(No Model.) 2 Sheets—Sheet 1.

J. FASKE.

MACHINE FOR DRILLING THE TIRES AND FELLIES OF WHEELS OF ROAD VEHICLES.

No. 446,856. Patented Feb. 24, 1891.

Fig. 1.

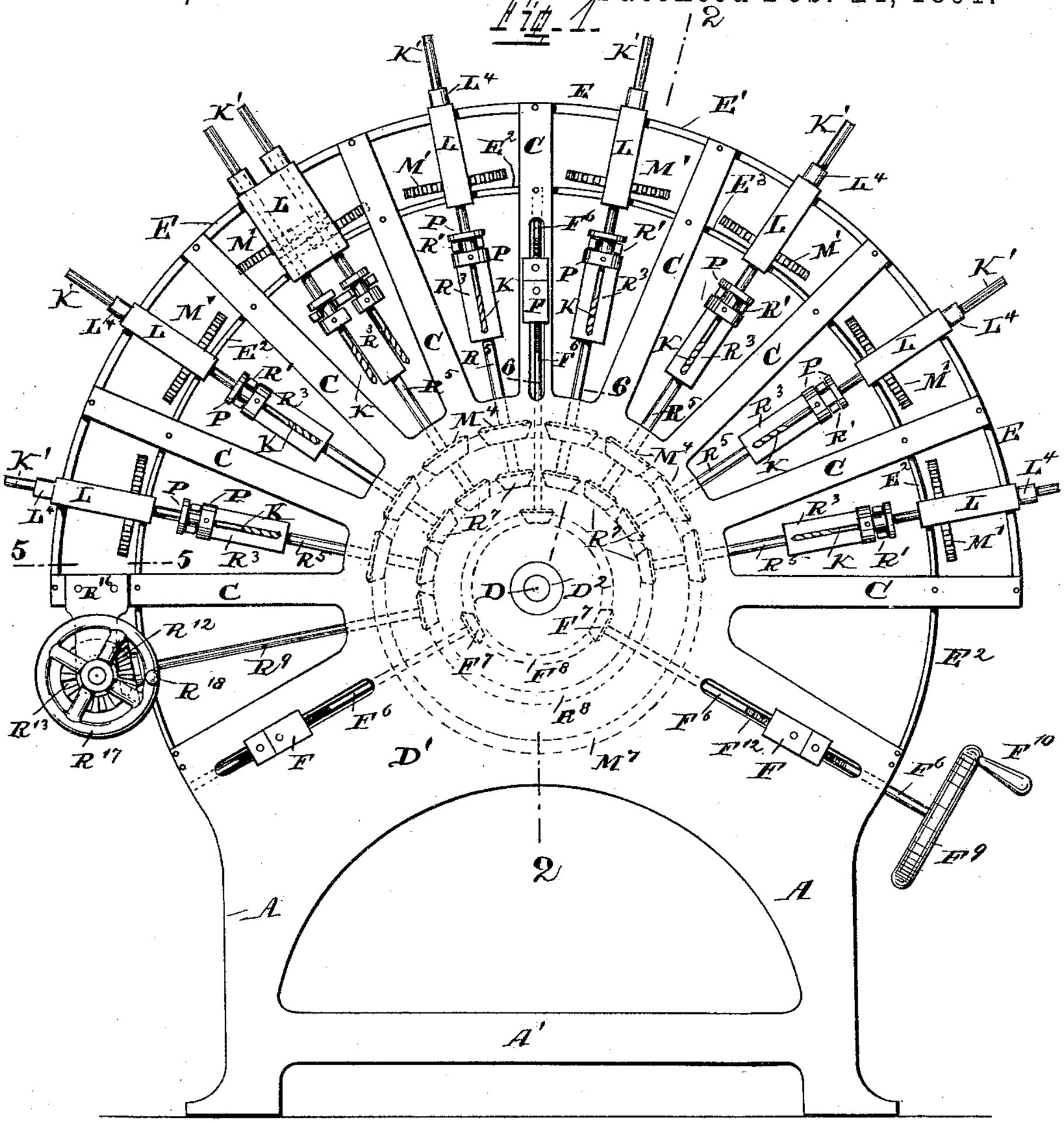


Fig. 5.

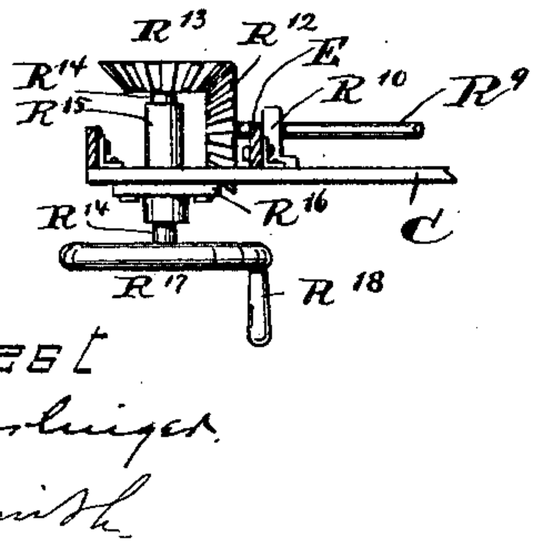
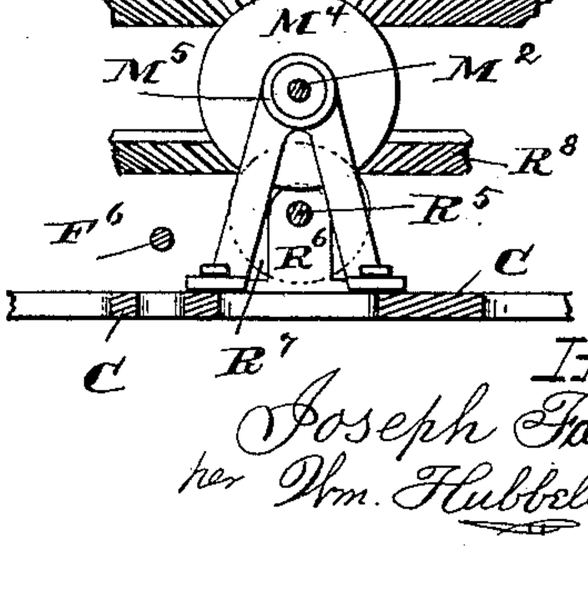


Fig. 6.



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(No Model.) 2 Sheets—Sheet 2.

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MACHINE FOR DRILLING THE TIRES AND FELLIES OF WHEELS OF ROAD VEHICLES.

No. 446,856. Patented Feb. 24, 1891.

Fig. 2.

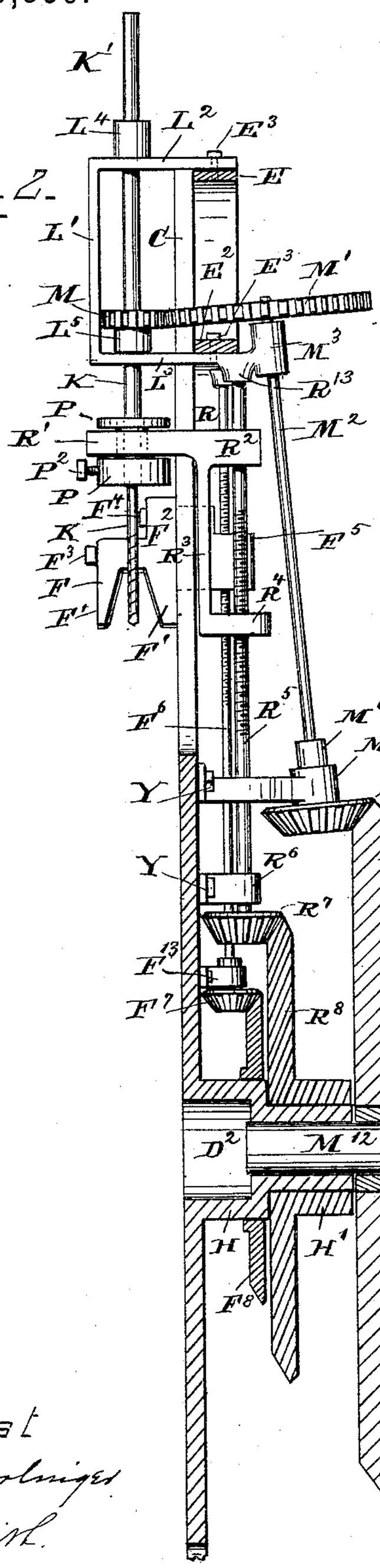


Fig. 3.

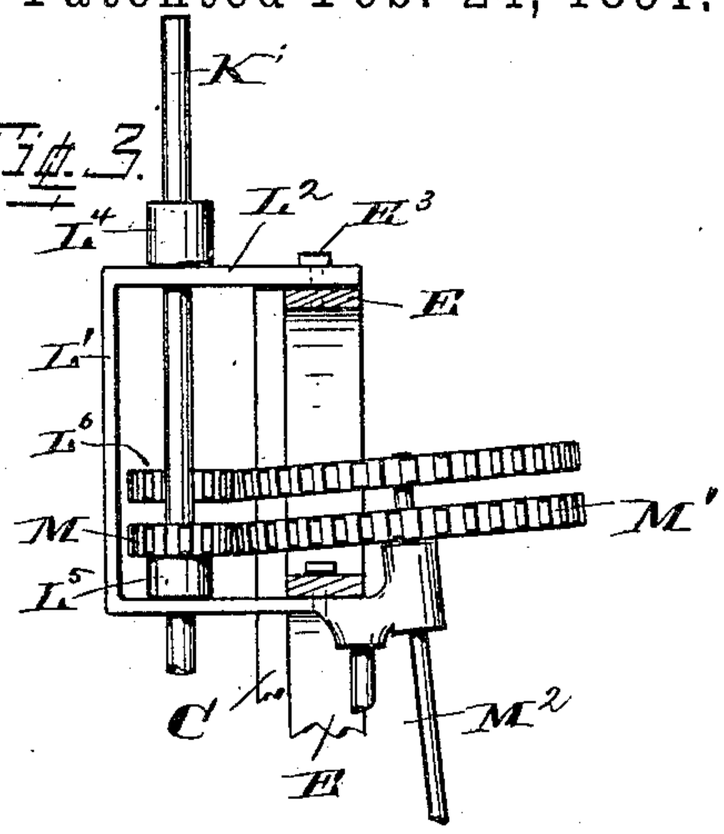
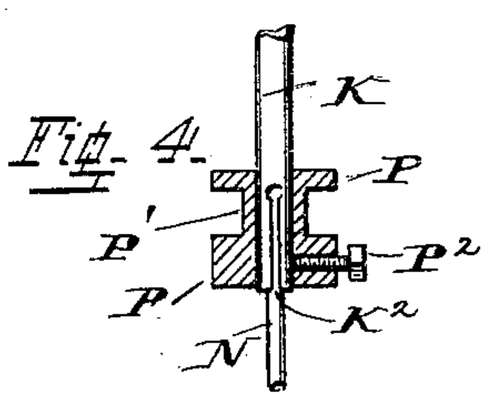


Fig. 4.



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UNITED STATES PATENT OFFICE.

JOSEPH FASKE, OF CINCINNATI, OHIO.

MACHINE FOR DRILLING THE TIRES AND FELLIES OF WHEELS OF ROAD-VEHICLES.

SPECIFICATION forming part of Letters Patent No. 446,856, dated February 24, 1891.

Application filed June 12, 1890. Serial No. 355,252. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH FASKE, a citizen of the United States of America, and a resident of the city of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Machines for Drilling the Tires and Fellies of the Wheels of Road-Vehicles, of which the following is a specification.

The several features of my invention and the various advantages resulting from their use, conjointly or otherwise, will be apparent from the following description and claims.

In the accompanying drawings, making a part of this specification, and to which reference is hereby made, Figure 1, Sheet 1, is a front elevation of a machine embodying my invention. Fig. 2, Sheet 2, is a transverse section of said machine, taken in the plane of the dotted line 2 2 of Fig. 1, and showing portions of the machine in elevation and portions in section. That face of the section is seen which faces toward the right hand in Fig. 1. Fig. 3, Sheet 2, is a detail view showing in side elevation the adjacent gear and mechanism for simultaneously boring in the tire and felly those holes which are to be made, respectively, in the meeting ends of the felly and in the tire. Fig. 4, Sheet 2, is a detail view showing in elevation a part of the drill and that adjacent part of the drill-spindle into which the drill is received, and also showing in vertical central section the chuck or collar surrounding said drill. Fig. 5 is a top view of the hand-wheel and adjacent gear for operating the feed—viz., for advancing the drills toward and through the tire and felly, and retracting them therefrom. Fig. 6 is a top view of two bevel-pinions and the adjacent parts of their operating bevel-wheels, the one bevel-pinion operating to move the drills and the other to rotate the drills. This view also shows two bearings, in which respective shafts of the said bevel-pinions are respectively located.

The machine rests upon a suitable foundation or base of any desired conformation. One description of such base is shown in the drawings, and consists of the vertical front side supports A A and horizontal connecting-piece A′. These end supports A A extend up and are connected to those portions of the frame-work which directly support the working parts of the machine.

C C indicate radial arms located in a common plane and extending out at regular intervals. The center of the circle of which these arms are the radii is the point D. These arms C are suitably supported. A desirable and convenient means for supporting them consists of the metal discal piece D′. To the periphery of this piece D′ these arms C are attached. A convenient mode of connecting the disk D′ and the arms C is by casting or otherwise forming them in one piece. So, also, a convenient mode of attaching the disk to the end supports A A is by casting them and the disk together. Thus the weakness arising from joints between these parts is obviated. The outer ends of these arms are secured together by a brace or braces E. While these braces may consist of a number of pieces, they preferably consist of a single broad bar of metal E′, bent in a semicircular form and secured to the rear side of each arm C near to the outer end of the latter. These braces are preferably integral, and consist of a single broad bar E^2 bent in a curve and secured to the rear side of the arms C. Whenever practicable these braces E E^2 are cast with the arms C, and are integral with the rest of the frame. To further strengthen the arms and braces E E^2, each end of the inner brace is attached to its adjacent portion of the frame A D′. These bars E′ and E^2 perform the function not only of braces to stiffen the arms C and connect them together, and thereby form one solid frame-work, but they also serve as supports for other important portions of the mechanism hereinafter described.

One feature of my invention consists, in general, in the means for clamping the vehicle-wheel in position for the drills to properly operate in drilling holes in the tire and felly of the said wheel. Such means are as follows: Three or more, preferably three, clamping-jaws F F F are placed at equal distances apart in the periphery of a circle. These clamps F are each shaped substantially as shown in side elevation in Fig. 2.

In order to obviate the necessity for ap-

proximating one branch or part F′ of the clamp F against its opposing branch or part F by means of a screw or eccentric or the like when the rim of the wheel enters the mouth of said clamp, I form each of the inner sides of said branches F′ F′ with an inclination, so that these branches, or rather forks F′ F′, are widest apart at their free ends and nearest at their basal ends, where they are united. Each clamp F is provided with means for moving it to and from the discal center D of the machine, and the machine is so constructed as to admit of this movement. This construction and these means are preferably such as I have devised, and are as follows: The disk D is provided with slotways F^{12}, and an arm C is provided with a slotway F^{12}. A rearward extension F^5 of the clamp (see Fig. 2) extends through and beyond the slot F^{12}. This extension where it passes through said slot is narrower than the portion of the clamp F. At the rear of the slot the extension widens out. Thus the clamp is held securely to the frame. The front or forked part F is bolted to the rear piece F^5 by bolts, as F^3 and F^4. Through the rear extension F^5 extends a threaded opening, and a screw-shaft F^6 passes through said opening and there engages the screw of the latter. This shaft F^6, at or near its outer end, is journaled in a portion, as F^{13}, of the frame, and is thereby allowed to rotate, but is prevented from moving longitudinally. Its inner end—viz., that end of said shaft F^6 which is nearest the center D of the machine—is provided with a pinion F^7, preferably a beveled one, fixed to and turning with the said shaft F^6. The beveled pinions F^7 F^7 F^7 of the several shafts F^6 are located in a common circle, and each engage an adjacent portion of the teeth of a gear (beveled) wheel F^8. (See Fig. 2.) This gear-wheel turns loosely on a hub H, concentric with the center D of the machine. The rotation of the gear-wheel F^8 and screw-shafts F^6 is suitably accomplished.

A convenient and handy mode of rotating the screw-shafts consists as follows: One of these shafts F^6 (in the present illustrative instance that one which is shown in Fig. 1) is extended out beyond the frame D′, and on the end of that part thus extended is affixed a crank or wheel F^9, with crank-handle F^{10}. The rotation of this crank-wheel F^9 F^{10} rotates the adjacent screw-shaft F^6, and the latter rotates its bevel pinion-wheel F^7, and the rotation of the latter turns the beveled wheel F^8. This wheel F^8 rotates the other pinions F^7 F^7, and these respectively rotate their respective screw-shafts F^6, to which latter they are respectively attached. The respective clamps F F F on their respective screw-shafts F^6 are thereby simultaneously moved on said shafts, and by the screw on said shafts either toward or from the center D of the machine. As the screw-threads on the shafts F^6 run the same way, a rotation of the hand-wheel F^9 F^{10} in one direction will cause the clamps F to move at the same speed toward the center or away from it. In practice the clamps are moved outwardly far enough to receive the vehicle-wheel whose rim is to be perforated with holes, as hereinafter described. The lower edge of such wheel is placed in the mouth of each adjacent clamp, and the upper edge of said vehicle-wheel immediately below or opposite to the mouth of the upper clamp F. The hand-wheel F^9 is now rotated, so as to cause the clamp F to move toward the center D of the machine. As these clamps move forward toward one another, the upper edge of the vehicle-wheel enters the mouth of the upper clamp, and the edge of said wheel is forced along in each of said mouths of said clamps, and on account of the inclined shape of said mouths and for the reason that the inner part of each mouth is narrower than the edge of the vehicle-wheel, the latter will become firmly wedged in the mouth of each clamp, and by these clamps the wheel will be securely held in position to be operated upon by the drills. The mouth of each clamp is made of sufficient width and flare to receive the tire and felly of a wide or of a narrow wheel and to securely hold the same. These drills and their operating mechanism will now be described. At the outer portion of the machine are located the drill-shaft holders. The drills K are located, as shown, at a proper distance apart to drill the desired holes at the proper distance apart in the upper portion or half or the vehicle-wheel which is subjected to their operation. Each of these drills K points toward the center D of the machine.

The drill-shaft holder L is preferably constructed as follows: It has a vertical front plate L′ and a top horizontal plate L^2 and a lower horizontal plate L^3. The upper horizontal plate L^2 rests against and is secured to the semicircular brace E, preferably by a screw E^3, passing through the rear portion of said plate L^2 and screwed into the brace E. The lower horizontal plate L^3 rests against and is fixed to the semicircular brace E^2, preferably by means of a screw E^3, passing through the brace E^2 and screwed into the said horizontal plate L^3. The shaft K passes through the upper horizontal plate L^2 and through the lower horizontal plate L^3. The upper plate L^2 is provided with a bearing L^4 and the lower plate L^3 with a bearing L^5. These bearings serve to add increased steadiness to the shaft K. The latter passes through these bearings.

A desirable and novel construction for the rotation of the shaft is as follows: On the shaft K and between the plates L^3 and L^2 is the pinion M. This pinion M is concentric with shaft K. It is in the present illustrative instance supported on the upper end of the bearing L^5. The shaft is free to slide through this pinion, and at the same time turns with it. The preferred means for compelling the shaft K to turn with the pinion M is the usual feather-and-groove connection, the shaft car-

rying a longitudinal groove which receives a feather or stud of the pinion. The pinion M is rotated by a gear-wheel M′. The latter is concentrically fixed on a shaft M^2. This shaft is journaled in a bearing M^3. The shaft M^2 might be journaled elsewhere; but by connecting its bearing—viz., M^3—with the bearing R^9 of screw-shaft R^5 and bearing F^{13} of screw-shaft F^6 and the horizontal plate L^3, and arranging these as shown, I obtain a remarkably convenient collocation of parts, and by making these three bearings and said plate integral I obtain an economical and compact construction.

The lower or inner end of the shaft M^2 is provided with a pinion M^4, fixed to and concentric with said shaft M^2 and meshing with the gear-wheel M^7, fixed to and concentric with a shaft M^8. At the lower end of the shaft M^2 and just above the pinion M^4 is a bearing M^5, securely bolted at Y to the plate D. In this bearing turns the shaft M^2. On the latter, just above the pinion M^4, is a collar M^6, fixed to the shaft and preventing the latter from slipping down. The pinion M^4 and gear M^7 are preferably beveled wheels, as shown, rather than crown-wheels, &c.

The shaft M^8, which carries and turns the gear-wheel M^7, is operated by suitable power. In the present instance it is operated by means of a pulley M^9 fixed on it. Alongside of this pulley is a loose pulley M^{10}, in common use for receiving the pulley-belt when the latter is shifted from the pulley M^9.

The shaft M^8 is preferably hollow, as shown, and in such event turns upon the stationary shaft M^{12}. One end of this stationary shaft M^{12} extends into a rearward extension H′ of the hub H, and is thereby supported, and the other end of this shaft M^{12} is supported by a bearing M^{14}, upheld on a suitable support. One description of such support is shown, and consists of a pair of uprights M^{15}, fixed to the lower half of the flanged bearing M^{14} and extending downward and apart until they reach the ground or a supporting-platform, thus providing a broad base for firmly retaining the bearing M^{14} in a stationary position. The rotation of the wheel M^7 thus rotates the drill-shaft K.

The mechanism for connecting each drill to its shaft and for advancing said shaft, holding it stationary or retracting it, will now be described.

The lower end of the shaft K is provided with an axial opening or recess K^2, Fig. 4. This recess K^2 receives the rear end of the drill N. This recess on two opposing sides extends through the sides of the drill-shaft K. A recessed collar P fits around the lower end of the shaft K. This collar P has an annular recess or groove P′. In the lower portion of this collar is a set-screw P^2, screwed therein, and when screwed forward bears against one-half of the split end of shaft K, and forces said split end against the drill N and toward the other half of the split end of said shaft, thereby fixing the collar P firmly to the shaft K, and the latter in turn firmly to the drill N.

R, Fig. 2, is a carriage. The upper forward end of this carriage consists of a fork having two prongs or projections R′ R′. The neck of the sleeve P is received between these forks R′ R′, and the latter are in the recess P′. The said neck forms the back wall of said recess. From the fork R′ there rearwardly extends a lug or arm R^2, and from the latter extends down the bar or plate R^3. This bar or plate R^3 carries at its lower end the rearwardly-extending arm R^4. In this latter arm is an opening. A screw-threaded shaft R^5 passes through said opening. The upper portion of the shaft R^5 passes through a screw-threaded opening in the arm R^2 of the carriage and engages the screw-thread of said opening, and in order that increased steadiness may be imparted to the shaft R^5 the upper end of this shaft is journaled in the bearing R^9. This bearing R^9 is secured, as aforementioned, to the plate L^3. Near its lower end the screw-shaft R^5 is journaled in the bearing R^6, fixed to the machine-frame or other suitable support, and carries at its lower end the pinion R^7, concentric therewith and rigidly fixed thereto. This pinion R^7 engages the gear-wheel R^8. The latter turns loosely on the stationary axle or shaft H′ and is concentric therewith. The wheel R^8 and pinion R^7 are preferably beveled gear, as shown. All of the pinions R^7 mesh with the wheel R^8.

The preferred means for rotating the wheel R^8, and thereby simultaneously rotating all of the pinions R^7, is as follows: A pinion R^7, like the other pinions R^7, meshes with wheel R^8. This pinion R^7 (see Figs. 1 and 5) is fixed on a shaft R^{18}, journaled near pinion R^8 in a bearing R^6, and also near its other end journaled in a bearing R^{10}, Fig. 5, fixed to the frame, preferably to the curved brace E. On the outer end of the shaft R^9 is fixed a concentric bevel-pinion R^{12}, engaging a bevel-pinion R^{13}. The latter is concentrically fixed on shaft R^{14}. The latter is supported by and turns in a bearing R^{15}, fixed to a part of the frame. A convenient means of upholding the bearing R^{15} is by affixing it to a plate, as R^{16}, in turn bolted to one of the radial arms C of the frame. The shaft carries a hand-wheel R^{17} fixed thereto, and having a crank-handle R^8. A rotation of the hand-wheel R^{17} thus rotates shaft R^9 and its bevel-pinion R^7, and the latter imparts a rotary movement to the bevel-wheel R^8, and the latter rotates the other bevel-pinions R^7. The latter each respectively rotate their respective screw-shafts R^5, and the rotation of the latter respectively move each carriage R in the direction in which said screw-shaft R^5 is turned and moves the drill-shaft K′ and drills K to or from the center D of the machine. Thus a rotation of the hand-wheel R^{17} in one direction moves the

drills K toward said center and a rotation of the hand-wheel R^{17} in the other direction moves the drills away from the said center D.

Having now specified the construction of the mechanism embodying my invention, and having also set forth the operation of each different group of mechanism when considered by itself, I will now proceed to describe the general operation of the machine as a whole.

The object of my invention is to bore those holes in the felly and tire of the vehicle-wheel which are respectively to receive the respective bolts for securing the tire in position on the wheel.

Inasmuch as the felly consists of two pieces of wood, it is necessary that a bolt be passed through each adjoining end portion of the felly where the two ends of the felly come together. To accomplish this purpose two of the drills K and their operative mechanism are placed close together. For convenience and compactness one widened frame L is preferably employed, as shown, in connection with the second and third drills to the left of the center, as shown in Fig. 1. Fig. 3 is also illustrative of the rear mechanism in connection for these two drills thus located close together. The hand-wheel F^9 is turned and the clamps F are thereby drawn back from the center D sufficiently to admit the vehicle wheel whose rim is to be bored. This vehicle-wheel is now placed in the embrace of the jaws or in the mouth of the lower clamps. That end of the said wheel which is toward the face D′ of the machine is received into a recess D^2, which is present at the center of the machine, and is designed to admit the said end of the said hub in order that the spokes, tire, and felly of the wheel may lie in close proximity to the general face of the machine and in a proper position. The rotation of the hand-wheel F^9 is now reversed and the clamps F are moved toward the center D. As they thus move, the rim of the wheel to be bored is advanced into the mouth of the upper clamp F, and said rim is firmly wedged in the mouth of each clamp. The wheel is now firmly held in a position to be bored. It must be borne in mind that the wheel is to be so placed in the clamps that the adjacent ends of the fellies are respectively each under its respective drills of that pair of drills which is close together. Power is now applied to the pulley M^9 and the latter is rotated, thereby by means of the intervening mechanism heretofore described rotating the drills. The crank-wheel R^{17} is now rotated and the drills advanced to the tire of the wheel, and they are then gradually advanced and respectively and simultaneously drill a hole through the tire and felly. When the holes have been drilled, the crank-wheel is rotated in a contrary direction to that in which it was previously rotated and the drills withdrawn from the rim. The clamps F are now moved apart from one another, and the wheel whose rim has been bored is withdrawn therefrom. The machine is now ready to receive and bore the rim of another wheel. The latter being placed in the machine, the foregoing operations of clamping, boring, &c., are repeated.

The use of my machine is not confined to wheels having a tire and felly.

The invention is useful in boring discal and circular bodies, &c.

While the various features of my invention are preferably employed together, one or more of said features may be used without the remainder, and in so far as applicable one or more of said features may be employed in boring-machines other than the one herein specifically described.

What I claim as new and of my invention, and desire to secure by Letters Patent, is—

1. A machine for boring the rims of wheels, a frame D, and central gear-wheel F^8, and the pinions F^7 F^7 F^7 engaging therewith, each of said pinions, screw-shafts F^6 F^6 F^6, each shaft engaging a screw-threaded clamp F, guideway, each screw-shaft fixed to its adjacent one of the pinions F^7, the screw-shafts pointing toward the center of the machine, and the mouth of each clamp having inclined sides, substantially as and for the purposes specified.

2. A machine for boring the rims of wheels, a frame D, and central gear-wheel F^8, and the pinions F^7 F^7 F^7 engaging therewith, each of said pinions, screw-shafts F^6 F^6 F^6, each shaft engaging a screw-threaded clamp F, guideway, each screw-shaft fixed to its adjacent one of the pinions F^7, the screw-shafts pointing toward the center of the machine, and the mouth of each clamp having inclined sides, one of the shafts being provided with the hand-wheel F^9 F^{10}, substantially as and for the purposes specified.

3. In a machine for boring the rims of wheels, a frame D and screw-shafts F^6, each pointing toward a common center D, slots F^{12} in the frame, each slot serving as a guideway for a clamp F, each clamp F provided with inclined jaws and engaging the screw-shaft, pinions F^7, each fixed to its shafts F^6 and each engaging the gear-wheel F^8, concentric with the center D, and means, substantially as described, for rotating a shaft F^6, substantially as and for the purposes specified.

4. In a machine for boring the rims of wheels, the radial drills and shafts, each rotated by its pinion receiving power from a suitable source, and the drill-shaft sliding through said pinion, and means, substantially as described, for advancing said drill toward the center D and retracting it therefrom, substantially as and for the purposes specified.

5. In a machine for boring the rims of wheels, the radial drills and shafts, each rotated by its pinion receiving power from a suitable source, and the drill-shaft sliding through said pinion, and collar P, connected to said drill-shaft, and carriage R, connected

to said shaft, and screw-shaft R^5, engaging a female screw of the carriage and rotated by suitable means, substantially as and for the purposes specified.

6. In a machine for boring the rims of wheels, the radial drills and shafts, each rotated by its pinion receiving power from a suitable source, and the drill-shaft sliding through said pinion, and collar P, connected to said drill-shaft, and carriage R, connected to said shaft, and screw-shaft R^5, engaging a female screw of the carriage, and pinion R^7 on said shaft R^5, and gear-wheel R^8, engaging the pinions R^7 and rotating the same, substantially as and for the purposes specified.

7. In a machine for boring the rims of wheels, the radial drills and shafts, each rotated by its pinion receiving power from a suitable source, and the drill-shaft sliding through said pinion, and collar P, connected to said drill-shaft, and carriage R, connected to said shaft, and screw-shaft R^5, engaging a female screw of the carriage, a pinion F^7, engaging said gear-wheel R^8 and fixed to shaft R^9, provided with pinion R^{12}, pinion R^{13}, engaging said pinion R^{12}, shaft R^{14}, carrying said pinion R^{13}, and crank-wheel R^{17}, fixed on shaft R^{14}, substantially as and for the purposes specified.

8. In a boring-machine, the radial drill-shafts K, each radial drill having a pinion M engaging a pinion M′ on shaft M^2, pinion M^4, fixed on the lower end of said shaft M^2 engaging gear-wheel M^7, substantially as and for the purposes specified.

9. In a machine for boring the rims of wheels, the radial drill-shafts K, each radial drill-shaft being provided with a frame L, fixed to the frame, the drill-shaft passing through the said frame, and the pinion M, fixed to said shaft within said frame, gear M′, having shaft M^2 journaled in journal M^3, and journal M^5, and carrying gear-wheel M^4, meshing with gear-wheel M^7, substantially as and for the purposes specified.

10. In a boring-machine, the radial drills, each having stationary frame L, and a pinion M, located on the radial drill-shaft, gear M′, engaging therewith and mounted on shaft M^2, journaled in journal-bearing M^5, and carrying gear-wheel connected to the source of power, and carriage R, connected to detent on the drill-shaft and engaging the screw-shaft R^5, journaled at its upper end in journal-bearing R^9, and clamp F, engaging the screw-shaft F^6, journaled at its upper end in bearing F^{13}, the bearing M^3, and the bearing R^9 and the bearing F^{13} and plate L^3 of the frame L being in one piece and fixed to the main frame of the machine, substantially as and for the purposes specified.

11. In a boring-machine, the frame having the hub H and the second axle or extension H′, shaft M^{12}, entering therein, hollow shaft M^8, the gear-wheel F^8 for moving the clamps being journaled on the axle H, and the gear-wheel R^8 for advancing and retracting the drills being located on the axle H′, and the gear-wheel M^7 for rotating the drills fixed on the hollow axle M^8, connected to power-wheel M^9 and turning on shaft M^{12}, substantially as and for the purposes specified.

12. The radial drill-shaft having the recess K^2, provided with slotted openings K^2, and drill N, received into said recess, and collar P, having recess P′, and set-screw P^2, bearing against the drill-shaft K and securing the collar, drill-shaft, and drill together, substantially as and for the purposes specified.

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