No. 784,083. PATENTED MAR. 7, 1905.

J. TREADWELL.

BRIQUET PRESS.

APPLICATION FILED APR. 7, 1902. RENEWED AUG. 2, 1904.

2 SHEETS—SHEET 1.

Fig. 1.

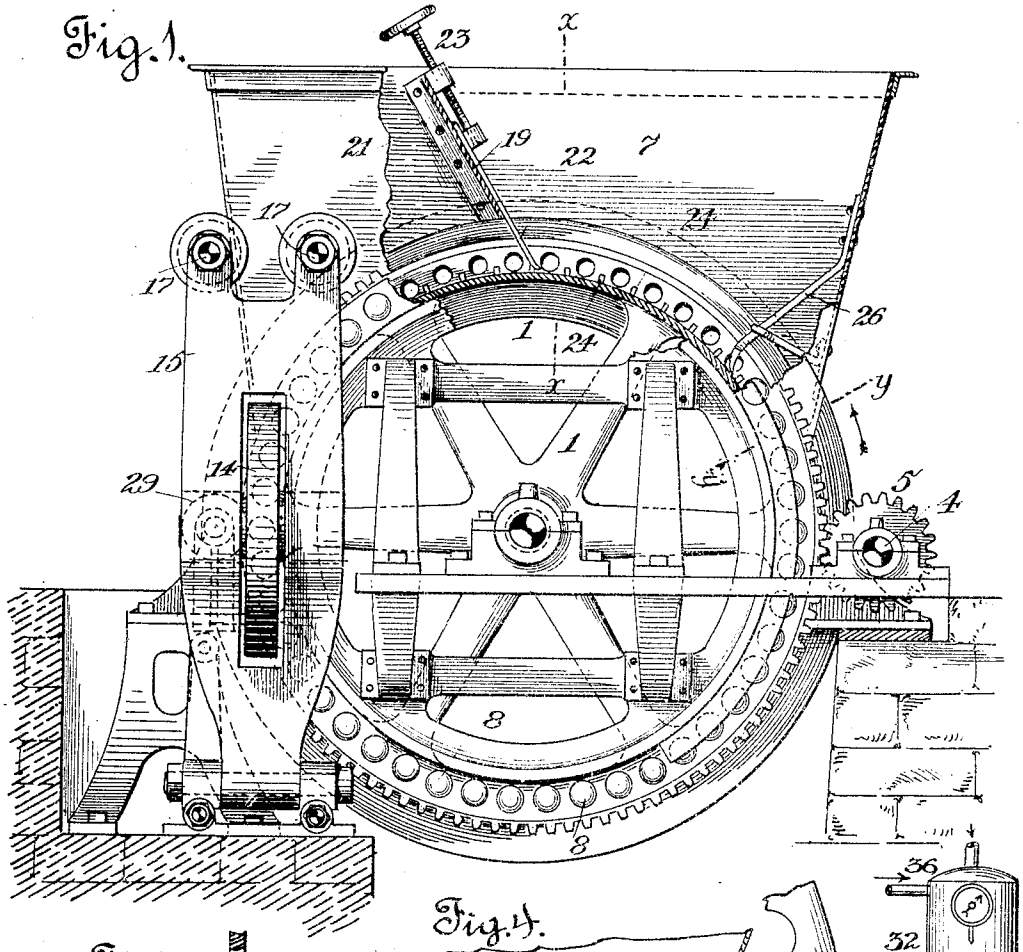


Fig. 5.

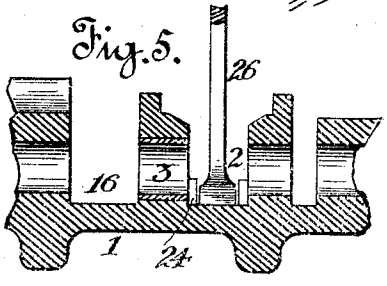


Fig. 4.

Fig. 6.

Witnesses.

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2 SHEETS—SHEET 2.

Fig. 2.

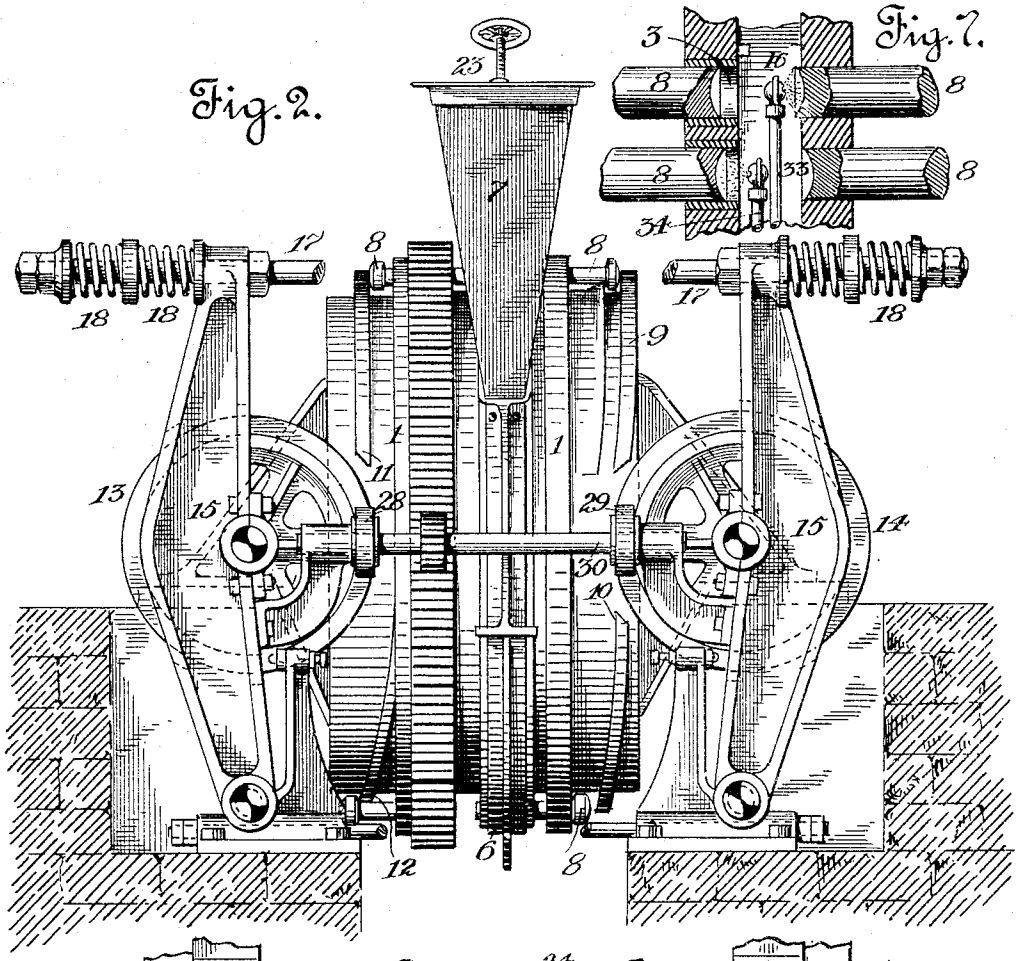


Fig. 7.

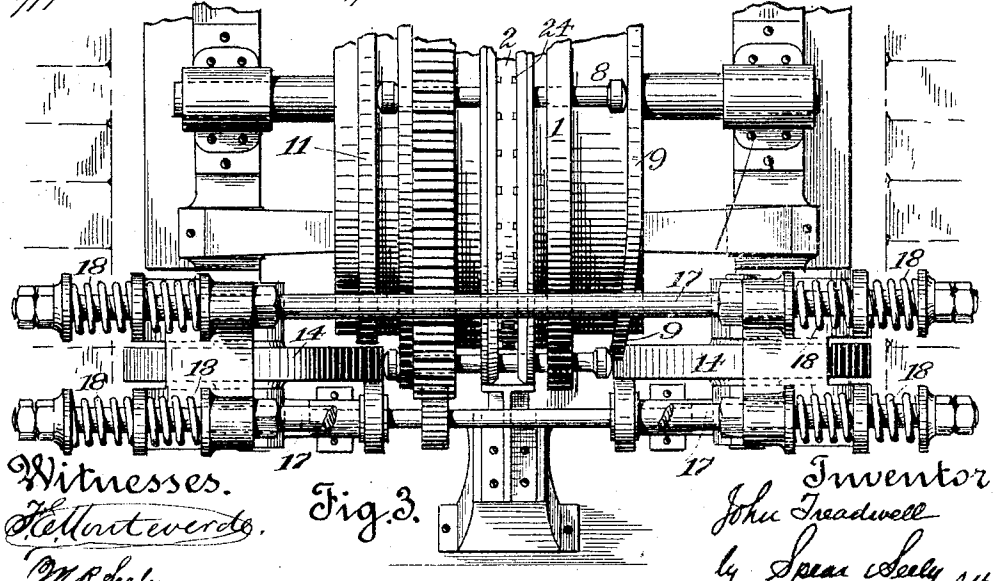


Fig. 3.

Witnesses.

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No. 784,083. Patented March 7, 1905.

UNITED STATES PATENT OFFICE.

JOHN TREADWELL, OF SAN FRANCISCO, CALIFORNIA.

BRIQUET-PRESS.

SPECIFICATION forming part of Letters Patent No. 784,083, dated March 7, 1905.

Application filed April 7, 1902. Renewed August 2, 1904. Serial No. 219,227.

To all whom it may concern:

Be it known that I, JOHN TREADWELL, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Briquet-Presses, of which the following is a specification.

Letters Patent of the United States No. 640,109 were granted to me December 26, 1899, for a briquet-press; and the present invention relates particularly to certain improvements which render the said press effective in operation and more durable. A part of such improvements relates to the feed of material and includes also means for insuring a proper supply of material between the plungers which form the briquets. Another part relates to the prevention of the banking or filling of the bottom of the feed-groove with hardened material, which when permitted brings a side friction and an undue strain upon the plungers and their operating-cams and causes unnecessary wear. Another portion relates to the pressure-rollers which force the plungers toward each other and is also designed to obviate wear on said rollers, and so increase their effective life.

A further improvement relates to a means for lubricating the plungers and molds, so as to prevent their adhesion to the briquets.

These improvements are fully hereinafter described and are shown in the accompanying drawings, and I have considered it advisable to illustrate the entire machine in order that a complete understanding of the improvements may be obtained.

Figure 1 is a side elevation of the whole press. Fig. 2 is a front elevation. Fig. 3 is a partial plan view. Fig. 4 is a cross-section through the hopper and the wheel-rim on line *x x* of Fig. 1. Fig. 5 is a cross-section on line *y y* of Fig. 1. Fig. 6 is a detail elevation of the device for lubricating the plungers and molds. Fig. 7 is a cross-section showing the same device.

The general construction of the press herein described and shown is like that illustrated in the patent referred to and requires only a general description.

A rotary wheel 1 is provided with a spur-gear, by which it is geared down from the driving-shaft 4 and pinion 5. The periphery of the wheel is ribbed, so as to provide the feeding-groove 2 and the open discharging-groove 16 parallel to it, Figs. 4 and 5. In the rib between these grooves are the transverse holes or molds 3, of which there are a series extending entirely around the wheel. The feeding-groove 2 is closed by a circular guard-plate 6, which extends entirely around it excepting beneath the feed-hopper 7. On each side of the wheel, carried by it and working in pairs across its rim, are pistons or plungers 8, having rounded heads. These are controlled by stationary cam-sections placed adjacent to the rim of the wheel and which bear against the projecting heads of the plungers. The plungers on one side (right side of Fig. 4) are first caused to push material from the feed-groove into the molds 3 and to hold it there, the pair of plungers keeping the opposite ends of the molds closed; secondly, the plungers compress that material in the molds and form the briquet; thirdly, one of the pair is retracted and the other further advanced to push the completed briquet out of the mold and to discharge it through the open space 16. The first and third operations are caused by the stationary cam-sections 9, 10, 11, and 12; but the second motion, which forms the briquet, is produced by a pair of rollers 13 14, between which the plungers pass in contact, Fig. 3. The rollers are journaled in hinged standards 15, tied together by double rods 17, held by nuts and provided on each side with springs 18. These rollers force the successive plungers toward each other and form a briquet at each instant when a pair of plungers passes between them. The pressing ends of the plungers are somewhat cup-shaped, producing a briquet which is cylindrical, (formed by the mold,) but having convex ends, (formed by the concave plungers.)

In the patent referred to the feed-hopper has a simple open bottom from which material escapes into the open groove 2. It was supposed that this material would fill up the feed-groove completely and always maintain itself in proper quantity and consistency between the plungers; but it was found in

practice that the supply between the plungers was sometimes so attenuated that there was not enough to make a perfect briquet and sometimes so excessive as to make too thick a briquet, wider than the mold, and so bring an undue strain upon the compressing devices and clog the machinery. The material used is generally pulverized coal or coal-dust mixed with asphaltum or some analogous material as a binder and which although feeding readily is capable of compression into a solid shape. In the present improvements instead of depending upon the amount of material in the feed-groove in the path of a pressing-plunger and which is forced into a mold by said plunger and which was found impracticable the feed-groove 2 is provided with devices which insure a positive feed and supply of material into the molds 3. Across the hopper is a partition or bulkhead 19, having an inclined guide 21, in which is mounted the gate 22 adjustable toward and from the bottom of the groove 2 by a screw 23. This gate projects down through the open bottom of the hopper and into the feed-groove. The sides of the groove are provided with short ribs or projections 24, which alternate in position with the molds 3, and the gate is so shaped at the bottom as to clear these ribs as the wheel revolves. The material delivered from the hopper falls through its open bottom in the space to the right of the gate 22, Fig. 1, the wheel revolving with the arrow in that figure. The mass of material entering the feed-groove is carried up toward and against the gate 22 by the motion of the wheel aided by the ribs 24, and as the gate fills the width of the feed-groove such material is compelled to enter the open molds 3, Fig. 4. A part of the material is, however, carried past the gate by the successive ribs and under the gate, according to the adjustment of the latter, so that the feed-groove beyond the gate is not empty of material. The amount of such material allowed to pass can be regulated by the adjustment of the gate according to conditions in operation—such as the character and consistency of material, the speed at which the wheel is being run, and the thickness of briquet desired—so that the plungers at the pressing-point will simply push enough additional material into the full mold to form a briquet of the desired size.

The feed-groove of the patent referred to, supplied with material from the hopper in the manner therein described, is open to a further objection—that material is liable to bank or pack in the bottom of the groove, so that the compressing-plunger instead of moving freely across the groove works on a bearing composed of such material, and is thus exposed to a considerable frictional resistance, causing undue wear to the plunger-heads and the controlling-cams. In order to remove this material and clear the groove, I provide the scraping device 26, Figs. 1 and 5. This device is firmly secured and braced to the hopper and projects down into the feed-groove, as shown. Whatever hard material is in the bottom of the groove is loosened and removed by this scraper and is carried forward by the motion of the wheel. Therefore all material operated on by the plunger is loose just as it comes from the hopper, and this element of frictional resistance is entirely eliminated.

In the patent referred to the pressure-rollers 13 14 are idle and turn in their bearings only by contact with the successive plunger-heads. It has been found in practice that with no material in the machine—as, for instance, when commencing operations—the plungers slip past the pressure-rollers without turning them, and frequent repetitions of this would wear holes or grooves in the surfaces of the rollers. I have obviated this objection by positively gearing the pressure-rollers to the machine, so that they commence to turn with the machine. The preferred form of gearing and which the driving arrangement renders simple and convenient is by means of two friction-rollers 28 29, mounted upon a shaft 30, which has a pinion engaging with the main gear of the machine. These frictions bear on the sides of the respective rollers and turn them at the same rate of speed as the main gear, which is also the rate at which they are turned by contact with the plunger-heads and in the correct direction. Therefore, although any well-known means of releasing the frictions from contact can be employed, if desired, such means are not necessary, as the frictions can remain in contact at all times without affecting the normal operation of the pressure-rollers.

I have provided simple and effective means for lubricating the plungers and molds in order to prevent adhesion when the artificial-fuel composition is of a sticky adhesive nature, such as those in which asphaltum or coal-tar pitch are used as binders. The compressing-surfaces of the plungers and the mold-bushings are successively exposed to a spray of oil or other lubricant, as shown in Figs. 6 and 7. A tank 32 is supported in some convenient location, so that its discharge-pipe can communicate with the spray-pipes 33 34, having valves 35 and outlets. These pipes are led into the open discharge-groove 16 at a point where the relation of the plungers to said groove leaves the mold partly open, and their outlets face in opposite directions, Fig. 7. A pipe 36 enters the tank 32 and supplies air or steam under pressure. Oil is thus forced from tank 32 by the pressure and is sprayed against the successive plunger-faces, as shown in Fig. 7, the quantity being regulated by the valves. At the point where the spray is applied the plunger is being retracted, and thus permits the mold-bushing to be lubricated, as shown in Fig. 7. The lubricant

must be supplied under strong pressure, so as to produce a spray or cloud at the outlets, as the rapidity of passage of the plungers would render any ordinary jet, flow, or other supply of lubricant absolutely useless.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a briquet-press, an open-bottomed feed-hopper, a wheel having a peripheral feed-groove and rotating beneath said hopper, transverse molds formed in the rim and opening from said groove, oppositely-acting plungers movable in the rim of the wheel, and means for obstructing the feed-groove and so regulating the delivery of material from the feed-groove to the molds formed in the rim.

2. In a briquet-press, an open-bottomed feed-hopper, a wheel having a peripheral groove and rotating beneath said hopper, transverse molds formed in the rim and opening from said groove, oppositely-acting plungers movable in the rim of the wheel in line with said molds, and a gate projecting through the bottom of the hopper and into the groove, whereby said groove is obstructed and material delivered from the hopper into the groove is compelled to enter the open molds formed in the rim.

3. In a briquet-press, an open-bottomed feed-hopper, a rotary wheel beneath said hopper having a peripheral groove, transverse molds formed in the rim and opening from said groove, oppositely-acting plungers movable in the rim of the wheel, a gate projecting from the hopper into the groove and means for adjusting said gate relatively to said groove whereby the groove is controllably obstructed, and the entrance of material into said molds is regulated.

4. In a briquet-press, an open-bottomed feed-hopper, a rotary wheel beneath the same and having a peripheral groove into which material is fed from the hopper, horizontal molds opening into said groove, projections from the inner walls of said groove alternating with the said molds, and an adjustable gate projecting from the hopper into the said groove, and shaped so as to permit the passage of said projections.

5. In a briquet-press, a rotary wheel having a peripheral groove, a hopper for supplying material to said groove, molds in the rim of the wheel communicating with said groove, plungers sliding in the rim of the wheel and across said groove, and a scraper adjacent to the bottom of said groove and to said hopper, whereby material in said groove is prevented from banking and hardening in the path of the plungers.

6. In a briquet-press, a rotary wheel having a peripheral feed-groove, a series of molds opening therefrom, pairs of plungers movable in the rim for compressing material in said molds, a pair of pressure-rollers between and in contact with which the pairs of plungers are compelled to pass, and gearing connected to said rollers for positively driving them, substantially as and for the purpose set forth.

7. In a briquet-press, a rotary wheel, having a series of compressing-plungers sliding transversely in its rim and projecting outside of it, a peripheral gear on said wheel, a shaft in gear with said peripheral gear, a pair of oppositely-placed pressure-rollers for forcing said plungers toward each other by contact with their projecting ends, and wheels on said shaft adapted to engage said pressure-rollers and to drive the same.

8. In a briquet-press, a rotary wheel having peripheral parallel feed and discharge grooves, and carrying series of compressing-plungers working transversely in the rim of the wheel and in the described relation to said grooves, molds in the wheel opening from said grooves, and oil-supply pipes entering said discharge-groove and having discharge-outlets directed toward said plungers, whereby the plungers and molds as they successively pass said outlets, receive oil upon their compressing-faces.

9. In combination with a briquet-press comprising a rotary wheel having a peripheral feed-groove and a parallel peripheral discharge-groove, molds opening from said discharge-groove, a series of compressing-plungers for forming briquets in said molds, an oil-pressure tank, pipes connected thereto and extending into the discharge-groove, and relatively small outlets from said pipes directed toward said plungers and molds.

In testimony whereof I have affixed my signature, in presence of two witnesses, this 31st day of March, 1902.

JOHN TREADWELL.

Witnesses:
L. W. SEELY,
F. M. BURT.