

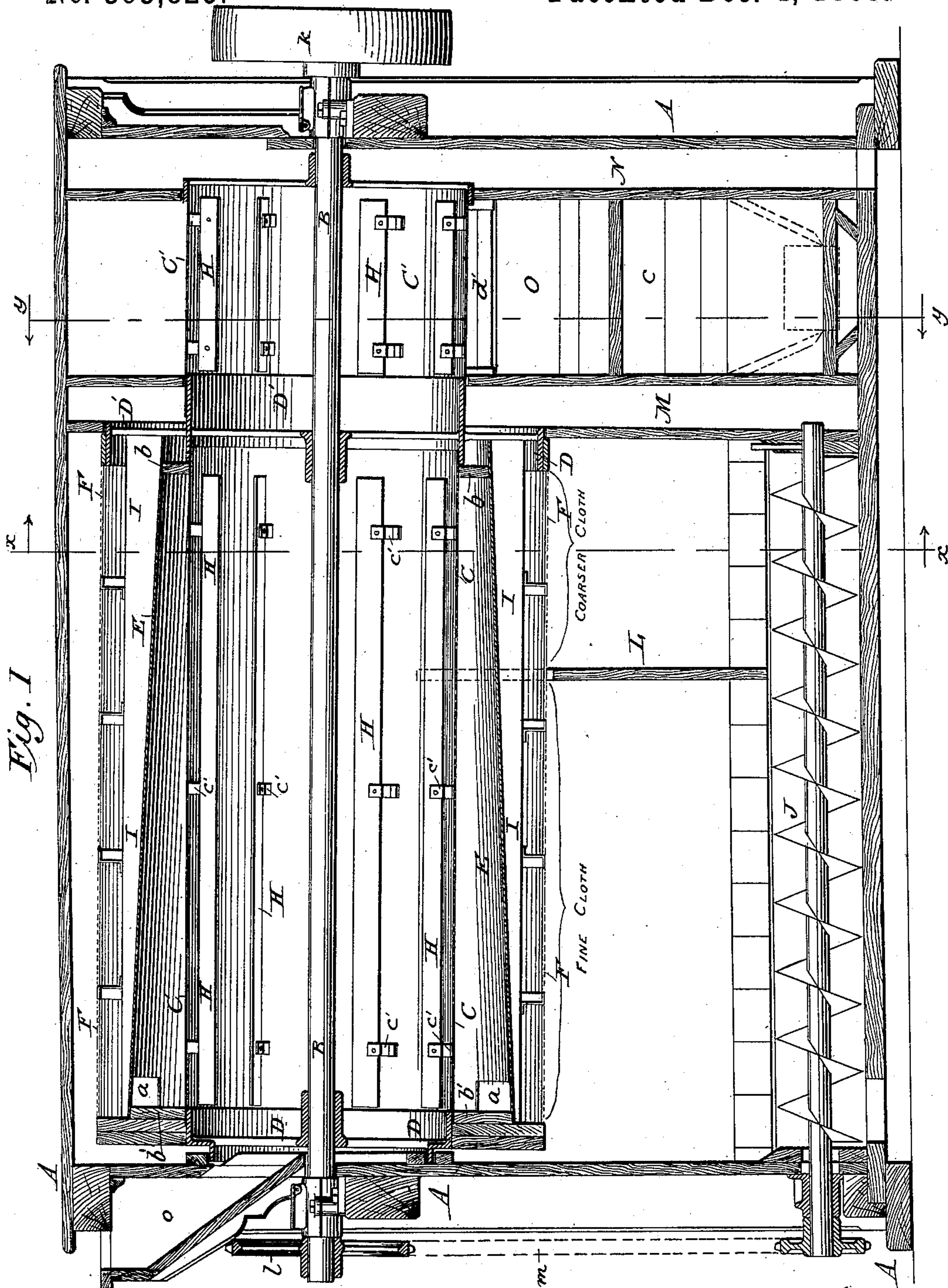
(No Model.)

3 Sheets—Sheet 1.

W. D. GRAY.  
BOLTING REEL.

No. 393,825.

Patented Dec. 4, 1888.



Attest.  
Sidney P. Hollingsworth  
Amos R. Kennedy,

Inventor.  
W. D. Gray  
By Phil. T. Dodge



(No Model.)

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Fig. 3.  
on line y-y

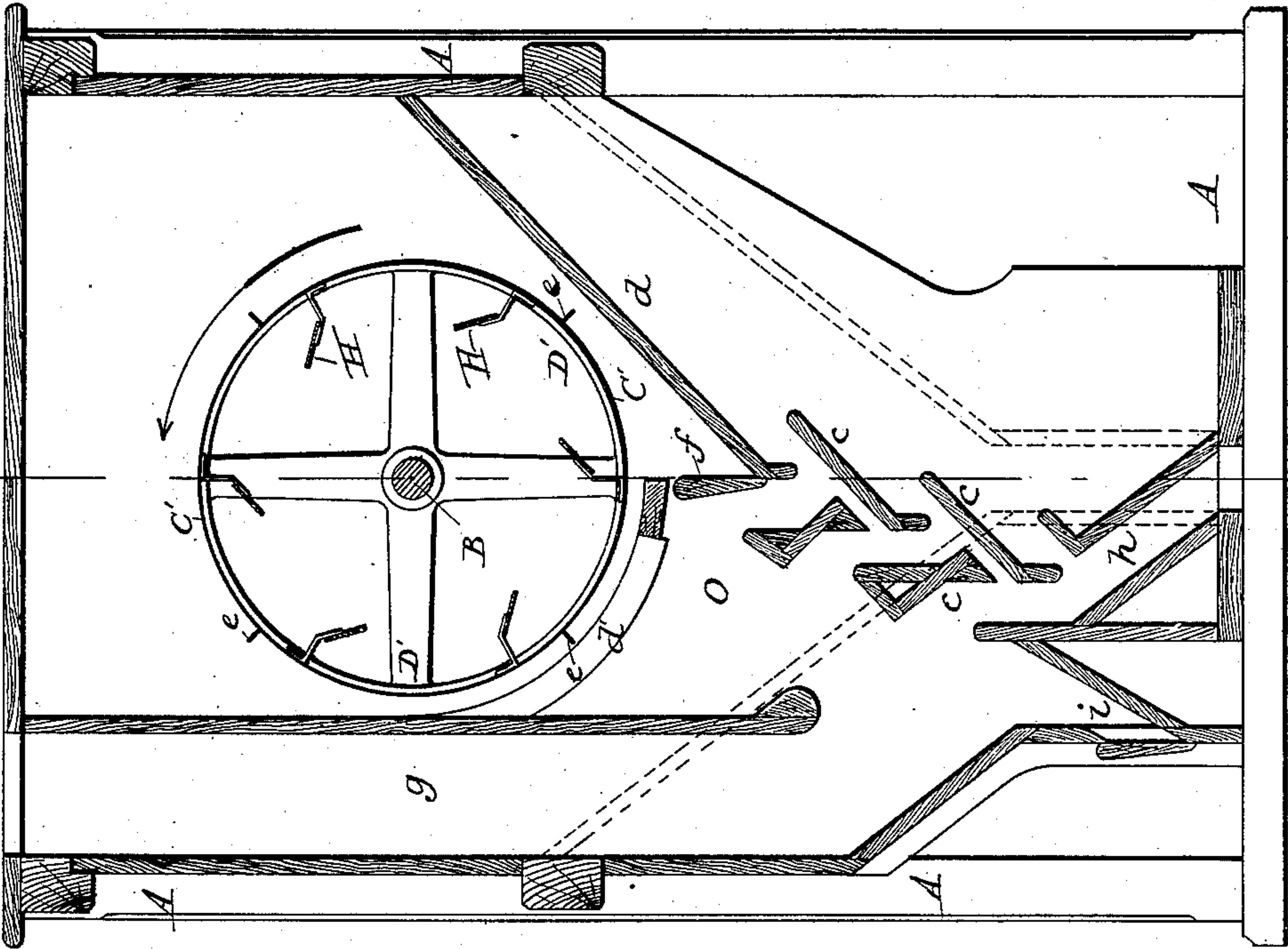
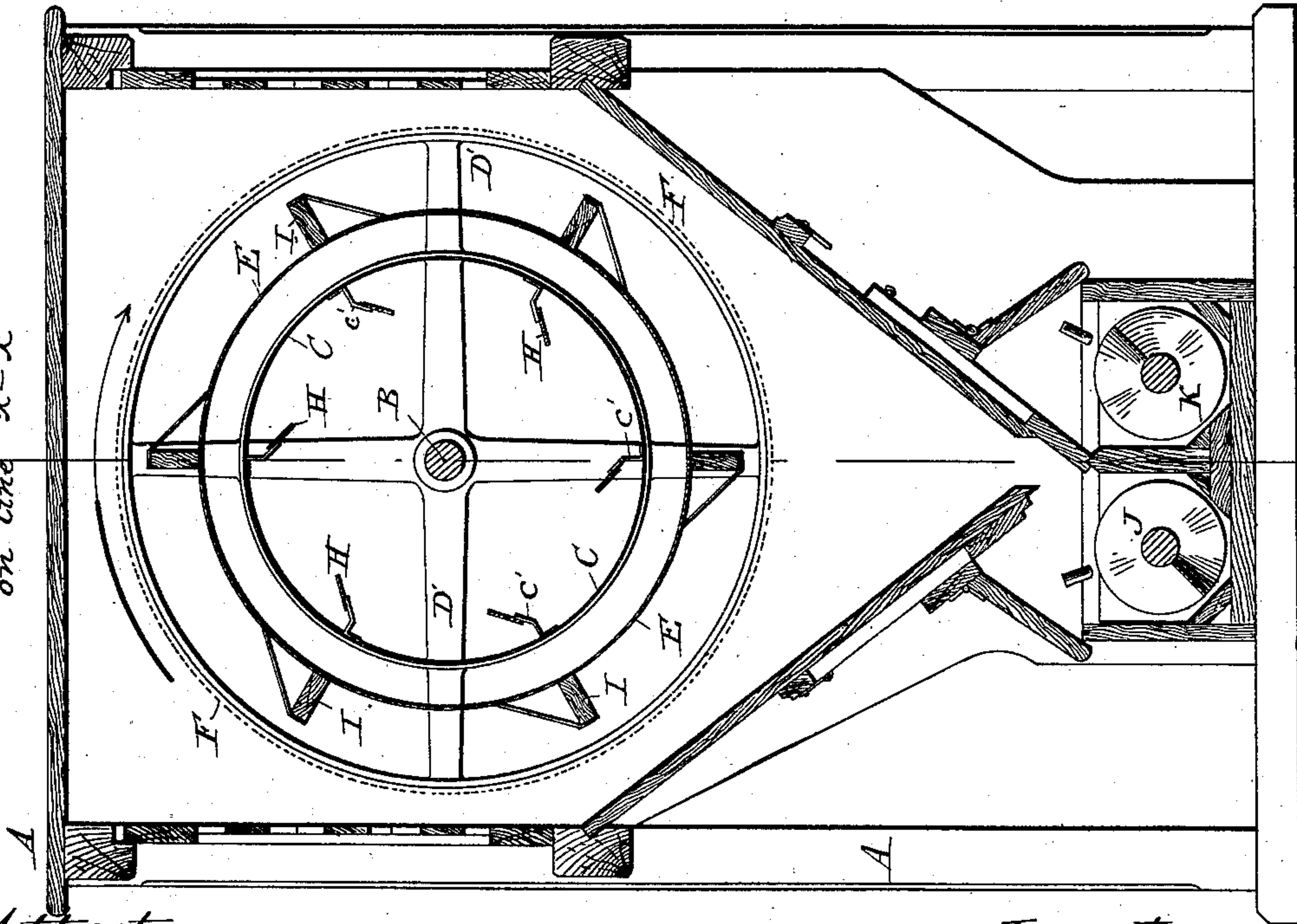


Fig. 2.  
on line x-x



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*Sidney P. Hollingsworth*  
*Atty. General*

Inventor.

*W. D. Gray*  
*By his Atty*  
*Phil. T. Dodge*

(No Model.)

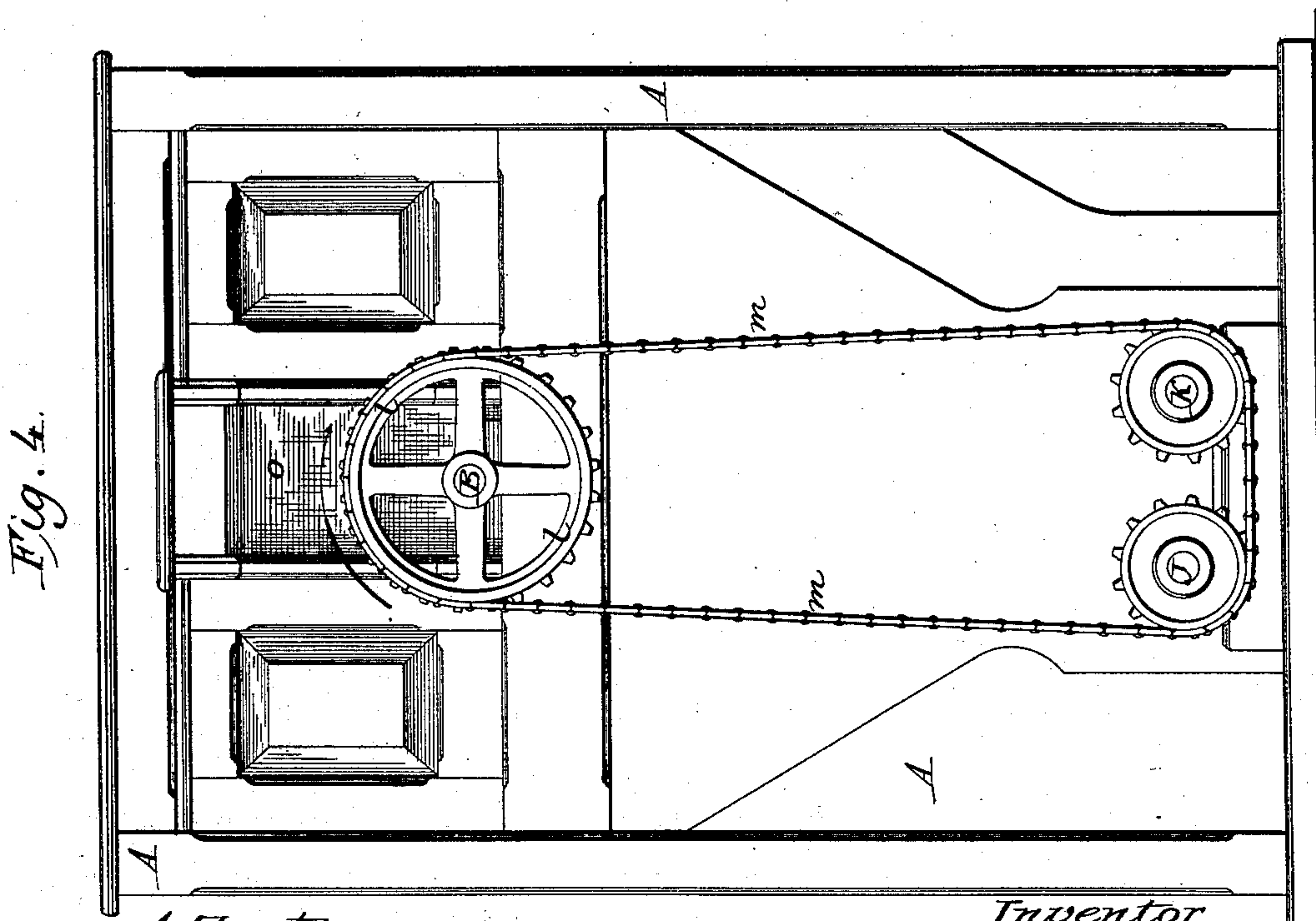
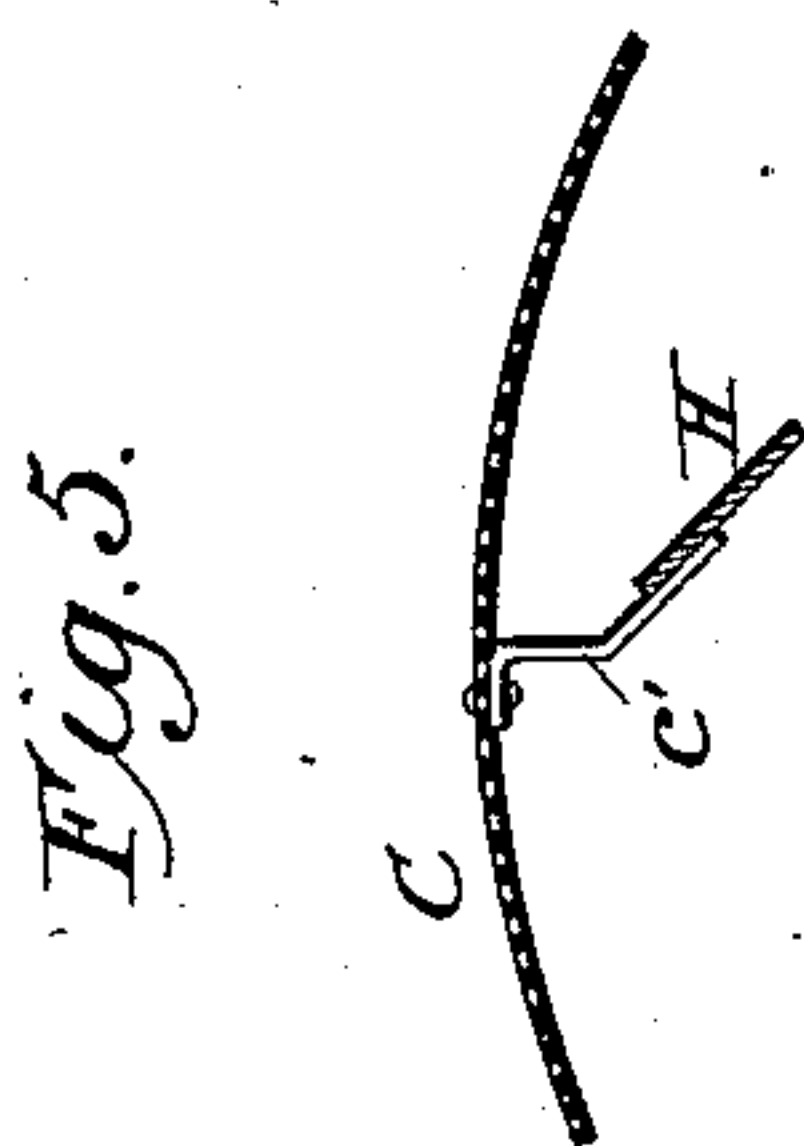
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*Jedney P. Hollingsworth*  
*Wm. B. Kennedy*

Inventor.  
*W. D. Gray*  
By his atty  
*Phil. T. Dodge*



# UNITED STATES PATENT OFFICE.

WILLIAM D. GRAY, OF MILWAUKEE, WISCONSIN, ASSIGNOR TO E. P. ALLIS & COMPANY, OF SAME PLACE.

## BOLTING-REEL.

SPECIFICATION forming part of Letters Patent No. 393,825, dated December 4, 1888.

Application filed March 24, 1886. Serial No. 196,394. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM D. GRAY, of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain  
5 Improvements in Combined Scalping and Aspirating Machines, of which the following is a specification.

My invention relates to a machine adapted to separate the fine flour and middlings from  
10 the coarser materials and subject the valuable portions of the coarse material to the action of an air-current to remove the light impurities therefrom.

In the accompanying drawings, Figure 1  
15 represents a longitudinal vertical section of the machine on the line of the main shaft. Fig. 2 is a vertical cross-section on the line  $x x$ , looking in the direction indicated by the arrow. Fig. 3 is a vertical cross-section on  
20 the line  $y y$ , looking in the direction indicated by the arrow. Fig. 4 is an elevation of the head of the machine. Fig. 5 is a sectional view, on an enlarged scale, showing the lifting-blades employed in the internal screens.

25 A represents the main frame of the machine.

B represents the main shaft extending through the same from end to end through  
30 suitable bearings thereon, with a downward inclination toward the tail end.

C is a cylindrical screen of smooth zinc or other sheet metal, provided with suitable perforations commonly from one-sixteenth to one-  
35 twentieth of an inch in diameter. This screen is mounted at its two ends on skeleton wheels  $D D'$ , fixed firmly to the main shaft.

E is a returning-cone of imperforate sheet metal surrounding the internal screen C and constructed of larger diameter at the head of  
40 the machine than at the tail, so that all material passing through the inner screen to the inner surface of this cone or tube will flow down the same to the head of the machine, where the cone is provided with openings  $a$ ,  
45 through which the material escapes. This returning-cone is supported at opposite ends by collars or disks  $b b'$ , encircling the inner screen.

F represents a cylindrical reel or screen

consisting of a frame of wood or other suit- 50  
able material clothed externally with bolting-cloth or wire-gauze. This outer screen is fixed at its head to the collar  $b'$  and at its tail to the outer flange of the wheel  $D'$ , the construction being such that both screens and  
55 the intermediate returning-cone revolve together. The screening surface of the outer reel, F, is usually of finer material at the head end than at the tail, so that the fine flour will be discharged through the head and the mid- 60  
dlings through the tail.

The present machine resembles that represented in Letters Patent of the United States No. 332,250, granted to me on the 15th  
day of December, 1885, in that it presents 65  
two concentric reels combined with an intermediate returning-cone; but it differs therefrom in that the reels are now made of an outer cylindrical form instead of a conical  
70 form, and in that the axis of the reels is inclined instead of horizontal. The inclination of the cylindrical reels causes the flow of material toward the tail end; but the enlargement of the cone in the opposite direction is so great as to compensate for this inclination, 75  
and also give a downward inclination of the lower surface of the cone toward the head of the machine. Thus it is that although the screens descend toward the tail the concentric cone is enabled to return the material to- 80  
ward the head. The employment of screens which are of an outer cylindrical form is advantageous as compared with those of conical form in that they are more easily constructed, that screening-surfaces of greater 85  
area may be used in a body of given size, and in that the bolting-cloth may be applied more readily and kept under more uniform tension.

For the purpose of increasing the bolting capacity of the inner reel, I mount therein a 90  
series of longitudinal blades, H, of sheet metal or other suitable material, their inner edges separated slightly from the surface of the reel, as shown in Figs. 1 and 5. As the reel re-  
volves in the direction indicated by the ar- 95  
row these blades carry the material upward on the ascending side, the material in the course of its descent flowing downward grad-



ually past the inner edge of the blade over the surface of the screen, which is thus given a greatly-increased capacity without beating or agitating the material in such manner as to cause an objectionable production of the fine or dust flour. These blades may be secured in place in any suitable manner; but I commonly use small metal arms *b*, riveted at one end to the blades and at the opposite end to the inner face of the screen. To the outer surface of the returning-cone I secure, as in my previous patent above referred to, longitudinal blades *I*, which act to carry the material upward and deliver it against the inner surface of the outer reel, so that it may slide downward thereover. The materials passing through the outer reel fall into the base of the body, which has converging walls provided with gates of well-known form for delivering the material to screw conveyers *J* and *K*, which are mounted in troughs provided with returning boards or gates, as usual, to effect the desired division or gradation of the products.

A vertical partition, *L*, is commonly located in the chamber beneath the reel to maintain the separation between the coarse and fine products delivered therethrough.

The outer reel, *F*, is extended through the side of and delivers its tailings into a vertical chamber or receptacle, *M*. The inner reel is prolonged or extended, as shown at *C'*, beyond the outer reel into the side of a chamber or receptacle, *N*, which receives the tailings therefrom. The extended end *C'* of the inner screen is provided with perforations coarser than those in the remaining portion of its length, so that although the various coarse materials are discharged over the tail of the material of the next finer grade is delivered through the extended end into the escaping-chamber *O*. This chamber is located between the receptacles *M* and *N*, and the extended end *C'* of the central reel extends through or across the same from side to side. In the lower part of this chamber I mount a series of inclined overlapping shelves, *c*, constructed and arranged in the same manner as in ordinary aspirating-machines, with which every miller is at the present day familiar. Between these shelves or deflectors and the reel-extension *C'*, I place a partition or diaphragm, *d d'*, to cut off the air-current. In order to permit a compact arrangement of the parts, the side *d'* of the partition is curved to follow the periphery of the reel. The latter is provided on the periphery with scrapers *e*, of leather or other flexible material, which act on the curved surfaces of the partition, so as to deliver the material therefrom to the gate *f*, through which it passes to the aspirating devices.

As usual in aspirating-machines, there is an upwardly-extending suction-flue, *g*, which will be connected with a fan or other exhaust apparatus, a throat, *h*, for the delivery of the

fine heavy products, and a valve-receptacle, *i*, to receive such light products as are not carried off by the air-currents.

Power is communicated to the machine through a pulley, *k*, applied to one end of the main shaft, which is in turn provided at its opposite end with a sprocket-wheel, *l*, which communicates motion through a single chain, *m*, to sprocket-wheels on the ends of the two conveyers.

At the head of the machine there is a feed-spout, *o*, arranged to deliver the material into the head of the inner reel.

The operation of the machine is as follows: Motion being imparted to the main shaft *B*, the screening-surfaces and the intermediate returning-tube revolve in unison. The aspirator-flue *G* being connected with an exhaust apparatus, air flows inward and upward between the various shelves or conductors. The chop delivered through the feed-spout *o* enters the head of the inner reel or screen, *C*. The blades *H*, lifting the material, cause it to work constantly downward over the smooth screening-surface. The fine materials pass through this inner screen to the returning-cone *E*, and are all carried to the head of the machine and delivered through the openings *a* to the head of the outer reel. Flowing downward within this reel, subject to the lifting action of the blades *H*, the fine flour and middlings pass through the upper and finely-clothed end, while the material of a coarser character passes through the tail end of said screen. The coarse middlings pass over the tail into the chamber *M*. The material which has failed to pass through the inner screen, *C*, to the returning-cone continues its course into the extended and coarsely-perforated end *C'*, through which the coarse "break" and valuable particles of the grain pass to the aspirating devices, by which they are purified preparatory to a further reduction. The bran and coarse materials continue over the tail end of *C'*, and are discharged into the chamber or receptacle *N*.

While I prefer to make use of inclined screens of outer cylindrical form, as herein described, it is manifest that the extension of the inner screen, the aspirating devices, and the blades *H* may all be used in connection with screens of conical form, such as represented in my previous patent.

Having thus described my invention, what I claim is—

1. In a scalping and aspirating machine, the two receptacles *M* and *N* and the intermediate aspirating-chamber, in combination with the external reel, delivering its tailings into receptacle *M*, the returning-cone within said reel, and the internal screen extending through the returning-cone and continued beyond the same through the aspirating-chamber to receptacle *N*, the portion within said chamber having coarser perforations than the remaining portion.

2. In a scalping-machine, the combination,



substantially as described, of the following  
elements: a central perforated metal reel,  
blades carried in the interior of said reel at a  
distance from its surfaces to lift the mate-  
5 rial at one side, an imperforate returning-  
cone surrounding said reel, the blades se-  
cured longitudinally on the outer side of the  
returning-tube, and the external encircling  
reel.

In testimony whereof I hereunto set my io  
hand, this 30th day of December, 1885, in the  
presence of two attesting witnesses.

WILLIAM D. GRAY.

Witnesses:

JOHN I. MARSHALL,  
R. BIRKHOLZ.