated upon are placed in a horizontal position upon the cylinders, as shown in Figs. 1 and 2, and a simultaneous inward motion of the cylinders against the tire serves to compress the latter into a smaller diameter and thus set it on the wheel. Each piston is held rigidly with the ring B by means of a hollow bolt or tube *m*, Figs. 1, 4 and 7, passing radially through the ring and threaded in the piston, and provided with a threaded tightening nut *n*, on the outer surface of the ring. The function of this two-part piston with the intermediate packing and other details of construction is as follows: In setting tires cold, great pressure is required to move the particles of the metal and in the use of a fluid as herein described, the packing between the cylinder and piston must be very securely held to prevent being forced out of place by the fluid. By making the piston in two parts, one of which is movable toward or away from the other, and placing the packing between these parts, as soon as the fluid is forced between the cylinder and the piston, the movable part of the latter is pressed against the packing, holding it with a force equal to that which the fluid is exerting. One part of the piston may, of course, be left free

to move, but I prefer to use a construction in which the movable portion of the piston may be locked when once forced upon the packing by the fluid, and in the present instance this is accomplished by the adjustable tube and nut. The ridge r' upon the piston binds against the packing and thus more effectually prevents any liquid finding its way through the absorbent packing to the opening through the stationary portion of the piston, in this way preventing the escape of the fluid and the consequent diminution of pressure.

In this machine a fluid is used in the cylinders to force the latter against the tire of the wheel. It is immaterial whether this fluid be steam or a liquid but I prefer to use oil, forced into the cylinders by means of an ordinary force pump D, Figs. 3 and 4. As arranged the pump forces the oil into a strong central chamber E, Figs. 1 and 2, located within the frame, through a pipe p, Figs. 2, 3 and 4. This central chamber is connected by a series of radial pipes o, with each of the cylinders, the tubes m forming parts of these pipes, by means of which the pump is enabled to force the oil into the cylinders. Passages o', Fig. 7, through the parts h of the pistons, in line with the bores of the tubes m, complete the communications between the pump and the cylinders.

In the machine shown in the drawings eighteen cylinders are employed equally spaced in a circle within the base ring; and to insure the radial motions of the cylinders being uniform and equal I employ a series of equalizers r, Figs. 1, 2 and 5. These equalizers are equal circular segmental plates, there being one secured by a fastener t, to each cylinder in an annular groove s, formed in the cylinders near their inner ends. These equalizers reach across the spaces between the adjacent cylinders and are adapted to slide in the grooves through short distances in longitudinal directions as the cylinders are moved toward or from the center of the base ring. The action of these equalizers causes all the cylinders to move alike and bear equally upon the outer surface of the tire.

With this machine I usually employ a circular presser F, for the tire and the wheel, Figs. 1 and 2, similar to that shown and fully described in my pending application for patent, Serial No. 470,384, filed April 14, 1893. This presser is connected with the ring B by a double-jointed hinge G, so as to move in vertical directions, and it is operated by the means shown and specified in said pending application, and the presser is provided with a gage lever u, similar to the lever c' of said application. This lever u is pivoted at v to an arm of the presser and bending downward at its inner end, is provided with a horizontal cross rod w, to receive the upward push of the spokes of the wheel when the latter is dished or sprung upward in the act of setting the tire.

A vertical lever x', Figs. 2, 4 and 9, is held in a bracket y, rigid with the ring B, to swing in a vertical plane. This lever, like the corresponding one shown in said pending application, is provided with a longitudinally-adjustable conical head z, to be pressed by a roller a', in the end of the gage lever u, when the latter is moved by the dishing wheel, as above described.

The pump D, which is single acting, draws the fluid from a tank H, Fig. 4, located in any convenient place, through a pipe c'. The pump also communicates with the tank through a pipe b', Figs. 3 and 4. An ordinary cock d', is located in the pipe b' to control the passage through the latter, and is provided with an arm e', by means of which to operate it. When the passage through b' is open the pump simply forces the oil around through a continuous circuit formed by the pipes b' and c', the pump communicating with both pipes and forming a part of the circuit. But when the pipe b' is closed by the cock the oil is forced through the pipe p into the cylinders, as above described. A detent lever f', Figs. 2, 3 and 4, pivoted at g', is formed with a notch at its free end to engage the pin h' of the arm e'. A spiral spring i', joined to the arm e' tends to draw the latter to the left, as appears in Figs. 3 and 4, in which position the cock is closed.

Now, it will be understood from the foregoing description that if the cock d' is closed when the arm e' is in the position shown by full lines in Fig. 4 and held by the detent f', the pump will draw oil through the pipe c' from the tank and force it into the cylinders through the chamber E, and the system of connecting pipes. But, if the detent f' be lifted to release the arm the cock will be opened by the spring i', and the flow of oil will then be upward through the pipe b', and the pump will be inoperative so far as acting upon the cylinders is concerned. That is to say, when the passage through the pipe b' is opened, no further pressure will be exerted upon the tire of the wheel by the cylinders.

The construction of the parts is such that the lever x' actuates the detent lever f' to open the cock. The former lever is provided at its lower end with a horizontal pin k', which engages a notch in the lower edge of the lever f'. This notch is formed with a slanting side l', so that when the lower end of the lever x' is pushed to the left, as appears in Fig. 4, by the action of the gage lever u, it will raise the free end of lever f' and so release the arm e' of the cock and allow the latter to be thrown open by the spring i', as described. These operations of the levers u, x' and f' and the arm e' will be readily understood by regarding the full-line and dotted-line positions of those parts. To operate the machine when a wagon wheel is put in position to have its tire set, the presser F is brought down upon the wheel and the cock d' is closed by the attendant seizing the pin h' of the

arm or by other convenient means. This being closed causes a forced flow of the fluid into the cylinders which moves them against the tire, the pistons remaining stationary. The machine being left to itself the tire will be pressed against the wheel until the latter springs upward at the middle and causes the gage lever to swing the lever x' and lift the detent lever f'. This releases the arm of the cock and allows the latter to be opened by the spring. The cylinders thus become inactive and the pressure upon the tire ceases.

To cause the cylinders to move back to release the wheel after the tire is set, I provide each with a rod m', Figs. 2 and 5, having their inner ends adapted to slide freely through bearings in the frame A. Upon these rods I place stiff spiral springs n', which bearing at their inner ends against the frame A, and at their outer ends against the cylinders, push the latter outward, the oil therein flowing back toward the tank.

I usually construct the part h of the piston with a circular ridge r', Fig. 7, to sink into the packing ring to insure a tight joint between the piston and the cylinder.

The cylinders, when forced back by the springs n', usually substantially bottom against the pistons, as appears in Fig. 7, the oil nearly all flowing outward toward the tank.

Ordinary blocks or dies p', Fig. 2, are used between the heads of the cylinders and the tire, these being varied in width according to the diameter of the wheel.

What I claim as my invention is—

1. A machine for setting tires and the like comprising a frame, pistons upon said frame, cylinders resting upon said frame and movably fitting upon said pistons, tables extending from the pressure face of said cylinders, slots in said tables, pins with enlarged heads passing through said slots and entering the frame, and means for supplying a fluid under pressure through said pistons; substantially as described.

2. A machine for setting tires and the like comprising a frame, a base ring supported thereby, chambers radially projecting therefrom, cylinders resting upon said frame and movably fitting upon said chambers, tables extending from the pressure face of said cylinders, slots in said tables, pins with enlarged heads passing through said slots and entering the frame, and means for supplying a fluid under pressure through said chambers; substantially as described.

3. A machine for setting tires and the like comprising a supporting structure, a series of movable pistons thereon having faces opposite the supporting structure, a packing between said faces and the supporting structure, a ridge upon one of the faces between which the packing lies, cylinders upon said pistons, said cylinders extending beyond the packing and being arranged to conform to the article to be acted upon, and means for supplying a fluid under pressure between the cylinders and the pistons; substantially as described.

4. A machine for setting tires and the like comprising a supporting structure, a series of adjustable pistons thereon, having faces lying opposite the supporting structure, a packing between said faces and the supporting structure, cylinders upon said pistons, said cylinders extending beyond the packing and being arranged to conform to the article to be acted upon, means for adjusting the pistons from the outside of the supporting structure, and means for supplying a fluid under pressure between the pistons and the cylinders; substantially as described.

5. A machine for setting tires and the like comprising a supporting structure, a series of adjustable tubes thereon, a piston upon each of the tubes, said pistons having faces lying opposite the supporting structure, a packing between said faces and the supporting structure, a cylinder upon each piston, said cylinders extending beyond the packing and being arranged to conform to the article to be acted upon, means for adjusting the tubes, and means for supplying a fluid under pressure through each of the tubes into the cylinders; substantially as set forth.

6. A machine for setting tires and the like comprising a radially perforated supporting structure, a tube fitting loosely through each perforation of the supporting structure and having a piston upon its end, said piston having faces opposite the supporting structure, packing between said faces and said supporting structure, a cylinder movable upon said pistons and extending beyond the packing, an adjusting nut upon each tube and bearing against the supporting structure, and means for supplying a fluid under pressure through said tubes; substantially as described.

7. A machine for setting tires and the like comprising a frame, chambers projecting therefrom, pistons movable in said chambers, said pistons having faces extending opposite the walls of said chambers, packing between said faces and said walls, cylinders fitting over said chambers, said cylinders being arranged to conform to the article to be acted upon, means for adjusting the pistons from outside the frame, and means for supplying a fluid under pressure between the cylinders and the pistons; substantially as described.

8. A machine for setting tires and the like comprising a frame, a base ring supported thereby, chambers radially projecting from the circumference of said ring, said ring being provided with radial perforations leading to said chambers, movable blocks having passages therethrough in said chambers, said blocks having faces extending opposite the walls of said chambers, packing between said faces and said walls, cylinders upon said chambers, tubes fitting loosely through the perforations in the ring and connected to the

blocks in line with the passages therethrough, adjusting screws upon the tubes and bearing against the base ring, and means for forcing a fluid under pressure through said tubes; substantially as described.

9. A machine for setting tires and the like comprising a frame provided with a radially perforated base ring, a tube through each perforation of the ring, a two-part piston upon each tube, a packing between the parts of the piston, a cylinder upon each piston, and means for supplying a fluid under pressure to the cylinders; substantially as set forth.

10. A machine for setting tires and the like comprising a frame, radially disposed plungers upon said frame, guide-ways upon said plungers, a plate held in the guide-way upon one plunger and extending into the guide-way of an adjacent plunger, and means for forcibly moving said plungers; substantially as described.

11. A machine for setting tires and the like comprising a frame, radially disposed plungers upon said frame, a groove upon each plunger, a plate held in the groove in each plunger and extending into the groove in an adjacent plunger, and means for forcibly moving said plungers; substantially as set forth.

12. A machine for setting tires and the like comprising a frame provided with a base ring, a series of pistons radially secured to the surface of the ring, a cylinder upon each piston, each cylinder being provided with an extending flat portion the end of which is provided with a groove, an equalizer movably secured in each groove, one end of which projects into the groove in the end of the adjacent portion, and means for supplying the cylinders with a fluid under pressure; substantially as described.

13. A machine for setting tires and the like comprising a frame, a base ring supported thereby, chambers radially projecting from the circumference thereof, cylinders resting upon the frame and movably fitting upon said chambers, extending flat portions upon said cylinders, a slot in said flat portion, pins having enlarged heads passing through said slots and entering the frame, a guide-way upon each flat portion, a plate movably secured in each guide-way and projecting into the guide-way in the adjacent flat portion, and means for supplying a fluid under pressure through said chambers; substantially as described.

14. A machine for setting tires and the like comprising a frame, a base ring supported thereby, chambers radially projecting from the circumference of said ring, said ring being provided with radial perforations leading to said chambers, movable blocks having passages therethrough in said chambers, said blocks having faces lying opposite the walls of said chambers, packing between said faces and said walls, tubes fitting loosely through the perforations in the ring and connected to the blocks in line with the passages therethrough, adjusting screws upon the tubes and bearing against the base ring, cylinders resting upon the frame and movably fitting upon the chambers, extending flat portions upon said cylinders, a slot in said flat portions, pins having enlarged heads passing through said slots and entering the frame, a groove in each flat portion, a plate movably secured in each groove and projecting into the groove in the adjacent flat portion, and means for supplying a fluid under pressure through said chambers; substantially as described.

In witness whereof I have hereunto set my hand, this 8th day of May, 1893, in the presence of two subscribing witnesses.

JONATHAN B. WEST.

Witnesses:
ENOS B. WHITMORE,
M. L. WINSTON.