A. BRIEN.

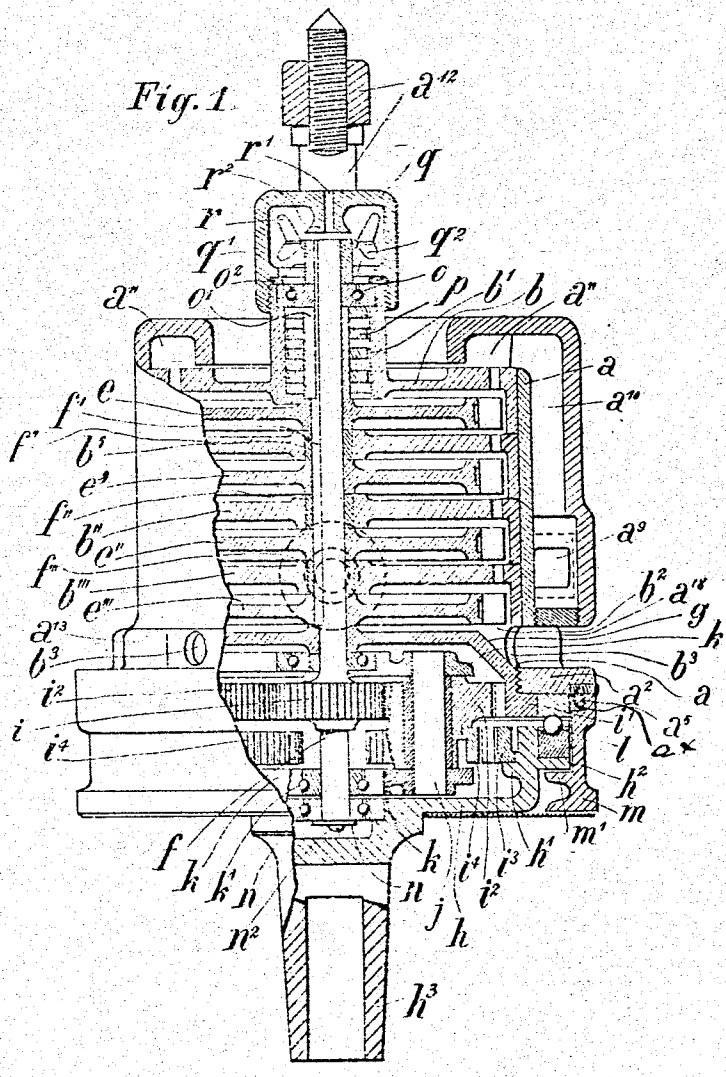
MOTOR DRIVEN TOOL CARRIER.

APPLICATION FILED SEPT. 13, 1909.

972,327. Patented Oct. 11, 1910.

2 SHEETS—SHEET 1.

Fig. 1.



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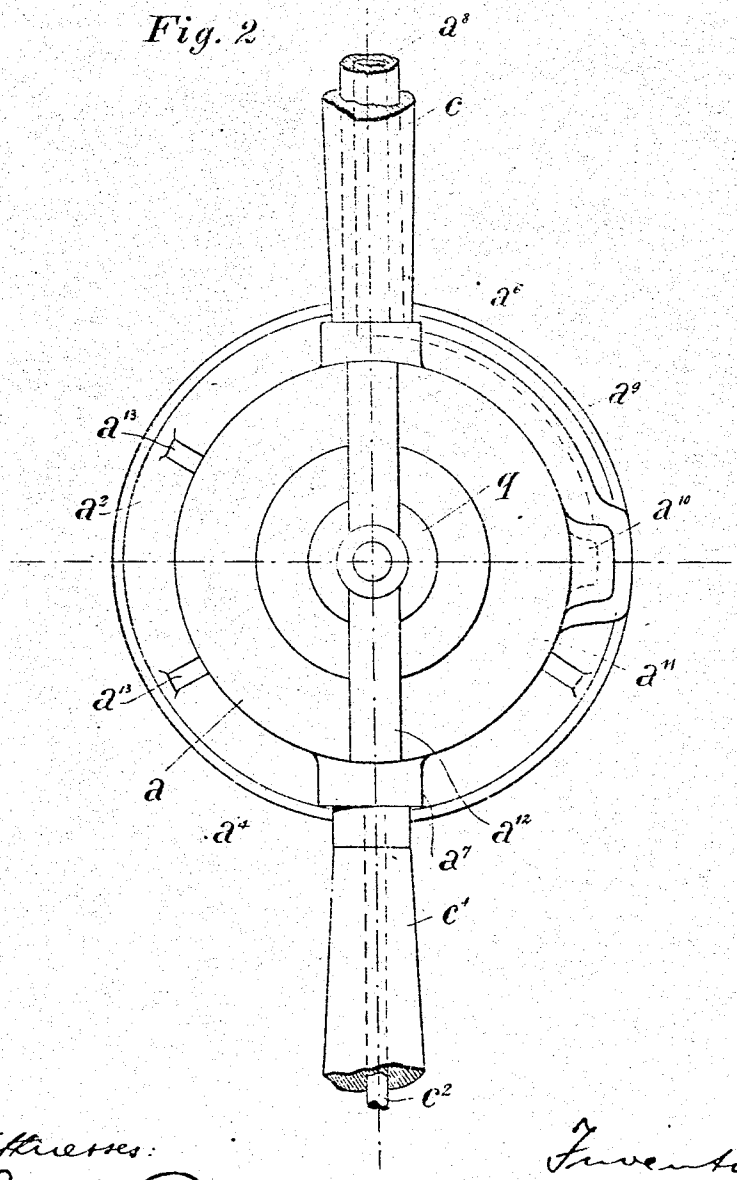
2 SHEETS—SHEET 2.

Fig. 2



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UNITED STATES PATENT OFFICE.

AUGUSTE BRIEN, OF DIJON, FRANCE.

MOTOR-DRIVEN TOOL-CARRIER.

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To all whom it may concern:

Be it known that I, AUGUSTE BRIEN, a citizen of the Republic of France, residing at Dijon, France, have invented certain new and useful Improvements in Motor-Driven Tool-Carriers, of which the following is a full, clear, and exact description.

The present invention overcomes certain disadvantages hitherto common in tool carriers and also other inconveniences inherent to each of them.

The invention essentially consists in utilizing a turbine actuated by an elastic medium as motor for the tool carrier, the type of turbine with graduated expansion steps being preferably used and combined, if necessary with a speed reducing arrangement, the whole being made portable or not according to circumstances.

I will now describe my invention with reference to the accompanying drawings showing as an example a portable tool carrier embodying the said improvements.

Figure 1 is an elevation partly in longitudinal section of the tool carrier, and Fig. 2 is a plan view of the same.

In these drawings the tool carrier is provided with a speed reducing arrangement and the turbine consists of an axial turbine with graduated expansion steps of known kind, the whole arrangement consisting of a cylindrical casing a prolonged at its upper extremity by a part a^1 turned downward and at its lower end by an annular part a^2 carrying a screw thread a^3 and a screw thread a^4 and is only connected to the main part a by a few ribs a^{13}. The casing is completed by a pair of oppositely situated bosses a^6, a^7 of which a^6 is prolonged by a tube a^8 which serves for the introduction of the actuating medium by a curved channel a^9 connected up to the channel a^8 in the boss a^6. The channel a^9 leads to a longitudinal channel a^{10} terminating in the annular chamber a^{11} which is formed by the upper surface of the distributer b, (hereinafter described) and the said part a^1. A handle is formed by the parts c fitted to the boss a^6 and by the part c^1 with tang c^2 fitted to the boss a^7 and by a kind of upper bridge a^{12}.

A series of distributers b, b', b'' and b''' are superimposed and consist each of a circular plate with central opening, a rim with distributing ports and a hanging cylindrical portion suitable for fitting closely within the interior periphery of the casing a. The first and last of these distributers differ slightly from the others. The distributer b has a collar b^1 which forms a stuffing box, and the last distributer b''' has a rim b^2 which fills the annular space between the parts a and a^2 of the casing. This rim is provided with one or more radial ports b^3 for the exhaust of the actuating medium.

A series of blade wheels e, e', e'' e''' are arranged between the above mentioned distributers. A shaft f is provided with a groove in which is a key f^1 which projects into corresponding grooves formed in the blade wheels and in rings f', f'' and f''' arranged in the central opening of the distributers b', b'' and b'''.

A part g consisting of a disk prolonged downwardly by a cylindrical portion corresponding to the thread a^4 and also provided with a boss with a central opening permits the passage of the shaft f which is prolonged on both sides of the above mentioned parts. This part g when screwed into the thread a^4 presses the upper surface of the distributer b against the turned down part a^1 of the casing a and holds the various other parts of the turbine in proper contact with each other. A part h prolonged upwardly by a cylindrical part with interior shoulder h^1 and flange h^2 is prolonged downwardly into the actual tool carrier h^3.

A differential gear situated in the casing formed by the parts g and h consists of a central pinion i firmly fitted to the shaft f, of a rim i^1 rigidly fitted to the part g of satellites i^2, meshing simultaneously with the pinion i and the rim i^1 each of said satellites being mounted loose on a shaft j integral with two superimposed brackets or cheeks k connected by stays (not shown) and mounted loosely on the shaft f by means of ball bearings k^1 of a supplementary rim i^3 of slightly less diameter than the rim i^1 and integral with the part h, which rim can turn freely with respect to the part g, and of supplementary satellites i^4 which mesh with the rim i^3 and are equal in number to that of the satellites i^2 with which they are integral and are each mounted loosely on the same shaft j as the corresponding satellite i^2.

A ball bearing l is provided, the upper part of which is situated in a recess in the part a^2 of the casing a and the lower portion of which rests on the upper surface of the flange h^2 of the part h.

A ring or hoop m has its lower portion provided with a shoulder m^1 on which rests the lower surface of the flange h^2 when the apparatus is not working and the tool carrier is arranged vertically, the part h^3 pointing downward.

The annular part a^2 has threaded engagement, as at a^3 with the rim i', as seen in Fig. 1. A ring a^5 is disposed in a screw-threaded annular recess in the upper portion of the rim m, as seen in Fig. 1, a small screw a^x, as shown in said figure, being provided above said member a^5. This ring forms a tight joint at this point.

A ball bearing n is situated at the lower extremity of the shaft f and its inner part is held in position by a plate n^1 and a screw n^2, the outer portion of said bearing being held in a corresponding recess of the part h. A ball bearing o similar to the preceding one is situated at the upper end of the shaft f and the inner portion of this is held between two sleeves o^1, o^2 integral with the said shaft f; the outer portion of this bearing rests on top of the packings p of the stuffing box b^1 and is held in a corresponding recess of the latter, the cover of which is formed by a threaded cap q screwed on to a corresponding threaded portion of b^1 and provided with a shoulder q^1 acting on a washer q^2.

Two lubricators are provided, the one (not shown) for the differential gear and the other formed by the interior of the cap q for the turbine. This latter lubricator consists preferably of a winged part r firmly fitted to the shaft f and having a feeding channel r^1 in a boss r^2 which in the example shown is integral with hood q and prevents any leakage of the lubricant in whatever position the tool carrier is held.

The fitting together of all these parts is exceedingly simple. The shaft f is turned upside down so that the end to which the pinion i is fitted is on top and then the cheeks k, the shafts j and the satellites i^3 and i^4 are pushed on to the shaft f then the lower ball bearing k^1, the ball bearing n, the plate n^1, and the screw n^2 are fitted in their respective positions and then the shaft f is turned back into its normal position. The upper ball bearing k^2 is then fitted and the part g placed above it, then the key f^1 is placed in the corresponding groove of the shaft f and then the parts e''', f''', b''', e'', f'', b'', e', f', b', e, b, o^1, p, o and o^2 are successively placed in position on the shaft f, the last mentioned part (o^2) being keyed or otherwise firmly fixed thereon, then the washer q^2 is slid on the shaft and the winged part r is arranged above it. The cap q is then screwed up tight. The shaft f together with all the parts just referred to can be slid as a whole from the bottom to the top into the casing a where the shaft is fixed in position by screwing the part g into the screw thread a^4 and when this has been effected the whole is turned back again, then the ball bearing l is placed in position as well as the arrangement formed by the part h and the rim i^2, which is then capped by the part m which is screwed on to the screw thread a^3. By manipulation of the handle c, the actuating medium is admitted to the chamber from which it is led to the distributers which are thereby caused to revolve and by means of the differential gear the actual tool carrier is rotated at a considerably reduced speed.

Of course the various parts may be made of any suitable metal but aluminum will preferably be used for all the various parts except the gear wheels and their shafts, the blade wheels, the main shaft and its fittings and ball bearings.

The invention is by no means limited to the single form of construction just described, but comprises on the contrary any modifications, such as those for example in which the differential gear is substituted by another system as by a gear for increasing the speed instead of a reducing gear as has been shown in the present example, or the number of expansion steps may be other than four, or a radial or reaction turbine employed, or the exhaust of the actuating medium more particularly if compressed air is used, may be effected through the axis of the whole arrangement so as to utilize this fluid for cooling the tool. Neither is the invention limited with respect to the special arrangement of the above mentioned lubricator, to the application of this said arrangement to the upper lubricator of tool carriers of the present system but includes the application of the said arrangement to all lubricators.

Having thus described my invention what I claim is:

1. A tool of the class described, comprising a cylindrical casing, a series of distributers superimposed, the lower one having an annular rim having radial ports, blade wheels arranged between said distributers, a shaft, and a differential gear in said casing, said blade wheels being splined to said shaft.

2. A tool of the class described, comprising a cylindrical casing, a series of distributers superimposed, the lower one having an annular rim having radial ports, blade wheels arranged between said distributers, a shaft, a differential gear in said casing, said blade wheels being splined to said shaft, and a winged lubricator carried by said shaft.

3. A tool of the class described, comprising a cylindrical casing, a series of distributers superimposed, the lower one having an annular rim having radial ports,

blade wheels arranged between said distributers, a shaft, a differential gear in said casing, said blade wheels being splined to said shaft, a winged lubricator carried by said shaft, and a cap forming a chamber within which said lubricator is disposed.

4. A tool of the class described, comprising a cylindrical casing having upward extensions at one end and an annular rim at the other, a shaft extending through said casing, distributers superimposed and blade wheels alternated with said distributers, a disk having a downwardly prolonged cylindrical portion having threaded engagement with a fixed part and provided with a boss through which said shaft passes and constructed to press upon the upper distributer to hold the parts in position, and a differential gear, one member of which is mounted on said shaft.

In testimony whereof I affix my signature in presence of two witnesses.

AUGUSTE BRIEN.

Witnesses:

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LOUIS BOULLIER.