J. IIJIMA.

BRIQUETING MACHINE.

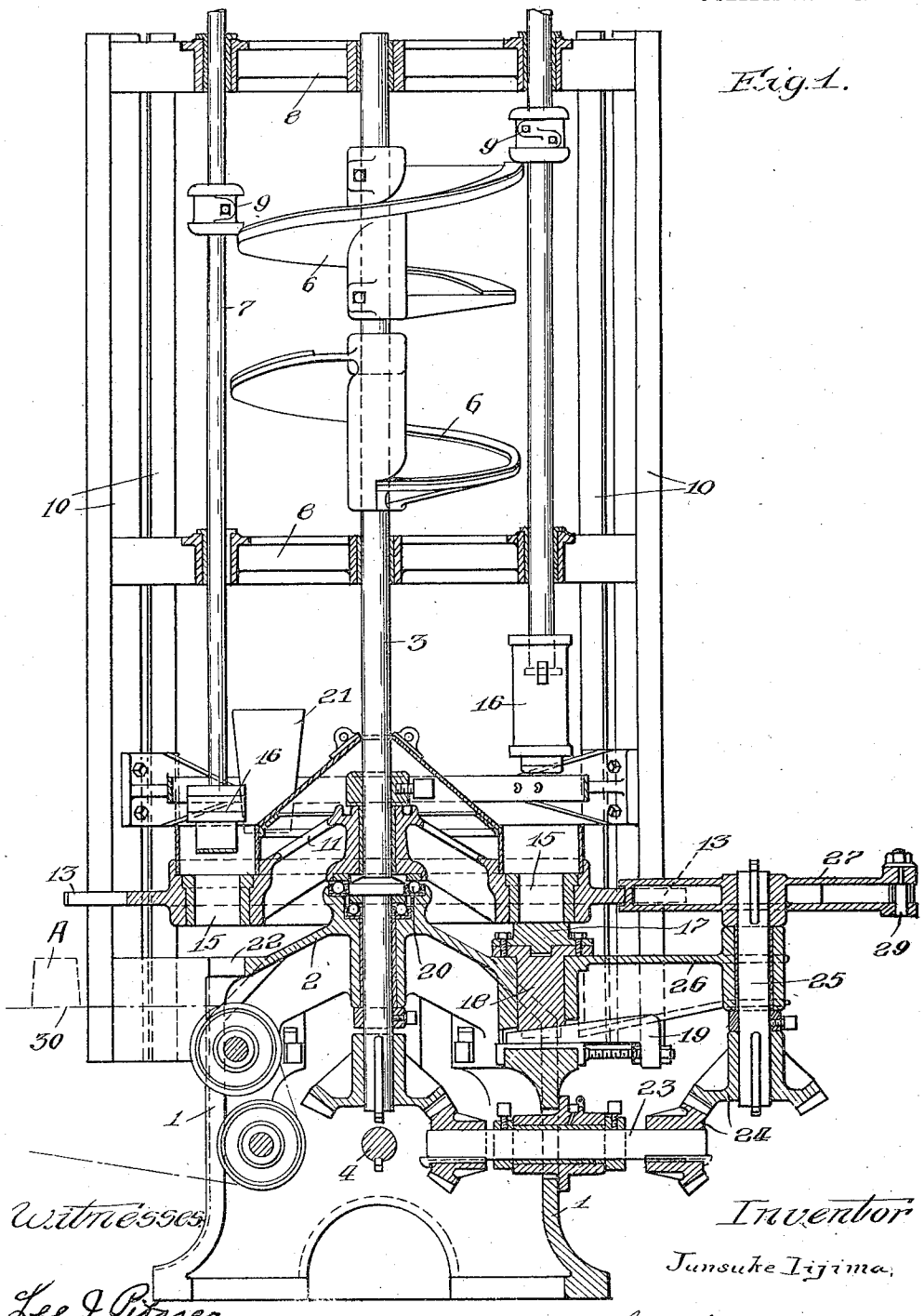
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1,125,103.

Patented Jan. 19, 1915.

3 SHEETS—SHEET 1.

Fig. 1.



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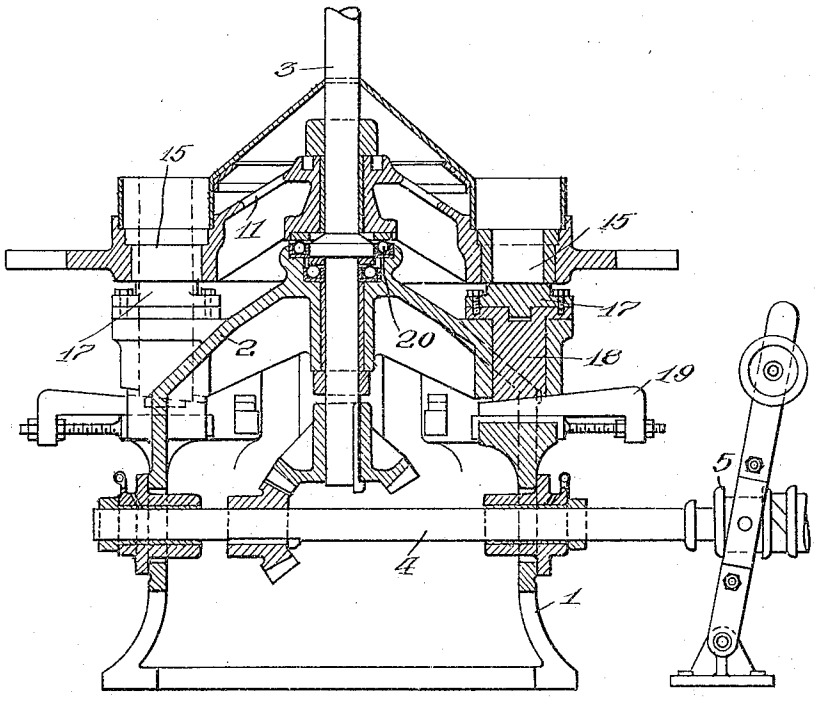
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3 SHEETS—SHEET 2.

Fig. 2.



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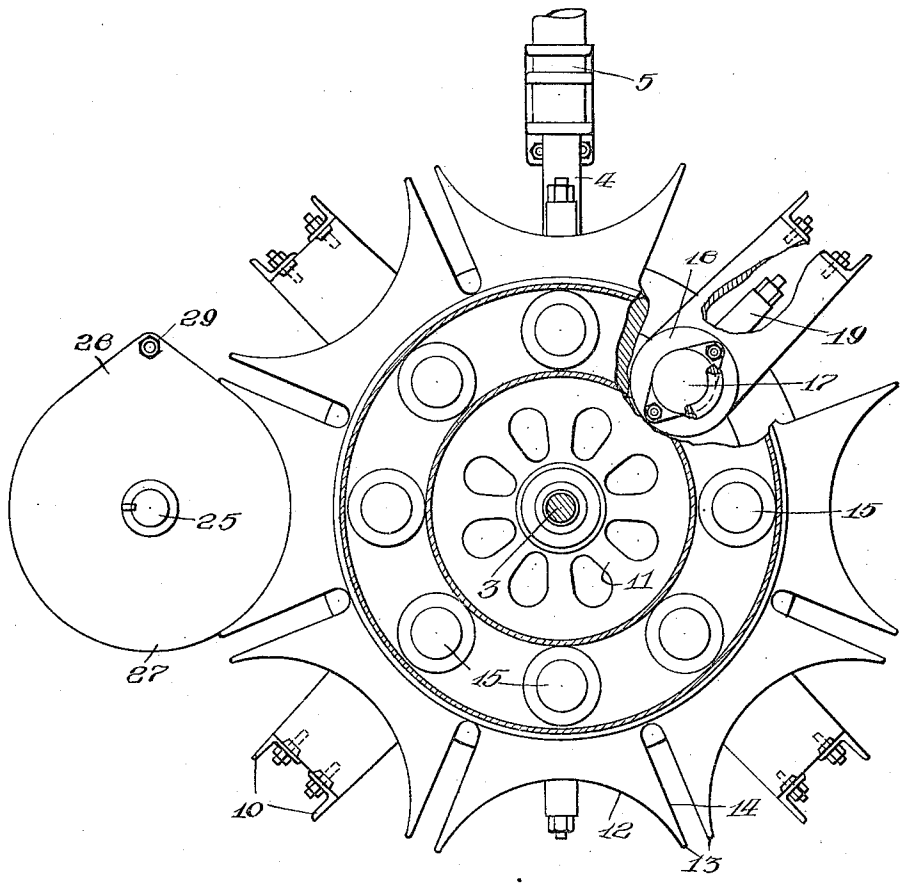
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3 SHEETS—SHEET 3.

Fig. 3.



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UNITED STATES PATENT OFFICE.

JUNSUKE IIJIMA, OF TOKYO, JAPAN.

BRIQUETING-MACHINE.

1,125,103. Specification of Letters Patent. Patented Jan. 19, 1915.

Application filed August 23, 1912. Serial No. 717,208.

To all whom it may concern:

Be it known that I, JUNSUKE IIJIMA, engineer, a subject of the Emperor of Japan, residing at No. 53 Minami-cho, Takanawa, Shiba-ku, in the city of Tokyo, Empire of Japan, have invented new and useful Improvements in Briqueting-Machines, of which the following is a specification.

This invention relates to improvements in briqueting machines and more particularly to machines by means of which briquets are made consecutively out of mine smalls, slimes, flue dusts or like substances, with or without using some binding material according to the nature of the material used, by means of a number of stamps equally spaced around the periphery of special cams of helical shape. The rotation of these cams lifts and drops said stamps so as to cause the respective stamp-shoes which are secured to the lower end of the stamp-stems to drop into corresponding molds arranged in an intermittently rotating disk or star-wheel, means being provided for adjusting and reducing the space between said star-wheel and the dies.

In order that this invention may be clearly understood and more readily carried into practice, reference may be had to the appended drawings illustrating a preferred form of this invention, and in which:—

Figure 1 is a longitudinal sectional view of the machine. Fig. 2 is a longitudinal sectional view of the lower portion of the machine taken at right angles to Fig. 1. Fig. 3 is a plan view of the star-wheel and connected parts, a portion being broken away to show parts below.

In a convenient embodiment of the invention such as illustrated by the drawings, a vertical shaft 3 extends upwardly from the center of a supporting frame 2, which is mounted upon the base 1 of the machine, and is rotated by means of the horizontal shaft 4, which receives motion from a suitable source of power and is adapted to be driven by means of the clutch 5. Helical cams 6 are secured to the vertical shaft 3 and are surrounded by a number of stamps 7, equally spaced from each other and at equal distances from the center of the vertical shaft 3. Two of these cams may be provided for equalizing the strains and reducing the wear, as some of the stamps may be driven by one cam, and intermediate ones by the other cam. One of said stamps 7 is also omitted for the introduction of a hopper 21, as will presently be described. At the upper portion of each stamp stem there is provided a tappet 9 which serves for lifting the stamp by engaging with the said helical cam 6 which lifts the stamps until they drop by gravity when the tappets are disengaged from the upper end of the helical cam. To insure perpendicular movement of the stamps, a suitable support 10, fastened to a horizontally disposed guide frame 8, is provided as shown in the drawings.

Loosely mounted upon the vertical shaft 3, is a rotary disk 11 which I term a "star-wheel," which has a plurality of projections 13 radially projecting at points around its circumference, as shown in Fig. 3. The outer edge of this disk is cut out as at 12, and the projections form grooves or slots 14, extending radially of the star-wheel. The molds 15 receive the mine smalls or like substances to be stamped or pressed, the number of molds being equal to the number of the stamps used, and the molds are arranged, to aline with the stamp-shoes 16 which are secured to the lower ends of the stamp-stems, when the machine is at rest, as shown in the drawings. The bottoms of these molds are intermittently closed by suitable seats or dies 17. Owing to the sliding friction, such seats or dies are liable to wear out in the course of time, resulting in the creation of an undue clearance between the lower face of the molds and the seats or dies. Such clearance will gradually widen, and will allow the contents of the molds to leak out therefrom, which is of course, detrimental. In order to provide for taking up such wear, suitable holes are provided in the supporting frame 2 directly underneath each of the said molds, when the star-wheel is at rest. These holes are made large enough to receive suitable false seats or supports 18 upon which the aforesaid seats or dies 17 are secured, as illustrated in the drawings. As the false seats or supports project beyond the lower face of the suporting frame 2, the clearance caused by the aforesaid wear may be readily taken up by providing, at points directly beneath the false seats or supports 18, a corresponding number of adjusting wedges 19, which may be adjusted by means of suitable screw devices as illustrated.

As the star-wheel is mounted loosely on the vertical shaft 3, the whole weight will rest entirely upon the supporting frame 2, and I provide a ball-bearing 20 to support the wheel and prevent wear. It will be observed that by this arrangement, the rotary movement of the vertical shaft 3 will cause each stamp to move up and down, and at the same time each mold is caused to move from one position to another, that is, the construction of the machine is such that each upward stroke of the stamps involves a change of position of each mold from one die to the next. One complete revolution of the star-wheel, therefore, enables each stamp to drop in succession on each mold until the briquet A is discharged from the exit 22 located directly underneath the last mold position which is not provided with a die. Above the next die 17 adjacent to the exit 22 and in a manner so as not to impede the motion of the star-wheel is a suitable hopper 21 through which mine smalls or like substances are to be fed into the mold that comes underneath the same.

While the stamps are in upward motion, each mold changes its position from one point to the next, that is, from one die around to the next die, and when the revolution of the star-wheel is complete, the material contained in each mold has been stamped separately by each stamp before it is at last stamped out from the exit 22 in the form of the briquet A. The stamp which is intended to strike the briquet A out through the exit 22 is preferably of a light resilient character. Wooden stamps will answer best for this purpose.

Instead of making the upper part of the supporting frame 2 flat, a conical surface is preferred, because otherwise there is not enough space left underneath the star-wheel for clearing away all escaping particles, and they would accumulate thereon to such an extent as to more or less impede the revolving motion of the star-wheel.

To effect the change in the position of each mold from one die to the other, that is, to cause the star-wheel to turn or revolve intermittently, a horizontal shaft 23, which is turned by means of suitable bevel gears from the horizontal shaft 4 is mounted in the base 1, and drives a pawl shaft 25 by means of the bevel gears 24. The shaft 25 is mounted in an arm 26 projecting outwardly from the supporting frame 2 and has at its upper end a pawl 27. This pawl locking wheel is of a special form, partly circular but having a projecting point as shown at 28 Fig. 3. A pin 29 is secured in this pointed portion 28 of the pawl 27, a portion of the periphery of the pawl being cut away at the pointed portion 28 leaving the said pin 29 exposed between the upper and lower plates as shown in Fig. 1. By this arrangement it will be observed that as long as the said pawl 27 revolves with its circular part in contact with one of the concave portions 12 of the star-wheel it transmits no motion to the latter, but when the pin engages in a slot of the star-wheel it will move the star-wheel, and by the time the pin is disengaged from the slot 14, the circular portion of the pawl will again come in sliding contact with the next concave portion 12 of the star-wheel. The desired intermittent motion will thus be imparted to the star-wheel for changing the position of each mold consecutively.

30 is a belt by means of which the briquet A is delivered from the machine.

I claim:

In a briqueting machine, a frame, a vertical shaft mounted in said frame, a helical cam mounted on said shaft, a plurality of stamps, means for causing the cam to lift the stamps and permit them to drop, a star-wheel loosely mounted on said shaft, molds carried by said star-wheel and arranged to aline with said stamps, dies arranged in alinement with said stamps for closing the bottoms of the molds, a locking wheel provided with a driving pin for intermittently turning said star-wheel and holding it in adjusted position, and means for receiving and carrying away the briquets when discharged from the molds, the star-wheel and cam being arranged so that each briquet is acted upon by each stamp during one revolution of the wheel.

In testimony whereof I affix my signature in the presence of two witnesses.

JUNSUKE IIJIMA.

Witnesses:

GENJI KURIBARA,

HARNTADA YARUMURA.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents. Washington, D. C."