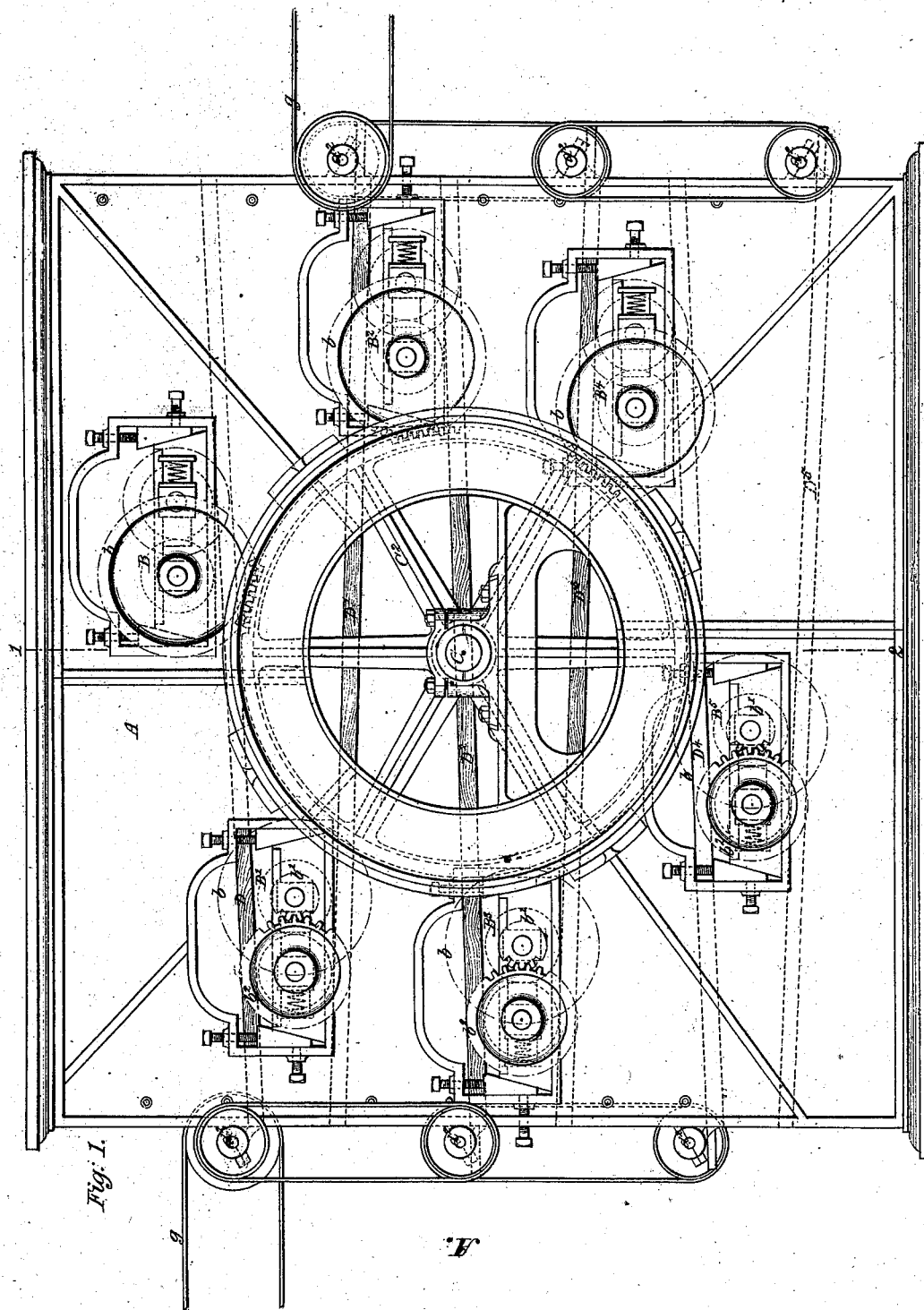


G. A. BUCHHOLZ.
Flour Mill.

3 Sheets—Sheet 1.

No. 108,102.

Patented Oct. 11, 1870.



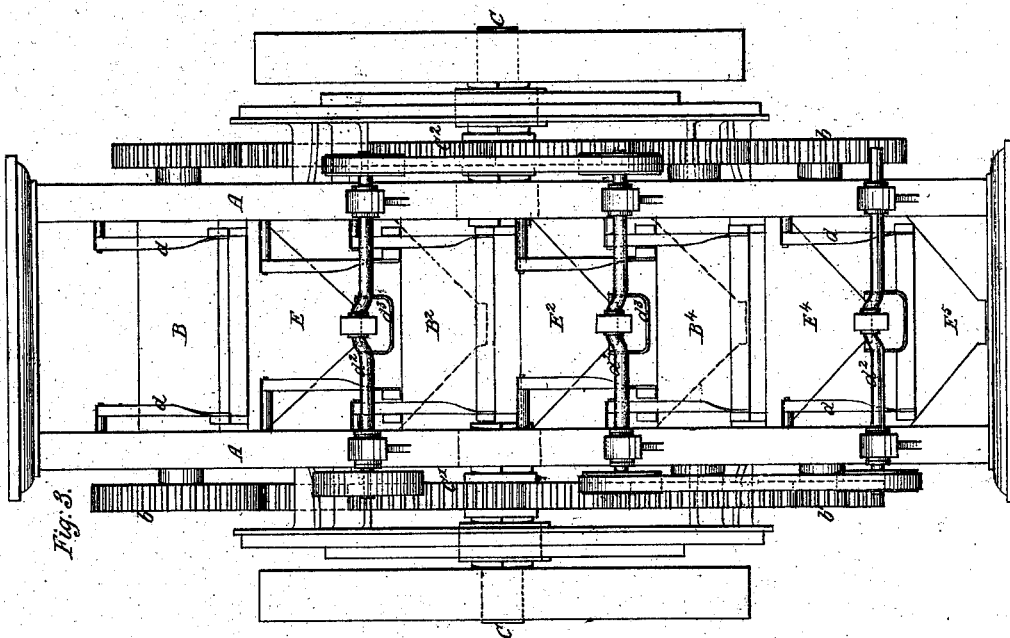
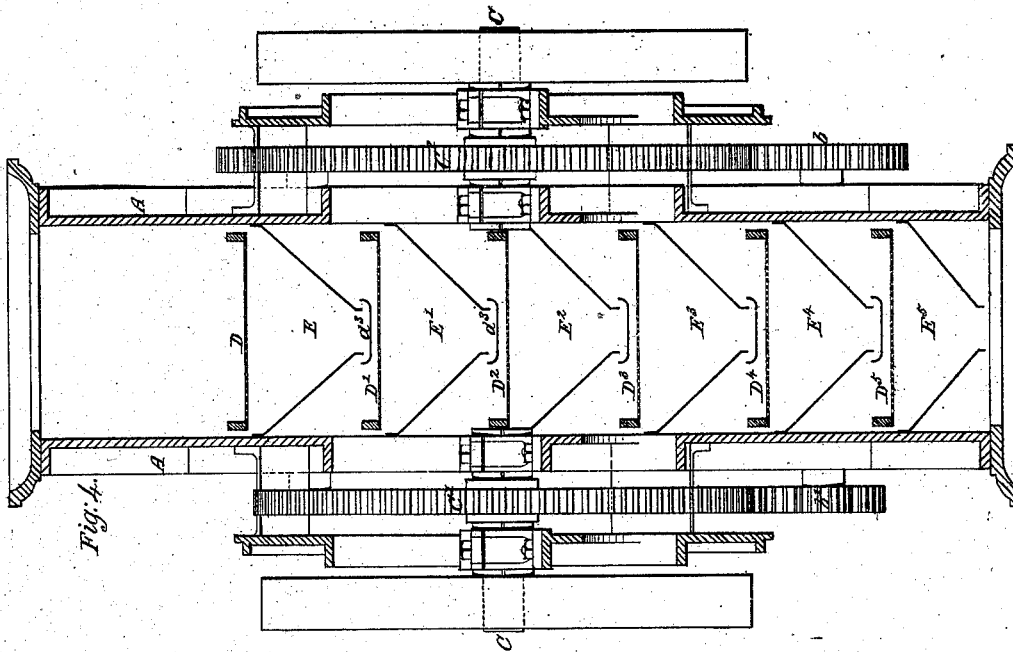
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No. 108,102.

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United States Patent Office.

GUSTAV A. BUCHHOLZ, OF REGENT'S PARK, LONDON, ENGLAND.

Letters Patent No. 108,102, dated October 11, 1870.

IMPROVEMENT IN THE MANUFACTURE OF SEMOLINA AND FLOUR.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, GUSTAV A. BUCHHOLZ, of Regent's Park, London, in the county of Middlesex, England, have invented new and improved Machinery for Manufacturing Semolina and Flour; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing, forming a part of this specification.

The chief object of this invention is to simplify the construction of machines for manufacturing semolina and flour on the principle of my patent of November 23, 1869, No. 97,038.

This end I attain by a novel arrangement of the pairs of acting rolls, which cut up and reduce the grain supplied to them.

This arrangement admits of the rolls being driven from central spur-gearing, and thus renders the construction of the machine very compact, and less costly than heretofore.

The pairs of ripping and cutting-rolls, say, for example, six in number, are set around a common center, and at such a distance therefrom as to allow of the inner or near roll of each pair being driven directly from a central gear-wheel. This arrangement is shown in the accompanying drawing, where—

Figure 1 is a side elevation of a semolina machine.

Figure 2 is a longitudinal section, taken through the center of the machine.

Figure 3 is an end elevation; and

Figure 4 is a vertical section, taken on the line 1 2 of fig. 1.

A A is the framing of the machine, made of cast-iron, constituting a casing, with open ends and top.

The side plates are cast with openings to receive the bearings of the ripping and cutting-rolls, and the shaft of the central gearing.

B B¹ B² B³ B⁴ B⁵ are six pairs of rolls for operating in succession upon the wheat; and they are arranged at different elevations around a central point to allow of the insertion and free action of inclined sieves between them.

The rolls B B¹, &c., receive motion from a central divided shaft, C C*, which, by being divided into two parts, leaves a clear space for the internal fittings, and permits of the two parts being driven in opposite directions for the purpose of giving the proper action to the rolls.

The shafts C C* are fitted with belt-pulleys, and carry also a pair of spur-wheels, C¹ C², one on either side of the framing.

Each of these spur-wheels serves to drive three pairs of rollers through spur-pinions *b*, keyed on the shafts of the inner of the several pairs of rollers.

Below each pair of rolls is a sieve, marked respect-

ively D D¹ D², &c. These sieves are set on a slight incline, and form together a zigzag way for the traverse of the cut grain to and from the several pairs of rolls.

The sieves are generally carried by pendent swinging rods at their opposite ends, and they are intended to receive the ripped or cut grain from the rolls above, and to sift out the finer particles from the coarser, and deliver the coarser into the bite of the rolls next below the sieve.

The sieves are each connected by a crank-rod, *d*¹, to a crank-shaft, *d*², which shafts turn in bearings at the ends of the framing A.

The sieve D, that receives the grain from the ripping-rolls B, is formed partly of pierced and partly of unpierced sheet-metal, carried by longitudinal bars, which are suspended from the swinging-rods *d*.

This sieve overlies a kind of hopper, E, which is formed with inclined sides and ends, and is fixed to the framing.

Into this hopper the fine particles (the semolina) formed by the ripping of the grain by the rolls B are delivered from the sieve D, which hopper guides the semolina onto a chute or inclined gutter, *d*³, of the sieve D¹.

This gutter *d*³ partly overlies the pierced metal of the sieve, and it extends out beyond the end of the machine, so that the particles of grain which fall upon it are discharged directly out of the machine into a proper receptacle.

The coarser particles, however, being kept back by the sieve D, are delivered to the first pair of cutting or semolina-rolls B¹, by which the ripped grain is, in part, reduced to the size of semolina, and discharged onto the second sieve D¹, to be again sifted and assorted, the coarser particles to undergo a further cutting-action, and the finer to be discharged out of the machine, but in the opposite direction to that at which the semolina or finer particles formed by the ripping-rolls left the machine.

The bottom of the sieve D¹, and also of all the other sieves, is composed of pierced and unpierced metal, the latter being situate at the middle of the sieve, or so arranged that the reciprocating motion of the sieves, caused by the rotation of their crank-shafts, shall not carry the pierced portion past the ends of the hoppers immediately underlying them; or wire-gauze, or other suitable screening material may be substituted for the pierced metal.

The ripped or cut grain falling from the rolls B¹, after having the finer particles sifted out and delivered into the hopper E¹, to be discharged by the chute or gutter *d*³ of the sieve D², is carried to the rolls B², where it undergoes a second cutting operation.

This cutting and sifting operation is repeated again

and again, the grain taking a zigzag course through the machine, until the ripped or torn fragments of grain are all converted into semolina, and discharged from the machine by the last sieve D⁵.

The rolls B B² B⁴ are driven from the spur-wheel C¹, and the rolls B¹ B³ and B⁵ from the spur-wheel C², the pinions *b* of the inner rolls taking into their respective spur-wheels, which are driven, as before stated, in opposite directions, so as to insure the rotation of the inner rolls in the proper direction, or toward their fellow rolls. By suitable gearing, the outer rolls are driven at a slower speed than the inner rolls.

To this end on the axles of the rolls carrying the pinions *b*, and at the opposite ends thereof, are keyed small pinions *b'*, which severally take into a pinion, *b*², of larger diameter on the axle of the outer roll, and thus any desired inequality of surface-speeds can be given to the two rolls of each pair.

The crank-shafts *d*², at the opposite ends of the machine, are driven by belts and pulleys, actuated from any first mover, as indicated by the independent driving-belts G G, shown in fig. 1.

The several pairs of rolls (see fig. 1) are mounted in bearings carried by independent frames, which rest on the main framing, and are capable of being adjusted by wedges and tightening screws to and from the central gearing.

These rolls are formed of steel, and after the pattern described and shown in the Letters Patent above referred to.

The action of the machine is as follows:

The hulled grain being fed to the ripping-rods B from a hopper, not shown in the drawing, passes between them, and is torn or cut to pieces, and delivered onto the sieve D. As this sieve receives a rapid reciprocating motion from its crank-shaft and rod, the semolina, if any is formed, is here sifted out and discharged from the machine, in manner above described, while the larger pieces are conducted to the first pair of semolina-rolls, to be further reduced, and soon in

succession to all the other pairs of rollers after the fine particles, as they are formed, are sifted out. Thus little flour is formed by the action of the semolina-rolls, and any that may be formed is subsequently to be separated from the semolina.

When, however, the result desired is flour and not semolina, instead of using semolina-rolls, as described in my patent above mentioned, I form flour-rolls in the following manner:

I take steel cylindrical rollers, of suitable size, and form thereon square ribs, arranged either parallel to their axis or helically. These ribs will be about twelve to the inch, their breadth being equal to the spaces between them. The height of the ribs will be, say from one-thirtieth to one-fortieth of an inch.

These rolls, when driven at different speeds, as explained with respect to the semolina-rolls, will act like shears upon the grain, and reduce it to flour (without any crushing action taking place) with great facility.

Having now set forth the nature of my invention, I wish it to be understood that I claim—

1. The successive ripping and cutting-rolls B B¹ B² B³, (more or less in number,) combined and placed at different elevations, around a common center, and having intervals between them for the sieves.

2. The combination of spur-wheels C¹ C², and pinions *b b'* *b*², when relatively arranged and applied to the ripping and cutting-rolls, as described.

3. A series of pairs of ripping-rolls, each of which is provided with an independent frame, adjustable on the main frame to and from the central gearing, as described.

In witness whereof, I, the said GUSTAV ADOLPH BUCHHOLZ, have hereunto set my hand the 12th day of July, A. D. 1870.

G. A. BUCHHOLZ.

Witnesses:

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66 Chancery Lane.

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