C. KORTE.

BRIQUETING PRESS.

APPLICATION FILED DEC. 22, 1916.

1,293,124.

Patented Feb. 4, 1919.

3 SHEETS—SHEET 1.

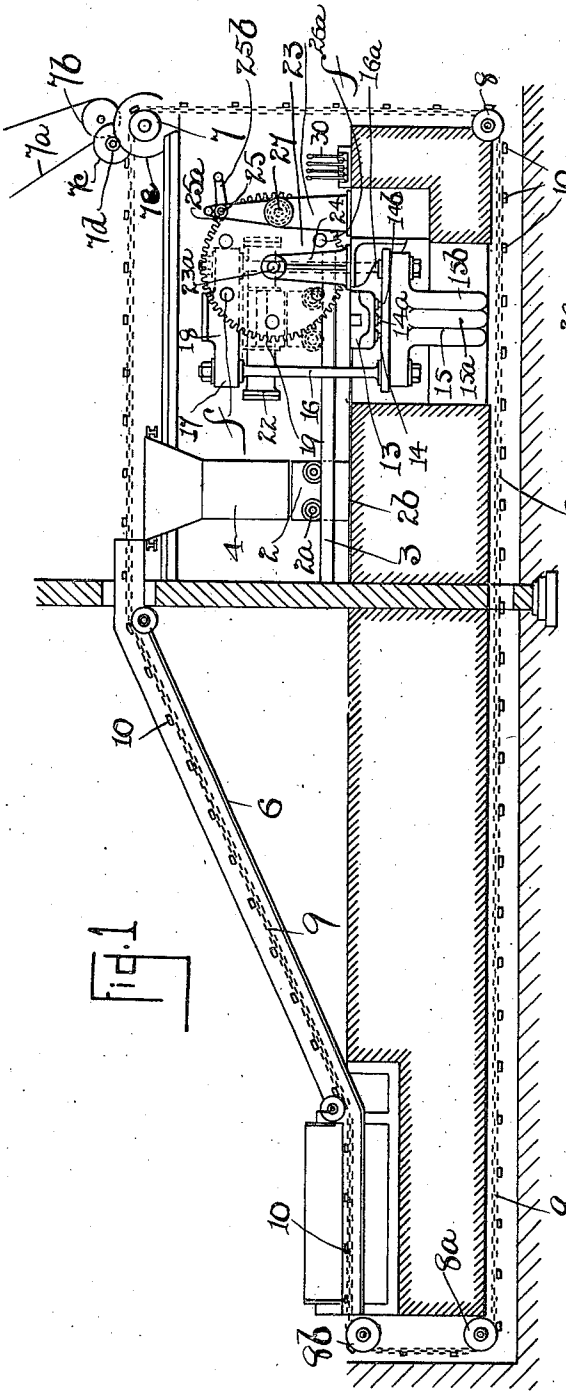


Fig. 1

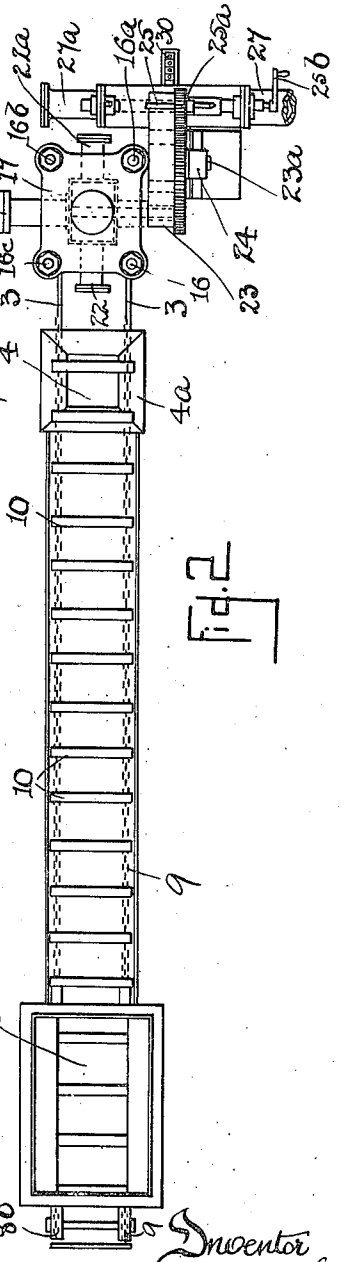


Fig. 2

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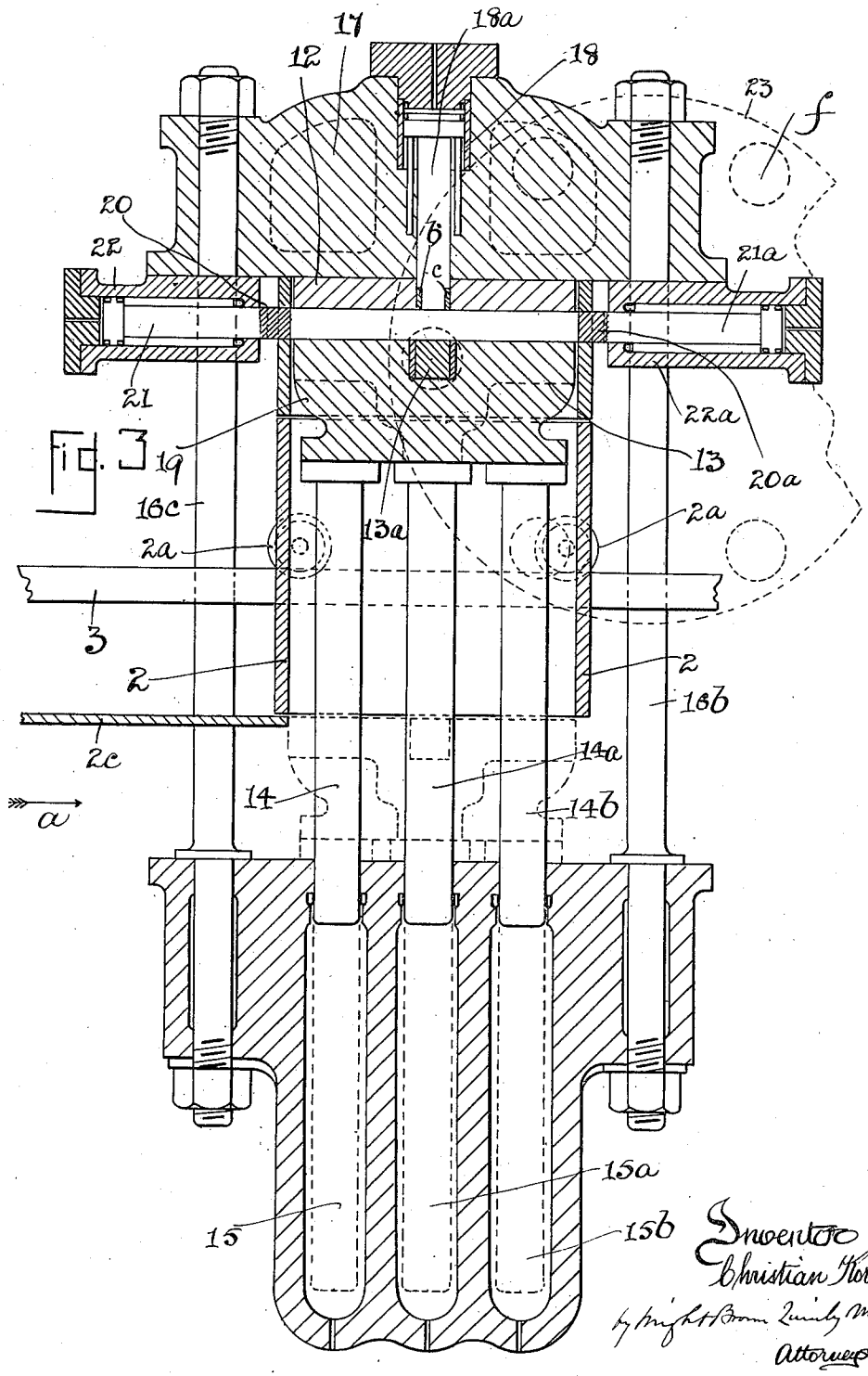


Fig. 3

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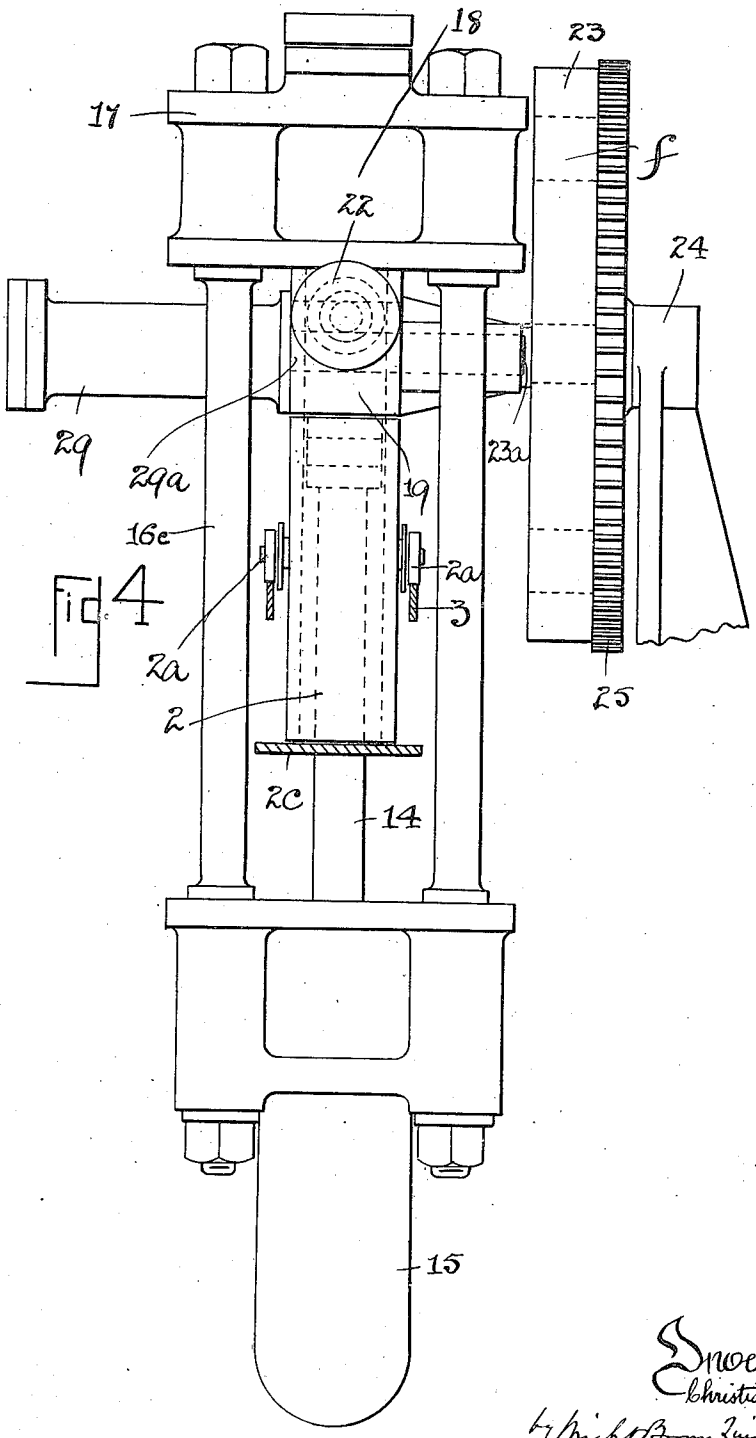


Fig. 4

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UNITED STATES PATENT OFFICE.

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BRIQUETING-PRESS.

1,293,124. Specification of Letters Patent. Patented Feb. 4, 1919.

Application filed December 22, 1916. Serial No. 138,324.

To all whom it may concern:

Be it known that I, CHRISTIAN KORTE, a subject of the King of Great Britain, and resident of Leeds, in the county of York, England, have invented a certain new and useful Improvement in Briqueting-Presses, of which the following description, having reference to the accompanying sheets of drawings, is a specification.

In the working of metals such as in the turning of shafts of steel, wrought iron or the like, the parts cut away are often in thin curled strips of considerable length so that they are difficult to handle to bring into such a state that they may be again made use of. The object of my present invention is the production of means as will enable me to take such curled strips of metal and form them into briquets so that their subsequent treatment may be carried out in manner well known.

My said invention consists in the production of apparatus into certain parts of which I may place bundles of these cuttings, exercise pressure over them to press them into certain flat or slab formation from which I then cut or shear portions of such forms, shapes or dimensions as will enable me afterward to mechanically transfer said cut-off portions to dies, where by pressing tools they are finally acted upon so that they are thereby brought into the condition or briquet formation stated.

In the accompanying sheets of drawings:—

Figure 1 is a side elevation illustrating my improved apparatus, certain of the parts being shown in section in order that parts behind may be more clearly illustrated.

Fig. 2 is a plan of parts shown by Fig. 1 and again certain of the parts are cut away so that the parts beneath might be seen.

Fig. 3 is a sectional elevation (taken on an irregular line) of the main pressing and shaping apparatus while Fig. 4 is an elevation of the parts shown by Fig. 3, as seen in the direction indicated by the arrow *a*.

In carrying my invention into effect, I make use of a receptacle 2 which is somewhat of the character well known as being used in connection with baling apparatus. This receptacle 2 is mounted so that its wheels 2^a may run on rails 3 from the position beneath the hopper or chute 4 as shown in full lines Fig. 1 to occupy a position within the machine as shown by Figs. 3 and 4.

This chute 4 is mounted within a building or inclosed space or otherwise, as may be found convenient, so that the curled strips of metal or cuttings that have to be briqueted may be deposited therein by any suitable apparatus. One set or appropriate kind of apparatus is illustrated by Figs. 1 and 2 of the accompanying drawings. In this feeding apparatus a pit 5 may be appropriately formed or it may be dug into the ground in a yard or space adjoining the building in which my improved apparatus is mounted and leading from this pit 5 is an inclined trough 6 preferably of sheet metal. This trough 6 terminates at the edge of the mouth piece 4^a leading to the hopper 4.

Through the lower part of this pit 5 and along the trough 6, over the top of the mouth piece 4^a and taking over the driving sprocket wheels 7 and other guiding wheels 8, 8^a and 8^b, are chains 9, 9^a the two shown being endless and having on their outer surfaces crossbars 10 which extend between them and above them as shown by Figs. 1 and 2. Thus as the curled strips of metal which are to be briqueted are deposited in the pin 5 they are carried by these slowly traveling chains 9, 9^a and their crossbars 10 until they reach the hopper 4^a where they will immediately descend down the chute 4 into the receptacle 2. The motion transmitted to the chains 9, 9^a may be derived from any prime motor through a belt 7^a which rotates the pulley 7^b, and by the gearing wheels 7^c, 7^d and 7^e transmit the motion to the chains as desired.

As the curled strips of metal are deposited into the receptacle 2, a workman by employing a bar of wood or metal will force such strips down in the said receptacle 2 in order that same may be, in a certain measure, compressed therein while resting upon the stationary base or support 2^b beneath. When the receptacle 2 is sufficiently charged, the workman then forces it or causes it to travel over the rails 3 into position within the press as illustrated by Figs. 3 and 4 and during its passage from one position to the other its contents are retained within it by the base 2^b and a plate 2^c forming an extension of said base. On reaching its position within the machine, its base is formed by a table 13 which is mounted upon the rams 14, 14^a, 14^b which act within the hydraulic cylinders

15, 15ª, 15ᵇ. These hydraulic cylinders 15, 15ª, 15ᵇ are supported by a suitable base while, by the vertical columns 16, 16ª, 16ᵇ, 16ᶜ, the head 17 is firmly and securely connected to said hydraulic cylinders. Beneath the head 17 is mounted a block or plate 12 within a shield 19.

In this head 17 is formed another hydraulic cylinder 18, the ram 18ª in which extends vertically through an appropriate opening within the pressure plate 12 while a corresponding opening 13ª is made in the table 13. At the end of the ram 18ª are mounted two shearing blades *b* and *c* while within the opening 13ª are mounted two other shearing blades *d* and *e* which are arranged to act as hereinafter described. The shield 19 which surrounds the plate 12 has elongated openings made laterally through it for the pressure plates 20, 20ª the ram 29ª and the discharge material moved by said ram, to pass through so that the said devices may operate beneath the pressure plate 12 and above the table 13 when this latter is in its raised position hereinafter described. The pressure plates 20, 20ª are mounted upon rams 21 and 21ª respectively and these operate within their hydraulic cylinders 22, 22ª.

At the rear of the machine a cylinder 29 having a ram 29ª is mounted in position so that said ram, on being forced out of its cylinder may enter the opening 13ª in the table 13.

Mounted upon a horizontal shaft 23ª is a rotary die plate 23 which is supported by its bearings 24 in front of the several hydraulic cylinders hereinbefore referred to so that as this circular die plate 23 is rotated each of the molds *f* formed therein may be successively brought opposite the opening 13ª made within the table 13. The die plate 23 is manually rotated by the handle 25ᵇ which is fixed upon the shaft 25 upon which is also fixed a pinion 25ª arranged to gear with teeth formed on the periphery of said die plate 23. Fixed upon suitable base pieces and bearings 26, 26ª are two hydraulic cylinders 27, 27ª the rams of which are in alinement with one or other of the molds *f* when another of said molds diametrically opposite to it is opposite the opening or space 13ª in the table 13.

The actions of the several parts hereinbefore described are as follows:—

Prior to the workman moving the receptacle 2 over the top of the table 13 (when this table is in its lowest position as shown in broken lines Fig. 3) he will have placed in the rectangular opening 13ª a solid bar of metal *h* in order to fill said opening so that the table 13 will by its aid present a flat unbroken surface to the contents of the receptacle 2 in order to press same into a slab against the plate 12 by rising into the position shown in full lines Fig. 3. After the block *h* has been placed in the position described, the receptacle 2 is moved from beneath the hopper 4 into position over the top of the table 13 (which at such time is in its lowest position as shown in broken lines Fig. 3) so that this table will support the contents within. The valves are then opened so that pressure water enters the cylinders 15, 15ª, 15ᵇ to cause said table to rise and press the contents of the receptacle 2 against the pressure plate 12. On the completion of said pressing actions, said table 13 will have reached the position shown in full lines Fig. 3. When the table 13 has reached this position the contents of the receptacle 2 will have been moved into or within the shield 19 to form a slab of material of a thickness corresponding to the space between the upper surface of the table 13 and the lower surface of the plate 12. The operator will then cause the ram 29ª within the hydraulic cylinder 29 to advance and press the block *h* out of its position within the table 13 into that mold or opening *f* in the die plate 23 that happens to be opposite to it and in position to receive same. The ram 29ª is then caused to recede so that the space 13ª within the table 13 is left vacant, and at this time water is admitted to the cylinder 18 so that the ram 18ª commences to descend and shear off such a portion of the slab of compressed material above the table 13 as might lie within its path, the shearing blades *b*, *c* on this occasion acting in conjunction with the other shearing blades *d*, *e* so that the portion of the slab of pressed material cut off is forced down into the space 13ª in the table 13. Now, water pressure is admitted to the cylinders 29 so that the ram 29ª on commencing to advance will force the cut off portion of material from the opening 13ª into the mold *f* in the die plate 23. This first cut-off portion of material to enter the mold *f* will force the block of metal *h* that had been previously carried into same, beyond said mold. Thus it will be clear of the die plate 23. When this block of metal *h* is thus forced out of its position in the die plate 23 it may be received by any appropriate support where it may remain until the operator again requires it, as hereinafter explained. The die plate 23 is now moved (by means of the handle 25ᵇ) one step forward and at the same time he will admit pressure water to the two cylinders 22 and 22ª so that the pressing plates 20 20ª are caused to advance to force the remaining portions of the slab of compressed cuttings between the table 13 and the pressing plate 12 so far forward that they will close the space from which the ram 18ª had previously cut the portion which was then supplied to the mold *f* in the die plate 23;

and the step forward that the operator has moved the plate 23, to bring another mold *f* opposite the opening 13ª in the table 13, enables him to bring the next mold *f* into position, while at the same time he will have opened the valve leading to the pressure cylinder 18 so that the ram 18ª will again cut off another portion of the curled strips of metal overhanging the opening 13ª in the table 13. At this time, the operator again causing pressure water to enter the cylinder 29 and its ram 29ª will advance to force the cut-off material from the opening 13ª into the mold *f* waiting ready to receive it. The operation of closing up the material between the table 13 and the pressure plate 12, the cutting-off of said material and the charging of same into the die plate 23, are repeated until the die plate brings the mold which was first supplied with this material opposite the rams in the cylinders 27 27ª. The water-pressure valves are now to be opened so that the rams from these cylinders 27 27ª are caused to advance one on one side the die plate 23 and the other on the other side thereof so that the contents of the mold opposite are compressed in both directions by these rams and that to the desired extent. The operator then shuts off the pressure water from one of these pressure cylinders, say cylinder 27ª, but allows the pressure water to act within the other pressure cylinder 27. Thus the ram therein continues its motion and ejects the compressed briquet from the mold. The pressure water within the cylinder 27ª will now be reversed so that it will cause the ram therein to release its pressure upon the discharged briquet (which up to this time will have been held between the two rams) so that this latter is thereby permitted to fall into any place or receptacle arranged to receive it. The operator then proceeds with the advancing of the die plate 23 together with the carrying out of the several functions hereinbefore described in connection therewith until the last or final portion of the material compressed between the table 13 and plate 12 have been exhausted or depleted. The valves are now again opened to enable the pressure water to cause the table 13 to descend by removing said pressure water from the cylinders 15, 15ª, 15ᵇ on which the receptacle 2 is moved and placed beneath the hopper 4, the block of metal *h* being again replaced in the opening 13ª within the table 13, to reinstate all the parts in their original or initial positions for the full series of operations to be recommenced.

For the convenience of the workman who has to operate the valves which govern the actions of the series of rams in the mechanism hereinbefore described, I have the valves connected to levers 30 which are situated near the handle 25ᵇ where the workman stands to operate the die plate 23.

Although I have described said apparatus as being controlled entirely by the workman through the levers and other devices hereinbefore described it is obvious that many parts of the apparatus might be made to operate or work automatically under the actions of the pressure water by the employment of valves for controlling such pressure water somewhat of the character already known and which I have described in previous specifications of British patents granted to me and another for this class of apparatus, viz: in No. 7365 of 1911 and in No. 16826 of 1912. As the curled strips of metal vary in length and volume to a great extent it may be necessary that the chain which is used for feeding said material to the hopper 4 may be required to travel in a path at a greater or less distance above the base of the inclined chute and to enable me to do this I make the guiding bowls or pulleys 8ᵇ so that I may adjust them in order to raise or lower said chain relatively with said chute. Or I may make use of adjustable pillars for supporting said chute so that I may extend them when it is desired to raise the chute, or I may reduce their length when said chute has to be at a greater distance from the chain.

Such being the nature and object of my said invention, what I claim is:—

1. A briqueting press comprising a movable table, a substantially stationary pressure plate arranged in the path of said table to coöperate therewith during the pressing operation, cutting means to be extended between said plate and table for cutting the material pressed into smaller portions.

2. A briqueting press comprising a movable table, a substantially stationary pressure plate arranged in the path of said table to coöperate therewith during the pressing operation, cutting means to be extended between said plate and table for cutting the material pressed into smaller portions, means for ejecting certain of said portions from between said table and plate.

3. A briqueting press comprising a movable table, a substantially stationary pressure plate arranged in the path of said table to coöperate therewith during the pressing operation, cutting means to be extended between said plate and table for cutting the material pressed into smaller portions, means for ejecting certain of said portions from between said table and plate, other pressing members arranged to enter between said table and plate from the sides thereof for forcing the material remaining therebetween together to permit a repeated effective operation of said cutting and ejecting means.

4. A briqueting press comprising a movable table having a transverse channel in the upper surface thereof and adapted to receive a removable block, a pressure plate arranged over the table to coöperate therewith during the pressing operation, cutting means to extend through said plate and receivable in said channel, when said block is removed, for cutting the pressed material, means for ejecting the cut material from said channel.

5. A briqueting press comprising a movable table having a transverse channel in the upper surface thereof and adapted to receive a removable block, a pressure plate arranged over the table to coöperate therewith during the pressing operation, cutting means to extend through said plate and receivable in said channel, when said block is removed, for cutting the pressed material, means for ejecting the cut material from said channel, other pressing members arranged to enter between said table and plate from the sides thereof for forcing the material remaining therebetween together to permit a repeated effective operation of said cutting and ejecting means.

6. A briqueting press comprising a movable table, a substantially stationary pressure plate arranged in the path of said table to coöperate therewith during the pressing operation, cutting means to be extended between said plate and table for cutting the material pressed into smaller portions, means for ejecting certain of said portions from between said table and plate, a die adapted to receive an ejected portion, and means for further compressing said portion in said die to complete the briquet.

7. A briqueting press comprising a movable table, a substantially stationary pressure plate arranged in the path of said table to coöperate therewith during the pressing operation, cutting means to be extended between said plate and table for cutting the material pressed into smaller portions, means for ejecting certain of said portions from between said table and plate, a series of progressively moving dies adapted to receive in succession said ejected portions, and means to further compress the material in the dies and to eject the same therefrom.

8. A briqueting press comprising a movable table, a substantially stationary pressure plate arranged in the path of said table to coöperate therewith during the pressing operation, and a feeding receptacle shiftable to a position between said table and plate.

9. A briqueting press comprising a movable table, a substantially stationary pressure plate arranged in the path of said table to coöperate therewith during the pressing operation, and a feeding means including an elongated plate or slide-way leading directly to the table and a bottomless receptacle movable over said plate to a position between said table and pressure plate.

10. A briqueting press comprising a movable table, a substantially stationary pressure plate arranged in the path of said table to coöperate therewith during the pressing operation, cutting means to be extended between said plate and table for cutting the material pressed into smaller portions, means for ejecting certain of said portions from between said table and plate, a rotatable wheel having a plurality of molds formed therein, each adapted to successively receive an ejected portion, and means arranged adjacent the wheel to further compress said portions, when the molds register therewith, and to eject the briquet.

CHRISTIAN KORTE.