W. F. & G. J. MOORE.

GRAIN GRINDING MACHINE.

APPLICATION FILED OCT. 3, 1908.

932,882.

Patented Aug. 31, 1909.

2 SHEETS—SHEET 1.

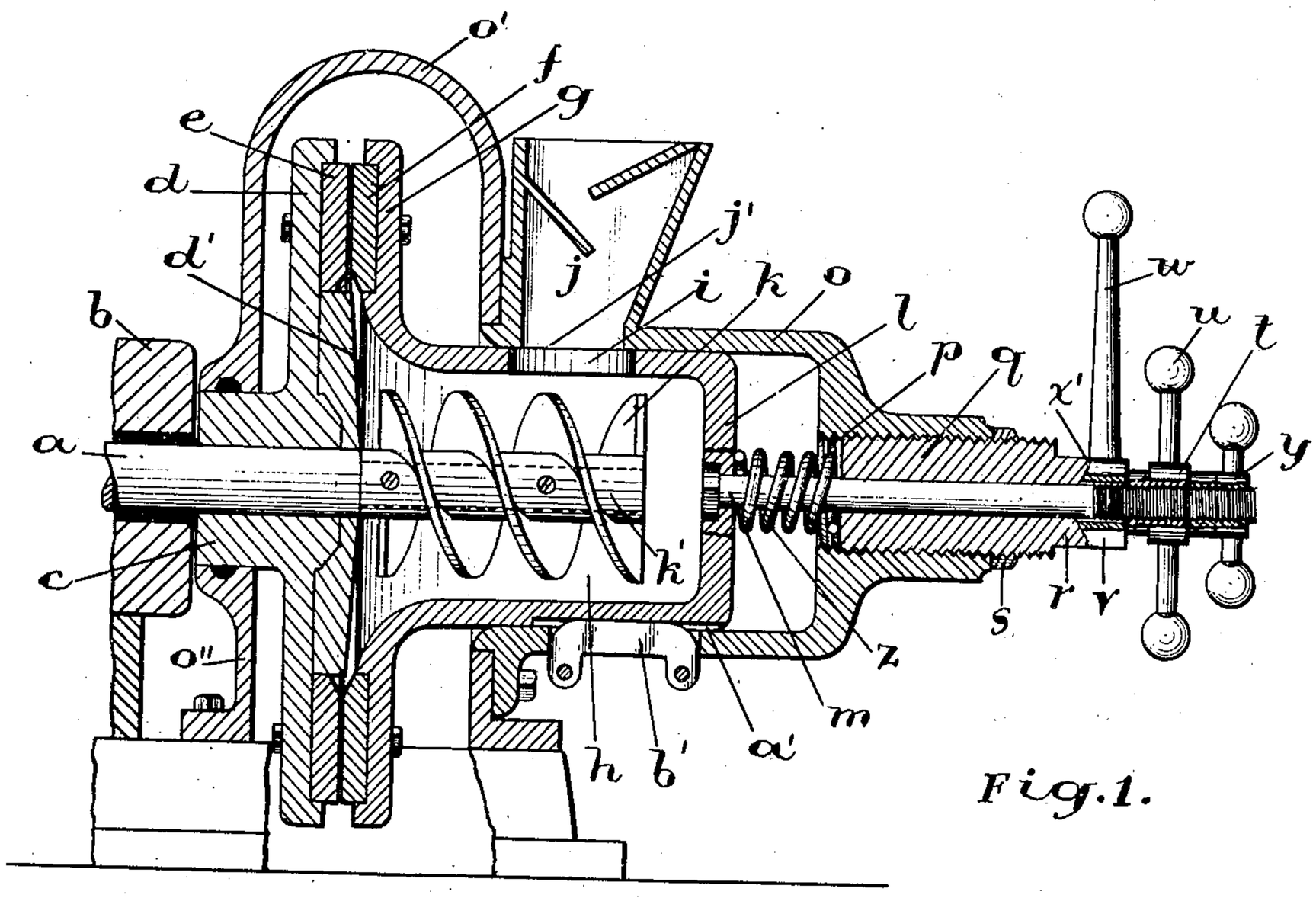

Fig. 1.

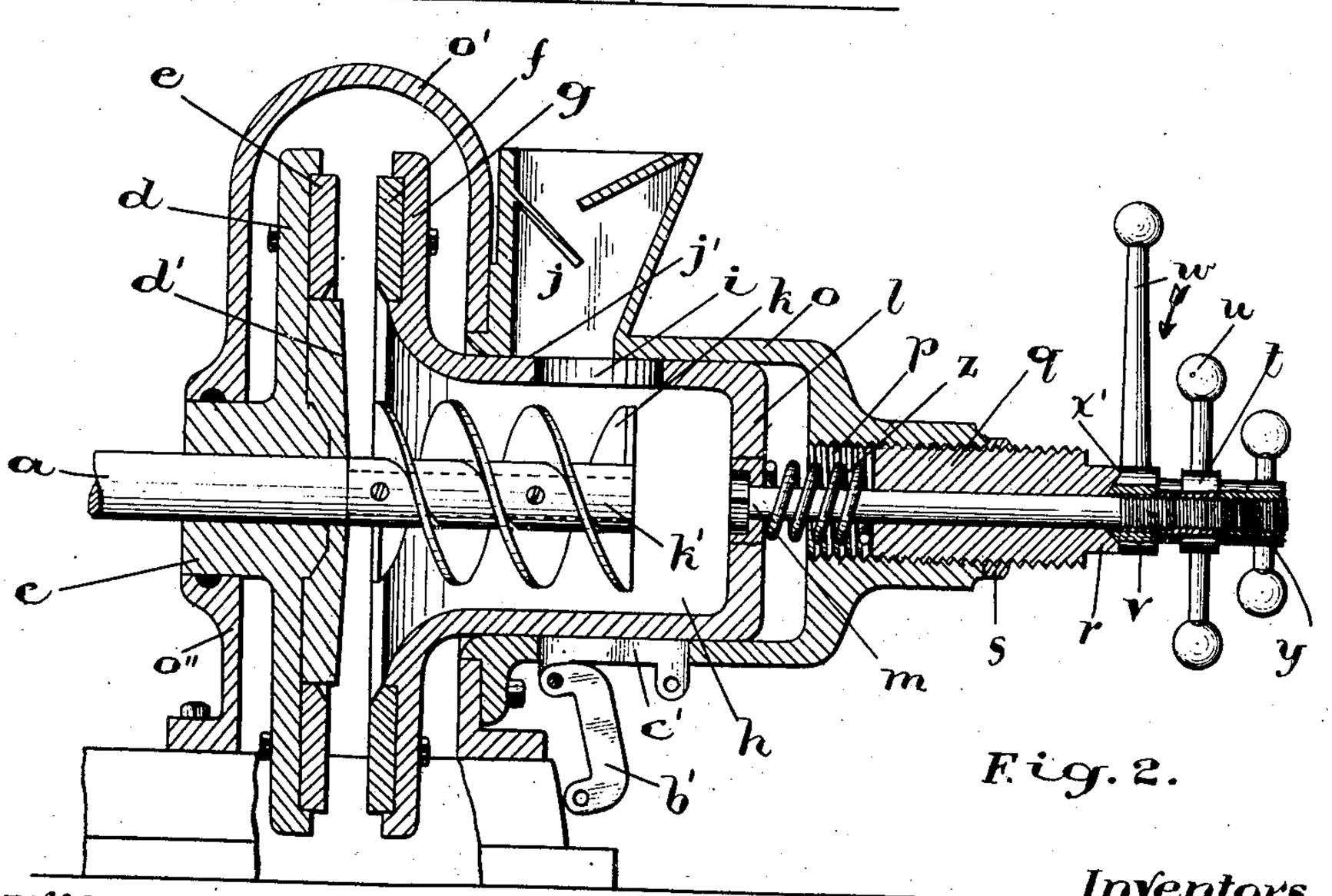

Fig. 2.

Witnesses.

H. C. Trimble

Olive Bellman

Inventors.

William F. Moore

George J. Moore

by C. H. Reeder

their attorney

W. F. & G. J. MOORE.

GRAIN GRINDING MACHINE.

APPLICATION FILED OCT. 3, 1908.

932,882.

Patented Aug. 31, 1909.

2 SHEETS—SHEET 2.

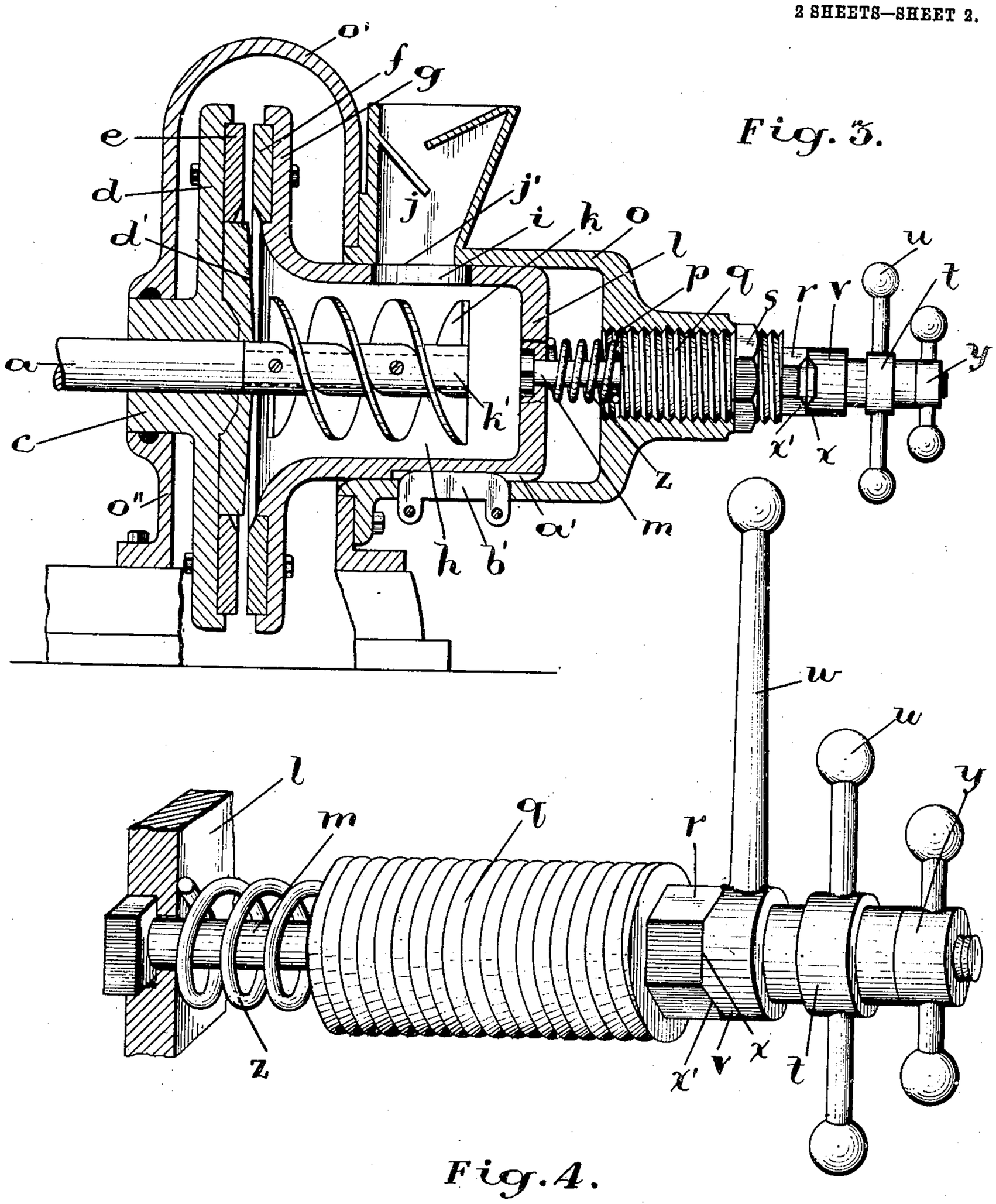

Fig. 3.

Fig. 4.

Witnesses.

H. L. Trimble.

Olive Bateman

Inventors.

William F. Moore

George J. Moore

by C. H. Nichols

their attorney

UNITED STATES PATENT OFFICE.

WILLIAM FORRESTER MOORE AND GEORGE JAMES MOORE, OF TORONTO, ONTARIO, CANADA.

GRAIN-GRINDING MACHINE.

932,882. Specification of Letters Patent. Patented Aug. 31, 1909.

Application filed October 3, 1908. Serial No. 456,028.

To all whom it may concern:

Be it known that we, WILLIAM FORRESTER MOORE and GEORGE JAMES MOORE, residents of the city of Toronto, in the county of York and Province of Ontario, Canada, have invented certain new and useful Improvements in Grain-Grinding Machines; and we hereby declare that the following is a full, clear, and exact description of the same.

This invention relates to a grain grinding machine characterized by an adjustable non-rotatable grinding head acting in conjunction with a rotatable head, technically termed the running head, mounted upon a revoluble shaft driven by any suitable means, in which the adjustable non-rotatable grinding head can be accurately adjusted to the running head and held in contact with the latter by a spring tensioned means which automatically yields to a limited extent under the influence of a refractory body entering between the grinding plates.

For an understanding of the invention reference is to be had to the following description and to the accompanying drawings in which:—

Figure 1, is a sectional view showing the normal position of the non-rotatable grinding head and its adjusting mechanism. Fig. 2, is a similar view to Fig. 1, showing the non-rotatable grinding head adjusted from the rotatable grinding head by its adjusting mechanism. Fig. 3, is a similar view to Figs. 1 and 2, showing the non-rotatable grinding head moved away from the rotatable grinding head by the quick releasing device. Fig. 4, is a perspective view of the adjusting means for the non-rotatable head.

Like characters of reference refer to like parts throughout the specification and drawings.

The running head shaft *a* is journaled in bearings *b*, and mounted upon the running head shaft *a* is the hub *c* of the running grinding head *d*. The grinding face of the running grinding head *d* is provided with grinding plates *e* to which are opposed the grinding plates *f* secured to the grinding face of the non-rotatable grinding head *g*. The grinding head *g* is formed with a throat *h* of a substantially cylindrical shape projecting centrally from the side face of the grinding head. The throat *h* is of an elongated hollow formation and is provided with an opening *i* which registers normally with the opening *j'* at the bottom of the hopper *j* to admit the grain from the hopper to the conveyer *k*, the hub *k'* of which is mounted upon the end of the running head shaft *a* projecting into the throat *h*. The throat *h* is formed with an end plate *l* to which is secured the fixed end of the adjusting bolt *m*. Inclosing the grinding heads *d* and *g* and throat *h* is a case *o* corresponding to the shape of these parts, and formed through the end of the case *o* adjoining the end plate *l* is a screw threaded bore *p*. Contained in the screw threaded bore *p* is a hollow tension screw *q* formed at its outer end with a clutch *r* to engage with the hub *v* of the quick releasing lever *w* by which the tension screw can be adjusted in the screw threaded bore *p*. Mounted upon the tension screw *q* is a lock nut *s* engaging the case *o*, the purpose of the lock nut *s* being to securely hold the tension screw in its fixed position and prevent its adjustment being affected by the vibration of the machine. The adjusting bolt *m* extends centrally through the bore *p* and through the hollow tension screw *q*, and the outer end of the adjusting bolt *m* is screw threaded to receive the adjusting nut *t* which is provided with handles *u* by which it can be turned for the purpose hereinafter stated.

Loosely mounted upon the adjusting bolt *m* between the adjusting nut *t* and the clutch *r* is the hub *v* of the quick releasing lever *w*. The hub *v* of the quick releasing lever *w* engages with the adjacent face of the clutch *r*, and the engaging faces of the hub *v* and the clutch *r* are each provided with expanding members *x x'* respectively. Fitted upon the adjusting bolt *m* on the outer side of the adjusting nut *t* is a lock nut *y* which engages the hub of the adjusting nut and locks it in its adjusted position. Coiled upon the adjusting bolt *m* between the tension screw *q* and the end plate *l* is a tension spring *z* to press the non-rotatable grinding head *g* into engagement with the running grinding head *d*.

Formed in the throat *h* is an elongated key-way *a'* to receive the key *b'* which is hinged to the case *o*, to project through the slot *c'* in the case and enter the key-way *a'* to prevent the revolution of the grinding head *g* during the operation of the machine. By hinging the key *b'* to the case *o* the key can be dropped from the position shown in

Fig. 1, to that shown in Fig. 2, to permit of the revolution of the non-rotatable head when changing or fixing the grinding plates *f*. For the purpose of fixing or changing the grinding plates the upper part *o'* of the case *o* is removable from the lower part *o''*.

The running grinding head *d* is fixed upon the running head shaft *a* so as to revolve with the latter during its revolution, but the non-rotatable grinding head *g* is held in a non-rotatable position by the engagement of the key *b'* in the key-way *a'* so that the opening *i* in the non-rotatable grinding head will constantly register with the opening at the bottom of the hopper *j* to permit of the continuous flow of the grain from the hopper to the conveyer *k*.

The conveyer carries the grain to the distributing plates *d'* by which it is fed to the grinding plates *e* and *f*. The tension spring *z* bearing against the tension screw of the throat plate *l*, presses the grinding head *g* in the direction of the grinding head *d* so that the grinding plates *e* and *g* will crush the grain fed to them by the conveyer, the pressure of the tension spring being sufficient to resist the outward pressure of the grain or substances not more refractory than grain.

Should a refractory substance enter between the grinding plates, the spring *z* will yield and permit the grinding head *g* to move away from the grinding head *d* so that the refractory substance can pass from between the grinding plates without materially injuring them, the grinding head *g* returning to its normal position under the influence of the spring *z* when such refractory substance has been ejected. Should the refractory substance be not ejected by the grinding plates the quick releasing lever *w* can be moved into the position shown in Fig. 3, causing the expanding members *x x'* to engage and force the adjusting nut *t* outward, the outward movement of which draws the adjusting bolt *m*, and the throat *h*, grinding head *g*, and grinding plates *f* into the position shown in the last mentioned figure, so that the refractory substance can be ejected by the plates of the running grinding head.

By means of the quick releasing lever it is possible to quickly separate the grinding head *g* from the grinding head *d* and restore it again to its grinding position, the action of the separation and the restoration being so rapid that no material quantity of grain will escape unground from between the grinding plates. To effect the separation of the grinding heads for the purpose of repairing or interchanging the grinding plates it is only necessary to slacken the lock nut *s* and turn the quick releasing lever *w* in the direction indicated by arrow in Fig. 2. The expanding members *x x'* then act as clutches to enable the quick releasing lever *w* to turn the tension screw with it and move the tension screw, the adjusting nut *t*, the adjusting bolt, and the non-rotatable grinding head from the position shown in Fig. 1 to that shown in Fig. 2, without altering the tension of the spring *z* or the adjustment of the grinding plates *f* to the grinding plates *e*, when the parts have been restored to the position shown in Fig. 1. To effect the fine adjustment of the grinding plates *f* to the grinding plates *e* while the machine is running, the lock nut *y* can be slackened and the adjusting screw *t* operated until the required adjustment is effected.

Having thus fully described our invention what we claim as new and desire to secure by Letters Patent is:—

1. A grain grinding machine comprising a non-rotatable grinding head having an elongated hollow hub with a grain receiving opening in it, a rotatable grinding head opposed to the non-rotatable grinding head, a shaft for the rotatable grinding head projecting into the elongated hollow hub of the non-rotatable grinding head, a conveyer screw on the shaft within the elongated hollow hub, a hopper registering with the grain receiving opening, a casing inclosing the grinding heads and elongated hollow hub, a key way in the elongated hollow hub, a key engaging in the key way and permitting of the lateral movement of the non-rotatable grinding head, a screw threaded sleeve on the casing opposed to the end of the elongated hollow hub, a hollow tension screw contained in the sleeve, an adjusting rod connected to the elongated hub extending through the hollow tension screw, a spring bearing against the tension screw and the elongated hollow hub, a clutch member for the tension screw, a lever connected with the adjusting rod having a clutch member engaging with the clutch member of the tension screw, and adjusting nuts mounted on the adjusting rod and bearing against the hub of the lever.

2. A grain grinding machine comprising a non-rotatable grinding head having an elongated hollow hub with a grain receiving opening in it, a rotatable grinding head opposed to the non-rotatable grinding head, a shaft for the rotatable grinding head projecting into the elongated hollow hub of the non-rotatable grinding head, a conveyer screw on the shaft within the elongated hollow hub, a hopper registering with the grain receiving opening, a casing inclosing the grinding heads and elongated hollow hub, a key way in the elongated hollow hub, a key engaging in the key way and permitting of the lateral movement of the non-rotatable grinding head, a screw threaded sleeve on the casing opposed to the end of the elongated hollw hub, a hollow tension screw

contained in the sleeve, an adjusting rod connected to the elongated hub extending through the hollow tension screw, a spring bearing against the tension screw and the elongated hollow hub, a clutch member for the tension screw, a lever connected with the adjusting rod having a clutch member engaging with the clutch member of the tension screw, adjusting nuts mounted on the adjusting rod and bearing against the hub of the lever, and means pivotally connecting the key to the casing.

Toronto, September 25th, 1908.

WILLIAM FORRESTER MOORE.
GEORGE JAMES MOORE.

Signed in the presence of—
C. H. RICHES,
N. R. ROBERTSON.