

No. 734,187.

PATENTED JULY 21, 1903.

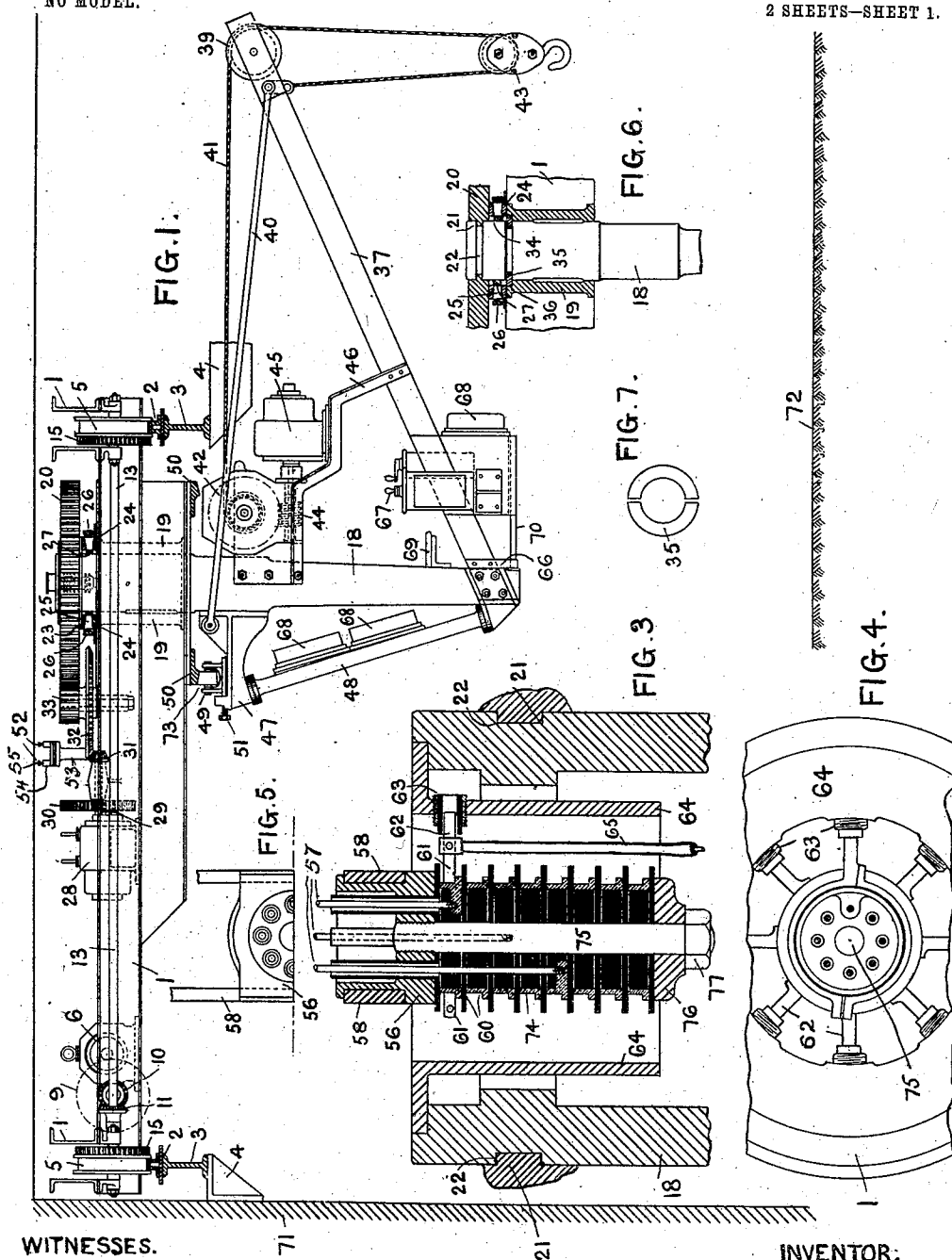
J. MATTHEWS.

CRANE.

APPLICATION FILED NOV. 10, 1902.

NO MODEL.

2 SHEETS—SHEET 1.



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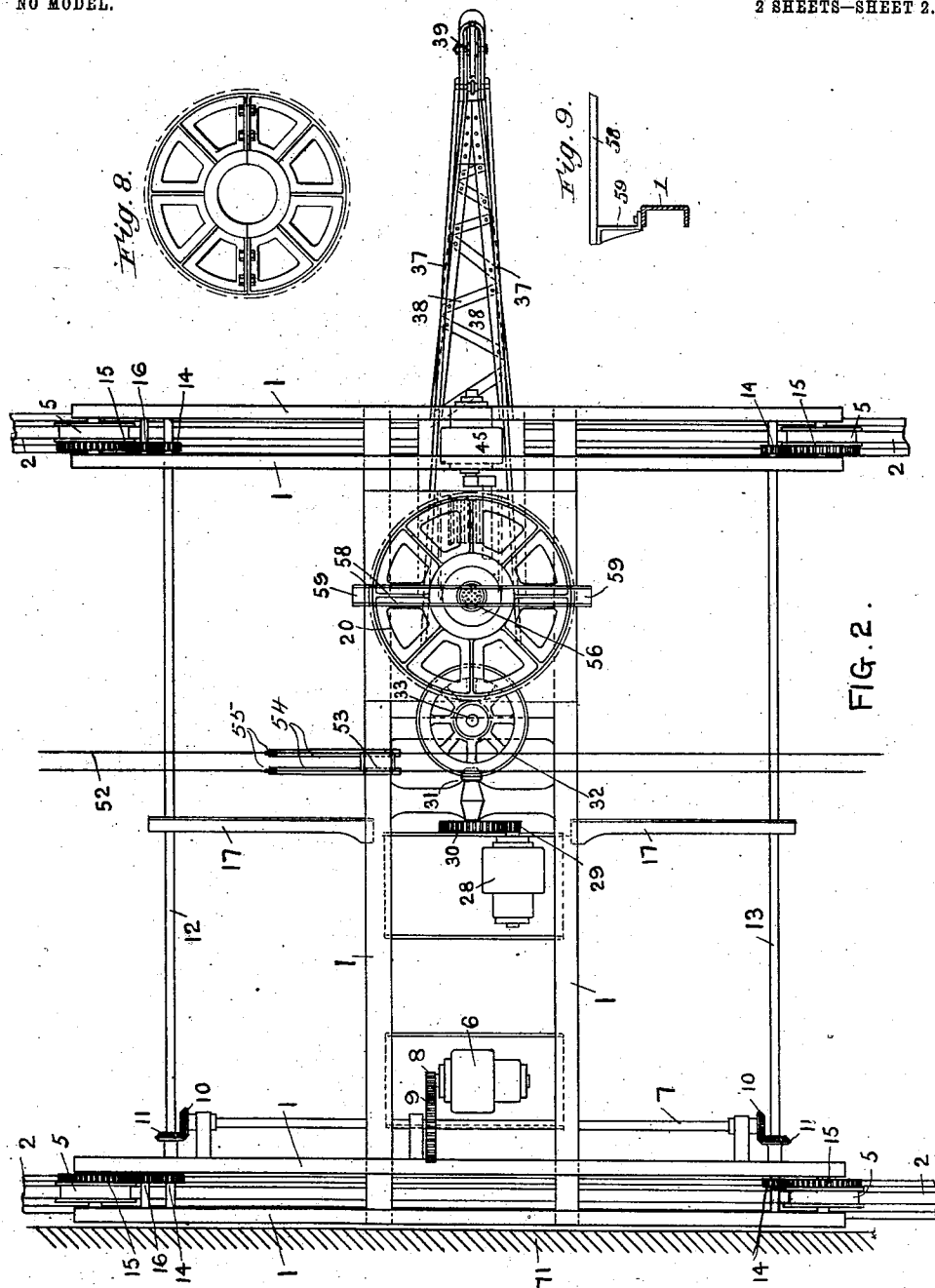
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WITNESSES.

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UNITED STATES PATENT OFFICE.

JOSEPH MATTHEWS, OF LIVERPOOL, ENGLAND.

CRANE.

SPECIFICATION forming part of Letters Patent No. 734,187, dated July 21, 1903.

Application filed November 10, 1902. Serial No. 130,753. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH MATTHEWS, engineer, a subject of the King of Great Britain, residing in Liverpool, in the county of Lancaster, England, (whose full postal address is 91 and 93 Northumberland street, Liverpool, aforesaid,) have invented certain new and useful Improvements in Cranes for Workshops and the Like, (for which application has been made in Great Britain, No. 9,550, dated April 24, 1902,) of which the following is a specification.

This invention has for its object a traveling crane specially adapted for use in sheds in which floor-space is limited and valuable and which is capable of reaching into embayments or lean-tos or between pillars and the like in a large shed.

The crane is mounted on an overhead carriage running on rails near the roof of the shed, and beneath this carriage at one point is hung a pillar upon which is a jib. Motors are provided for traversing the carriage, turning the pillar and jib, and operating a winch for winding up and paying out the cable and hook.

The invention will be described with reference to the accompanying drawings, in which—

Figure 1 is an elevation of the traveling carriage and crane. Fig. 2 is a plan view of Fig. 1. Fig. 3 is a vertical section of the ring contact device in the head of the crane-pillar. Fig. 4 is a plan view of said contact device with the top removed, and Fig. 5 is a plan view of one-half the head or cap. Fig. 6 is an elevation in section of a safety device for preventing the pillar from falling in case the bearing or the driving-wheel should break. Fig. 7 shows in plan two parts of the safety device. Fig. 8 is a plan view of the slip-wheel, and Fig. 9 is an elevation of the means for supporting the crane.

The apparatus comprises a carriage 1, which is made of angle-irons and girders riveted together in the manner usual in overhead cranes. Rail-tracks 2 are mounted near the roof of the shed on girders 3 and brackets 4 or the like, and four wheels 5 on the four corners of the carriage run on these tracks.

A motor 6, mounted on the carriage, drives a shaft 7 by means of pinion 8 and toothed wheel 9. Shaft 7 has on each end a miter-wheel 10, gearing with miter-wheels 11 on two cross-shafts 12 13, which are supported in brackets 17 and the end pieces of the carriage 1. Each shaft 12 13 carries a pinion 14 on each end. Pinions 14 on shaft 13 gear directly with toothed wheels 15 on the roller-wheels 5; but pinions 14 on shaft 12 drive the toothed wheels 15 on the wheels 5 at the other end of the carriage through an interposed cog-wheel 16, whereby the direction of rotation of the drive is made the same for all the four wheels 5.

On the carriage is pivotally mounted the crane. This consists of a large hollow pillar 18, preferably of cast-iron, which fits in a bearing 19 in the carriage 1. On the top of the pillar is a toothed wheel 20, by which the crane is turned. This is preferably made in halves bolted together around the head of the pillar. In this case each half has a tongue 21, which fits in a groove 22 in the pillar-head, Fig. 8. Beneath the wheel 20 is a conical bearing-ring 23, and a corresponding ring 24 is fixed on the carriage above the bearing 19. Between these two bearing-surfaces are a set of rollers 25, mounted between two hoops or rings 26 27. The weight of the crane and of its load is borne by these rollers and bearing-rings, which allow the crane to be turned freely when required. The mechanism shown for turning the crane is a motor 28, mounted on the carriage 1 and driving the wheel 20 through a pinion 29, toothed wheel 30, bevel-wheels 31 and 32, and pinion 33. It will of course be evident that any other suitable mechanism may be employed for gearing the toothed wheel 20 with the motor 28. In order to provide for the support of the crane-pillar in case the wheel 20 or part of the roller-bearing should give way, a second groove 34, Fig. 6, is formed in the pillar 18, and when erecting the crane the pillar is pushed upward beyond its ultimate position, and two half-rings 35, Fig. 7, of steel or wrought-iron, are slipped into the groove 34, and as the pillar is lowered they come into a groove 36 in the top of the bearing 19. When the roller-

bearing (25, &c.,) is adjusted, the half-rings 35 lie in the groove 36 clear of the pillar, as seen in Fig. 6; but should the wheel 20 or the bearing break or fail the pillar only drops a fraction of an inch and is then supported by the half-rings.

The jib consists of two steel strips 37, secured to the foot of the pillar 18 and having two angle-pieces on their inner faces, between which bracing-ties 38 are fixed. At the end of the jib is a pulley 39. The jib is supported from the head of the pillar by tie-rods 40, and the cable 41 is preferably secured, as shown, at the end of the jib and passed under a hook-block 43 before being taken over pulley 39 to the winch 42. The winch 42 is driven by worm-gearing 44 from a motor 45, which latter is supported, together with the winch, on a pair of bent brackets 46. At the rear of the pillar is mounted a casting 47, which is stayed to the base of the pillar by two posts 48. On the casting is arranged a block 49, having three, four, or any desired number of conical rollers 73 thereon. These rollers work on an inverted conical track 50 and take the back-thrust of the jib and load. The block 49 may be set up and adjusted by means of set-screws 51.

72 represents the floor over which the crane works.

The crane is driven electrically. Two wires 52—one positive and the other negative—are mounted on the tie-beams of the roof or on other convenient cross-pieces. A standard 53 on the frame of the carriage has two spring-strips 54 fixed in its upper end, and shoes 55 on the ends of these strips slide on the wires 52. The collectors 55 are connected by suitable leads to a set of conductors 57, mounted in a head-piece 56 on the pillar 18, which is seen in Figs. 3, 4, and 5. The head-piece 56 is supported by two cross-rods 58, Figs. 2, 3 and 9, which are held at the ends in brackets on the frame of the carriage 1. These rods besides supporting the head-piece hold it rigidly in the pillar-head and prevent it from rotating. Each of the wires from the collector is passed through insulation-blocks 74 in the head-piece 56 and ends in a conducting-ring 60. In the head-piece shown there are eight wires and eight contact-rings 60. On each of these rings is mounted a two-part conductor 61, which is capable of turning around the ring and which has an arm 62 at one side. This arm projects through a cylindrical insulator into a ferrule 63, screwed through the wall of a cylinder 64, fixed in the head of the pillar 18. Only one such conductor 61 and ferrule 63 are shown in Fig. 3, but one conductor is mounted on each contact-ring 60, and the arms 62 project into ferrules in the sides of the cylinder 64, as shown in plan in Fig. 4. The head-piece 56, contact-rings 60, and insulating-blocks 74 are held together by a bolt 75, head 76, and nut 77. A wire 65 is connected to each arm

62, and each wire is led down the pillar to a fuse-box 66 and controlling and reversing switches 67.

68 represents resistance-boxes, to each of which one of the wires passes, before reaching the controlling and reversing switches 67.

There is no novelty in the electric controlling system, and of course any other system might be adopted without departing from the scope of the invention. In the arrangement shown there are eight wires; but if more were required the head-piece 56 would be enlarged, as required. Of these eight wires one conveys current for the jib-motor 45, two others carry the positive currents for the field-magnets of the motors 6 and 28, four more lead to and from the armatures of the motors 6 and 28, and the last is a general return-wire.

A seat 69 is provided for the operator, and on a platform 70 are the reversing and controlling switches 67, by which the three motors 6, 28, and 45 are regulated.

It will be seen that the head-piece 56 will remain stationary in the head of the pillar 18 while this latter revolves; but the contact devices will turn and always complete the respective circuits.

As arranged in the apparatus shown the jib will command the floor of a shed to the right of the right-hand rail-track and up to the left wall 71; but the crane might also be hung in other positions on the carriage, depending on the plan of the sheds and the work to be done. The crane might also be used as a supplement to any known form of traveling overhead crane or for transferring loads from one crane to another.

The motors may be of any suitable known type, and, if required, they may be arranged in different positions from those shown.

I declare that what I claim is—

1. In a traveling crane, the combination of a traveling carriage; a pair of overhead rails therefor; a pillar; means for revolvably supporting the upper end of said pillar in the carriage; a jib attached to the part of said pillar below the carriage; a cable and lifting-tackle on said jib; means for traversing the carriage on the overhead rails; independent means for revolving the pillar; and independent means for operating the cable and lifting-tackle.

2. In a traveling crane, the combination of a traveling carriage; a pair of overhead rails therefor; a pillar; means for revolvably supporting said pillar in the carriage; a jib attached to said pillar; a cable and lifting-tackle on said jib; electric means for traversing the carriage; independent electric means for revolving the pillar; independent electric means for operating the cable and lifting-tackle; and one central control for all said independent means.

3. In a traveling crane, the combination of a source of electric current; a traveling car-

riage; a pillar revolubly supported on said carriage; a jib on said pillar; a cable and lifting-tackle on said jib; an electric motor for traversing the carriage; a second electric motor for revolving the pillar; a third electric motor for operating the cable and lifting-tackle; a central control on said pillar for said motors; and sliding contacts on said pillar, said sliding contacts connecting the source of electric current to the central control, and the central control to the several motors.

4. In a traveling crane, the combination of a source of electric current; a traveling carriage; a pillar revolubly supported on said carriage; a jib on said pillar; a cable and lifting-tackle on said jib; an electric motor for traversing the carriage; a second electric motor for revolving the pillar; a third electric motor for operating the lifting-tackle; a central control; a head-piece in the pillar and fixed to the carriage; a plurality of superimposed metal rings, insulated one from the other, connected to and stationary on said head-piece, each ring being connected with the source of current or one of the motors; a second set of superimposed metal rings, insulated one from the other, encircling and slidably mounted on said stationary rings, moving with said pillar, and each being connected to the central control, substantially as hereinbefore set forth.

5. In a hanging jib-crane, the combination of a traveling carriage; a pillar; conical roller-bearings supporting said pillar on said carriage; a jib on said pillar; means on said pillar for counteracting the back thrust due to the weight of the jib; conical roller-bear-

ings on such counteracting means; and means for compensating the wear of the said latter conical roller-bearings, as set forth.

6. In a hanging jib-crane, the combination of a traveling carriage; a pillar; conical roller-bearings supporting said pillar on said carriage; a circular track on the under part of the carriage; a backstay on the pillar below the carriage; adjustable conical roller-bearings on said backstay for bearing upward against said circular track; and means for radially adjusting said bearings.

7. In a hanging jib-crane, the combination of a jib; a pillar on which said jib is fixed; a traveling carriage; a split wheel; an annular tongue within the hub of said split wheel, said tongue fitting an annular recess formed in said pillar; and conical roller-bearings adapted to cause said split wheel to bear on the traveling carriage.

8. In a hanging jib-crane, the combination of a jib; a pillar on which said jib is fixed, said pillar having a groove formed therein; elevated means for revolubly supporting the top of said pillar, said means likewise having a recess formed therein; and a pair of half-rings adapted to lie in said groove and recess, whereby the pillar will be supported if the bearing gives way.

In witness whereof I have hereunto signed my name, this 30th day of October, 1902, in the presence of two subscribing witnesses.

JOSEPH MATTHEWS.

Witnesses:

HUBERT A. GILL,
FRED. P. EVANS.