

APPARATUS FOR CHARGING COKE OVENS WITH COAL.

APPLICATION FILED MAY 27, 1907.

Patented Feb. 16, 1909.

3 SHEETS—SHEET 1.

Fig. 1.

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Chas. A. ...
Patented

inventor
William John ...

Fig. 1.

Witnesses.
 Fredrick Chelmsford.
 Samuel Percival

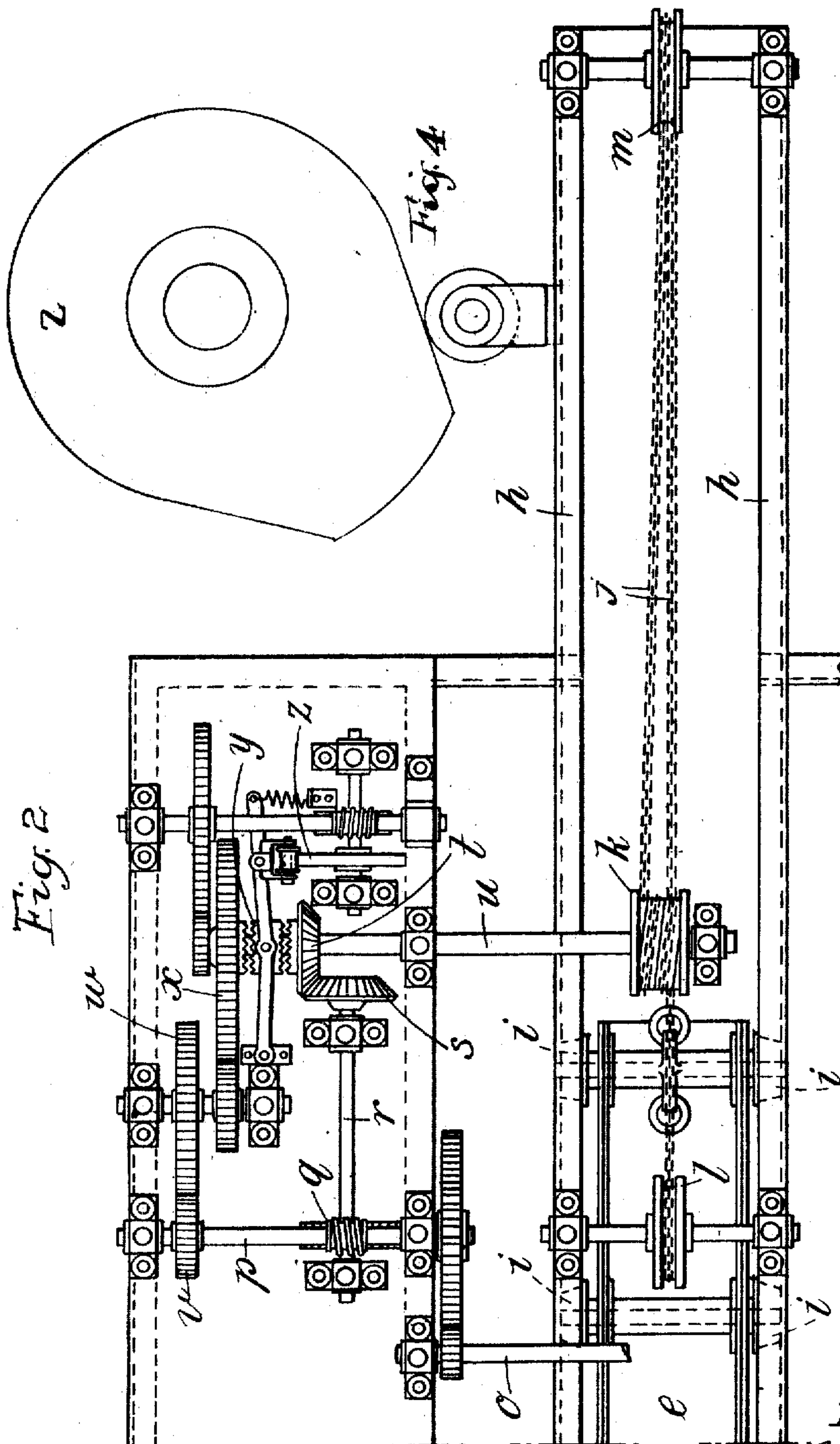
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3 SHEETS—SHEET 2.



Witnesses.
 Frederick Cleveland,
 Samuel Percival

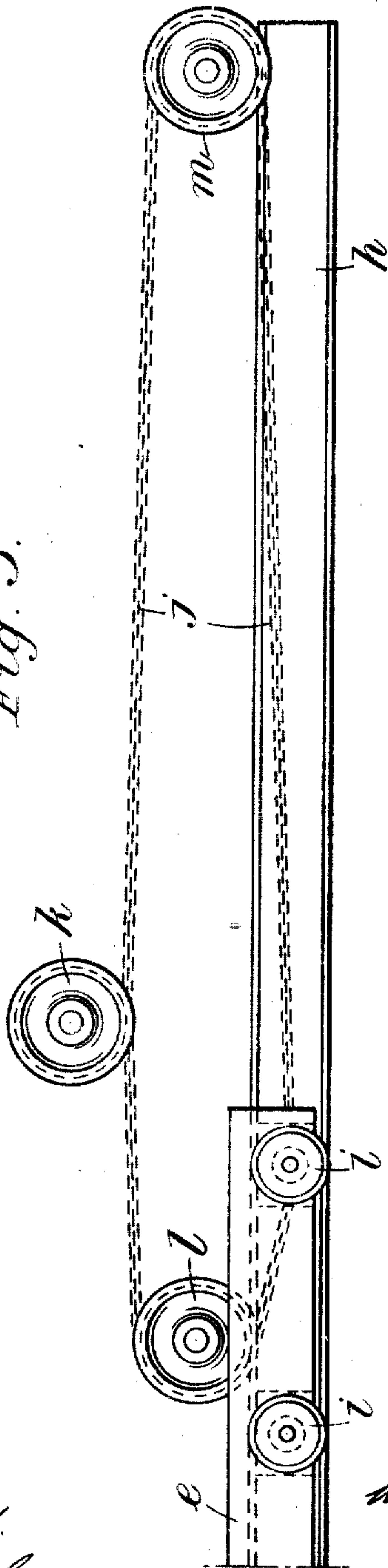
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3 SHEETS—SHEET 3.

Fig. 3.



Witnesses.
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UNITED STATES PATENT OFFICE.

WILLIAM JOHN JENKINS, OF RETFORD, NOTTINGHAM, ENGLAND.

APPARATUS FOR CHARGING COKE-OVENS WITH COAL.

No. 912,964.

Specification of Letters Patent.

Patented Feb. 16, 1909.

Application filed May 27, 1907. Serial No. 876,039.

To all whom it may concern:

Be it known that I, WILLIAM JOHN JENKINS, a subject of the King of Great Britain and Ireland, residing at Thrumpton Lane, Retford, Nottingham, England, have invented certain new and useful Improvements in Apparatus for Charging Coke-Ovens with Coal; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to mechanism or apparatus by means of which coke ovens may be charged from one or both ends with coal to any required depth by a machine of the projector type.

To carry my invention into practical effect I use a tray or chute of a suitable length arranged at a height to suit the depth of the required layer of coal, and carried on runner wheels which would run on the floor of the oven, or the tray or chute could be supported near the one end on a fixed support and be of sufficient strength to carry itself as a cantaliver. This tray or chute is run into the oven by hand or mechanically by certain mechanism which pushes the tray or chute forward at any required speed to the end of its stroke near the farther end of the coke oven, and then the charging commences. As soon as the coal begins to run along the tray or chute from the projector or charging machine, the tray or chute is slowly withdrawn from the oven, the speed of withdrawal being arranged by gearing in such a manner that the tray or chute is withdrawn about as fast as the charge of coal fills into the oven, and so that the tray or chute is completely withdrawn just before the charging of the oven is completed.

The mechanism might be carried by a frame geared in a suitable way to the projector mechanism or it might be carried on a separate frame and be driven separately but at a suitable speed corresponding with the speed of charging.

The coal from the projector machine will slide along the tray or chute and will fall off the end, and the thickness of the layer will be determined by the height at which the tray or chute stands in the oven. It is not

necessary for the tray to be withdrawn continuously, but it may equally well be done by a step by step motion.

In order that this invention may be readily understood I will proceed to describe the same with reference to the accompanying drawings, in which I show the application of my invention to a charging machine for coke ovens.

Figure 1 is an elevation of the charging machine supported on wheels which run along rails laid on the floor in front of the coke oven. Fig. 2 is a plan of the gearing for moving the tray into and out of the oven. Fig. 3 is an elevation of the tray with the rails for supporting same, and the chains for connecting the chute to the traveling gear. Fig. 4 is a detailed side elevation of the clutch shifting cam.

Referring to Fig. 1 *a* is the main framework of a coke oven charging machine supported on wheels *b* which travel along rails *c* laid on the floor, *d* is the oven to be charged with coal by the machine, and *e* is the tray along which the coal would slide into the oven when being projected by the projector *f*, *g* is the motor for propelling the machine along the rails. *h* is the hanging frame or support in which the tray or chute is carried by means of rollers *i* and *j* is the chain which is attached to the back end of the tray or chute and to the drum *k* around the guide pulleys *l* and *m*. *n* is a motor for driving the projector *f* and the gear for operating the tray or chute *e* by means of a belt driving on to the shaft *o* which in turn drives by a pair of spur wheels a shaft *p*.

In order that the tray or chute *e* may have two speeds of traveling, fast when entering the oven and slow when returning, the shaft *p* is fitted with two drivers, the one for the forward stroke being a spur pinion driving a spur wheel which is keyed on the shaft *w* on which is also keyed another spur wheel gearing with a spur wheel *x* which runs loose on the drum shaft *u*, the other drive for the slow return which is regulated to suit the flow of the coal consists of a worm gearing with a worm wheel on the shaft *r* on which is also keyed a bevel or miter wheel *s* which drives a corresponding wheel *t* running loose on the drum shaft *u*. The wheels *t* and *x* which run loose on the shaft *u* are each fitted with a

clutch face between which is arranged a double clutch *y* sliding on a square or feather keys on the shaft *u*. The clutch *y* is automatically actuated by a revolving cam *z* on the face of which the clutch lever keeps contact by means of a coil spring. The cam *z* is driven by means of suitable gearing from the shaft *u*, the gear being so arranged that at the end of each inward and outward stroke of the tray or chute *e* the clutch is thrown out of gear automatically.

A is a hopper or bunker for holding the coal and is fixed on the frame *a*. The hopper would be fitted with an agitator B to insure the coal falling into the feeder C which is of the screw type and which delivers the coal into the projector. The agitator B and the feeder C would be driven by suitable gearing (not shown) from the motor *n* which drives the projector *f* and there would be a suitable clutch (not shown) for throwing them into and out of gear by a hand lever arranged in a convenient position for the attendant.

In operation the hopper A is first filled with coal from an overhead storage hopper or bunker or by an elevator or other suitable means, then the machine or charging apparatus is placed opposite the oven to be charged. The projector is then set in motion running at its maximum speed and the tray or chute *e* is run into the oven *d* by means of the chains *j* and the gearing, the coal being then fed by means of the feeder B into the projector *f* which in turn projects the coal along the tray *e* to the farthest end of the oven *d* where it stacks or piles up to the level of the tray *e*, then the projector *f* commences to slow down which may be accomplished in any suitable manner and the tray *e* starts on its return stroke, the slowing down of the projector *f* and the speed of the tray *e* being so regulated that a level bed of coal is insured the full length of the oven when the charge is completed and the operation may then be repeated. The slowing down of the projector *f* may be accomplished in several ways. If the motor *n* is for a continuous current it would be arranged as a shunt motor with the field magnets regulated by means of a rheostat in such a manner that the speed of the motor could be increased by adding resistance to the field circuit and so weakening the magnetic field. The rheostat is of the ordinary type largely used for variable speed motors. If the motor is for use with three phase or alternating current it would run at a constant speed, and a variable speed of the projector would be attained by using a cone pulley, on the end of the motor spindle driving a cone pulley and projector with belt fork gear arranged to move the driving belt along the cone until the desired speed is attained.

What I claim and desire to secure by Letters Patent is:—

1. In a projecting apparatus for charging coke ovens, the combination of a wheeled supporting structure, a reciprocally mounted chute for operation within a coke oven, automatically operated means for rapidly moving said chute forward into the oven and for withdrawing it slowly therefrom, and means for projecting coal over said chute into said oven.

2. In a projecting apparatus for charging coke ovens, the combination of a wheeled supporting structure, a reciprocally mounted chute for operation within a coke oven, automatically operated means for rapidly moving said chute forward into the oven and for withdrawing it slowly therefrom, means for projecting coal into said oven through said chute, and means for regulating said projecting means to vary the amount of coal fed to the oven.

3. In a projecting apparatus for charging coke ovens, the combination of a wheeled supporting structure, a reciprocally mounted chute for operation within a coke oven, automatically operated means for rapidly moving said chute forward into the oven and for withdrawing it slowly therefrom, means for projecting coal into said oven, and means for slowing down said coal projecting means operable on the withdrawal of the chute.

4. In a projecting apparatus for charging coke ovens, the combination of a wheeled supporting structure, a reciprocally mounted chute for operation within a coke oven, automatically operated means for rapidly moving said chute forward into the oven and for withdrawing it slowly therefrom, said means comprising a shaft having spaced gear wheels mounted loosely thereon and provided with opposed clutch faces, a double clutch member keyed to slide on said shaft for engagement alternately with the clutch members on said wheels, a power shaft, worm mechanism connecting said power shaft with one of said loosely mounted wheels, gear wheels connecting it with the other of said loosely mounted wheels, automatically operated means for throwing said clutch alternately into engagement with the clutch members of said loosely mounted wheels, and means connecting said first mentioned shaft with the chute.

5. In a projecting apparatus for charging coke ovens, the combination of a wheeled supporting structure, a reciprocally mounted chute for operation within a coke oven, automatically operated means for rapidly moving said chute forward into the oven and for withdrawing it slowly therefrom, said means comprising a shaft having spaced gear wheels mounted loosely thereon and provided with opposed clutched faces, a double clutch member keyed to slide on said shaft for engagement alternately with the

clutch members on said wheels, a power
shaft, worm mechanism connecting said
power shaft with one of said loosely mounted
wheels, gear wheels connecting it with the
5 other of said loosely mounted wheels, a lever
carried by said clutch, a bearing on said
lever and operating thereon to throw the
clutch alternately into engagement with the
clutch members of the loosely mounted

wheels, and means connecting said first men- 10
tioned shaft with the chute.

In testimony whereof I affix my sig-
nature, in presence of two witnesses.

WILLIAM JOHN JENKINS.

Witnesses:

PERCY FISHBURNE,
CUTHBERT J. EDGELEY.