

(No Model.)

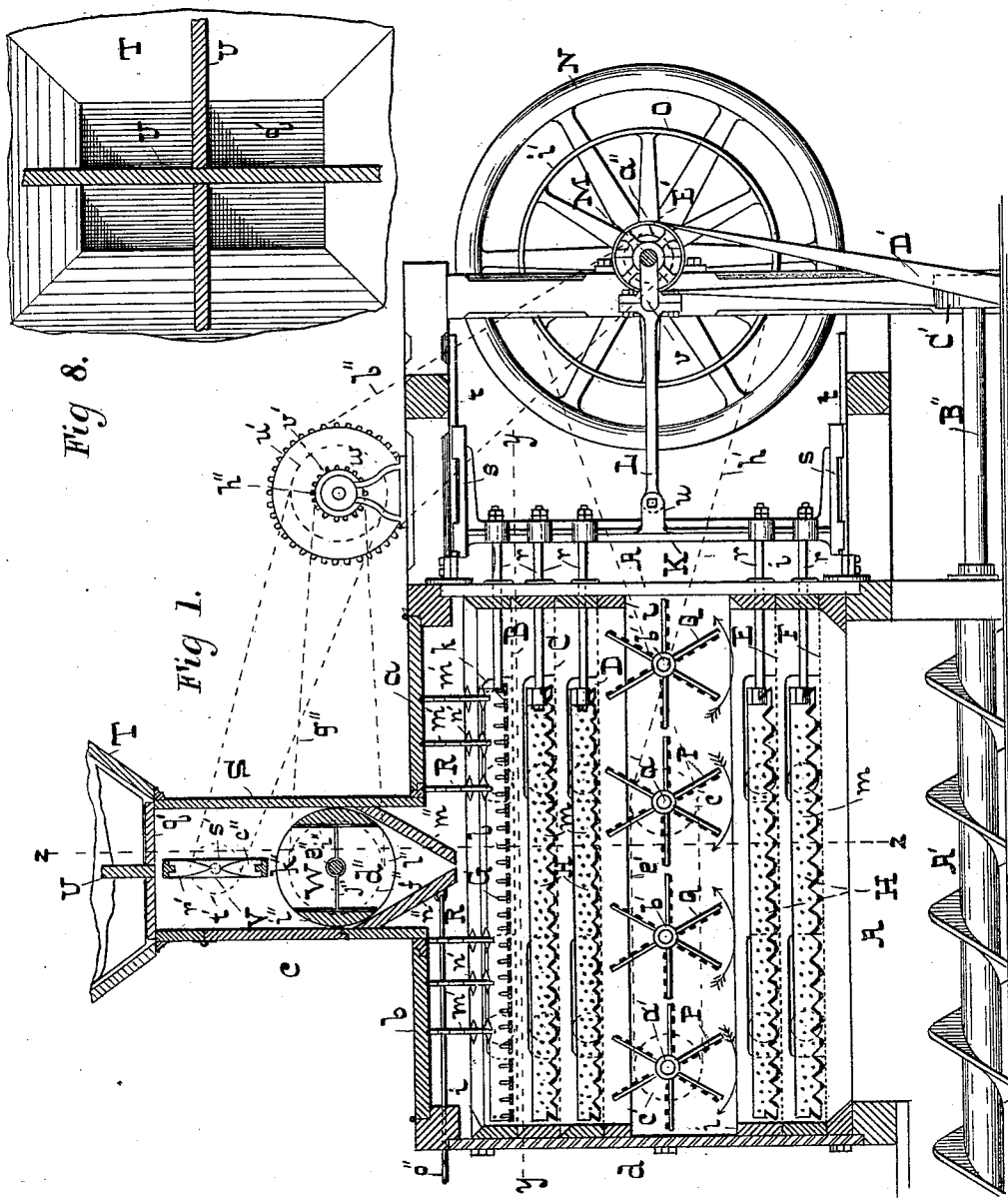
3 Sheets—Sheet 1.

J. D. BANGERT.

APPARATUS FOR MIXING FLOUR OR OTHER MATERIALS.

No. 487,507.

Patented Dec. 6, 1892.



-WITNESSES-

Don't Fisher.
Edw. Lyne

-INVENTOR-

John D. Bangert,
by Wm. H. T. Howard,
att'y.

(No Model.)

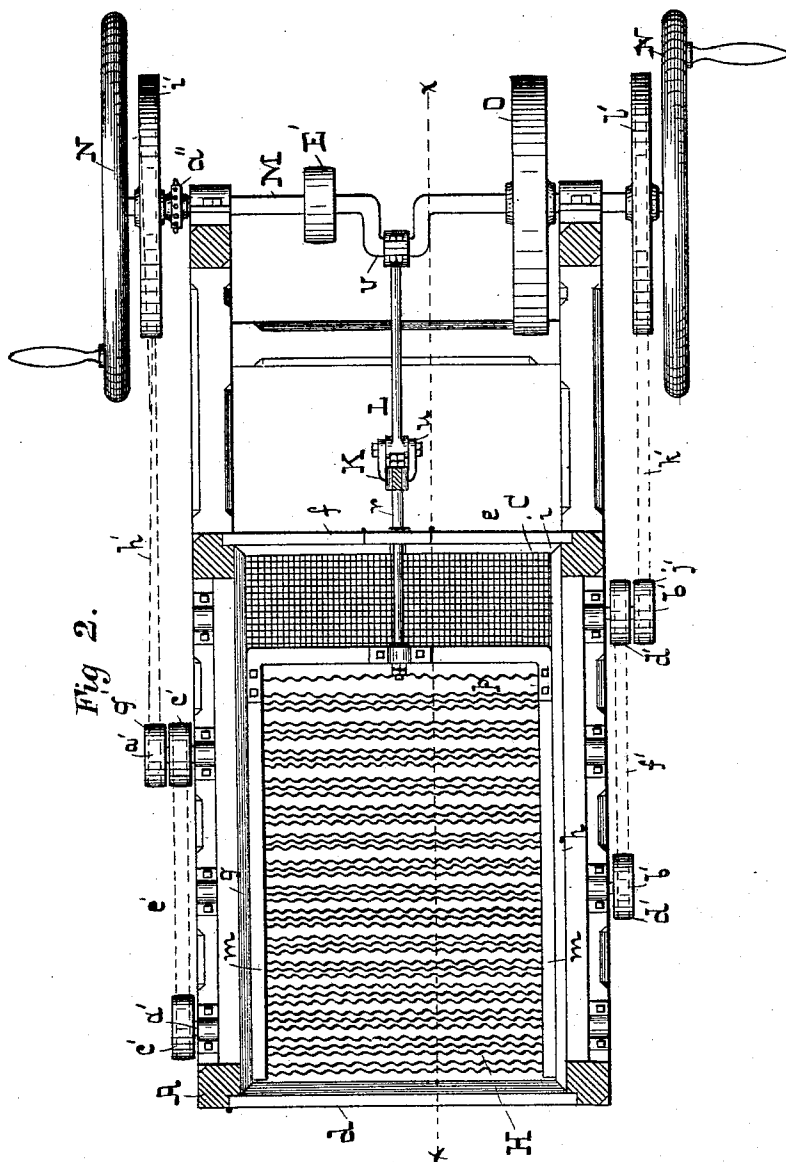
3 Sheets—Sheet 2.

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APPARATUS FOR MIXING FLOUR OR OTHER MATERIALS.

No. 487,507.

Patented Dec. 6, 1892.



-WITNESSES-

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(No Model.)

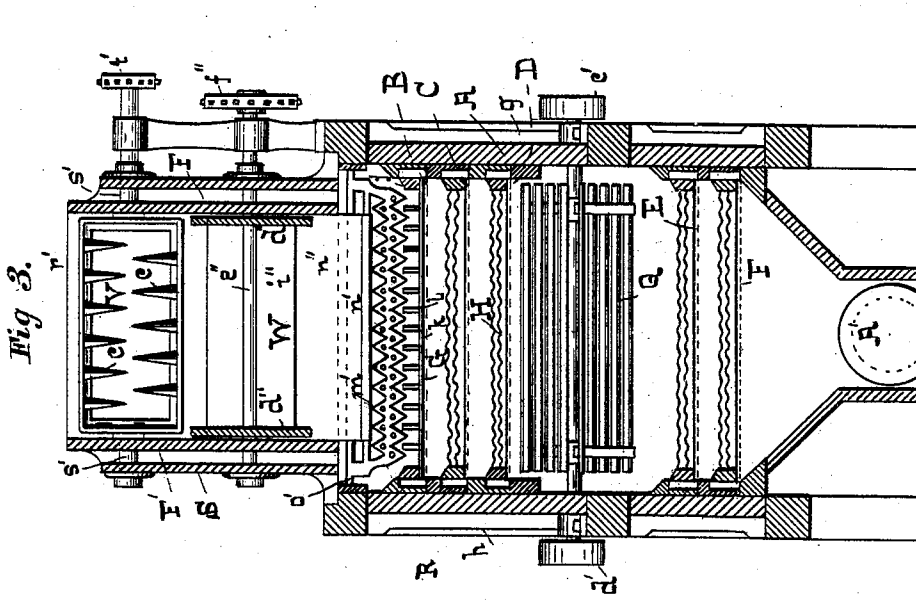
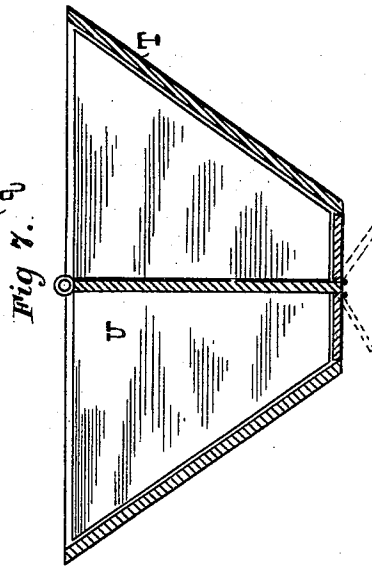
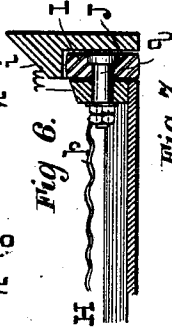
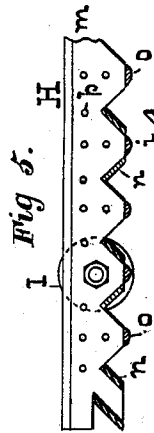
3 Sheets—Sheet 3.

J. D. BANGERT.

APPARATUS FOR MIXING FLOUR OR OTHER MATERIALS.

No. 487,507.

Patented Dec. 6, 1892.



-WITNESSES-

Don't Fisher.
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-INVENTOR-

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UNITED STATES PATENT OFFICE.

JOHN D. BANGERT, OF BALTIMORE, MARYLAND.

APPARATUS FOR MIXING FLOUR OR OTHER MATERIALS.

SPECIFICATION forming part of Letters Patent No. 487,507, dated December 6, 1892.

Application filed April 23, 1892. Serial No. 430,325. (No model.)

To all whom it may concern:

Be it known that I, JOHN D. BANGERT, of Baltimore, Maryland, have invented certain Improvements in Apparatus for Mixing Flour and other Materials, of which the following is a specification.

In the description of the said invention which follows reference is made to the accompanying drawings, forming a part hereof and in which—

Figure 1 is a longitudinal section taken on the dotted line *xx* of Fig. 2. Fig. 2 is a sectional plan taken on the dotted line *yy*, Fig. 1. Fig. 3 is a cross-section taken on the dotted line *zz* of Fig. 1. Figs. 4, 5, 6, 7, and 8 are details of the machine, on an enlarged scale.

Referring to the drawings, A is the casing of the machine, having hinged shutters *a*, *b*, *c*, *d*, *e*, and *f* and the removable ones *g* and *h*. B, C, D, E, and F are stationary sieves of different degrees of fineness, the finest one F being at or near to the bottom of the casing A, and the coarsest one B at the top. These sieves are secured within frame *i*.

G is the upper mixer, which consists of two side pieces *j*, connected transversely by separated flat bars *k*, each one of which has pins *l* projecting upwardly therefrom. The lower mixers (denoted by H) consist of two side pieces *m*, similar to the ones *j*, connected transversely by angularly-placed bars *n*, the horizontally-placed bars *o*, and the corrugated wires *p*. The horizontal bars *o* have rounded under faces, which are practically in contact with the sieves below them, so as to scrape their upper surfaces. Each mixer is supported by rollers I on studs *q*, which rest and roll on the frames *i* of the sieve next below it. By reference to Fig. 6 it will be seen that the rollers I are in recesses J in the frame *i*, the object of the said construction being to bring the frame *m* of the mixer closely in contact with the inside surface of the frame *i* of the sieve. Each mixer has a stem *r* leading from its front end through the casing A and connected to a cross-head K, the upper and lower ends of which have longitudinally-projecting arms *s*, adapted to slide on the guide-bars *t*, secured to the frame A. A connecting-rod L, pivoted to a lug *u* on the cross-head K, is attached to the crank *v* of a crank-shaft M, which is driven either by hand, through the

medium of crank-wheels N, as shown, or by a pulley O, which is driven by a belt not shown.

P and Q are rotary fans on shafts *a'* and *b'*, which extend transversely through the casing A and have pulleys *c'* and *d'*. The pulleys *c'* are connected by a belt *e'* (shown in dotted lines in Figs. 1 and 2) and the pulleys *d'* are connected by another belt *f'*, also shown by dotted lines in the same figures. The forward shaft *a'* has a pulley *g'* connected by a cross-belt *h'* to a larger pulley *i'* on the driving-shaft M. The forward shaft *b'* has a pulley *j'*, which is connected by a straight belt *k'* to a pulley *l'* on the driving-shaft M. Consequently in the revolution of the driving-shaft the fans P are driven in one direction and the ones Q in a reverse direction, as shown by the curved arrows in Fig. 1.

Above the mixer G are beaters R, which consist of pendent vibratory zigzag bars *m'*, having conical bosses *n'* on each side. The gudgeons of the beaters are denoted by *o'*. (See particularly Fig. 3.)

S is a chute on the top of the casing A, having at its upper end a hopper T, into which the materials to be mixed are placed.

U is a removable crossed partition adapted to rest in the hopper T and divide the same into four compartments, and to the lower end of this crossed partition are two hinged doors *q'*, which when the partition is in place in the hopper are in a horizontal position with their swinging ends resting on the edges of the chute, and they serve when so placed to separate the hopper from the chute. When, however, the crossed partition is to be lifted out, the doors *q'* fall and offer no obstruction to the said movement.

V is primary mixer consisting of a rectangular frame *r'*, having gudgeons *s'* resting in the sides of the chute S. One of these gudgeons is extended to form a shaft and fitted with a sprocket-pinion *t'*, driven by a chain belt from a sprocket-wheel *u'* on a shaft *v'*, supported by suitable bearing-boxes *w'* on the top of the frame A. This sprocket-wheel receives movement from a smaller sprocket-wheel *a''* on the driving-shaft M through the agency of a chain belt *b''*. The frame *r'* has splines *c''*, which extend from the sides thereof toward the center, and the two sets of splines are staggered, as shown in Fig. 3.

A revoluble intermittent feeding device W is placed in the chute S, and it consists of two circular heads d'' , connected by a shaft e'' , which passes through the sides of the chute S. One end of this shaft has a sprocket-wheel f'' driven by a chain belt g'' from a smaller sprocket-wheel h'' on the shaft v' . Between the heads d'' are two segments i'' , either one of which when placed across the chute stops the feed or the passage through the chute of the material from the hopper T. Between the segments i'' is a partition j'' of thin metal. Consequently the interior of the device is divided into two compartments k'' and l'' , which in the revolution of the device are alternately filled from above and emptied to below. Beneath this feeding contrivance is a stationary inclined partition m'' and also a swinging door n'' , which is operated by means of a rod o'' , leading to the outside of the apparatus.

A' is a screw conveyer in a trough in the bottom of the casing A, driven from a shaft B'', pulley C', and a belt D', which runs over a pulley E' on the main driving-shaft M. This conveyer carries off the material after its manipulation in the machine.

F' F' are ducts in the wall of the chute S to admit air to the interior of the apparatus and is especially useful when flour is manipulated, as flour requires aerating as well as mixing.

Supposing the various parts of the apparatus to occupy the positions shown, the materials to be mixed are placed in the compartments formed in the hopper by the cross-partition U. The said partition is then withdrawn when the materials fall and come in contact with the primary mixer, then pass to

the intermittent feeding device, and thence to the first of the series of sieves, where they are operated upon by the beaters R. They then pass through the series of sieves and in their passage are thrown up by the fans P and Q, and finally escape to the conveyer A', which carries them off in a thoroughly-mixed condition.

I claim as my invention—

1. In an apparatus for mixing substances, a hopper having a removable cross-partition with hinged doors at the bottom, substantially as specified.

2. In an apparatus for mixing materials, a casing and sieving devices within said casing, combined with a feed-hopper, a chute leading from the feed-hopper to the interior of the casing, a rotary beater and an intermittent feed within the chute, the beater being located above the feed, and suitable mechanism to operate the beater and the feed, substantially as described.

3. In a machine for mixing materials, a casing and a chute for introducing the material thereto, a series of pendent vibratory beaters located in the casing immediately below the chute, a series of fixed sieves arranged one above the other in the casing below the said beaters, a series of reciprocating mixers above the sieves, a series of fans between two of said sieves, and suitable mechanism to operate the mixers and fans, all combined and co-operating substantially as and for the purpose specified.

JOHN D. BANGERT.

Witnesses:

JNO. T. MADDOX,
DANL. FISHER.