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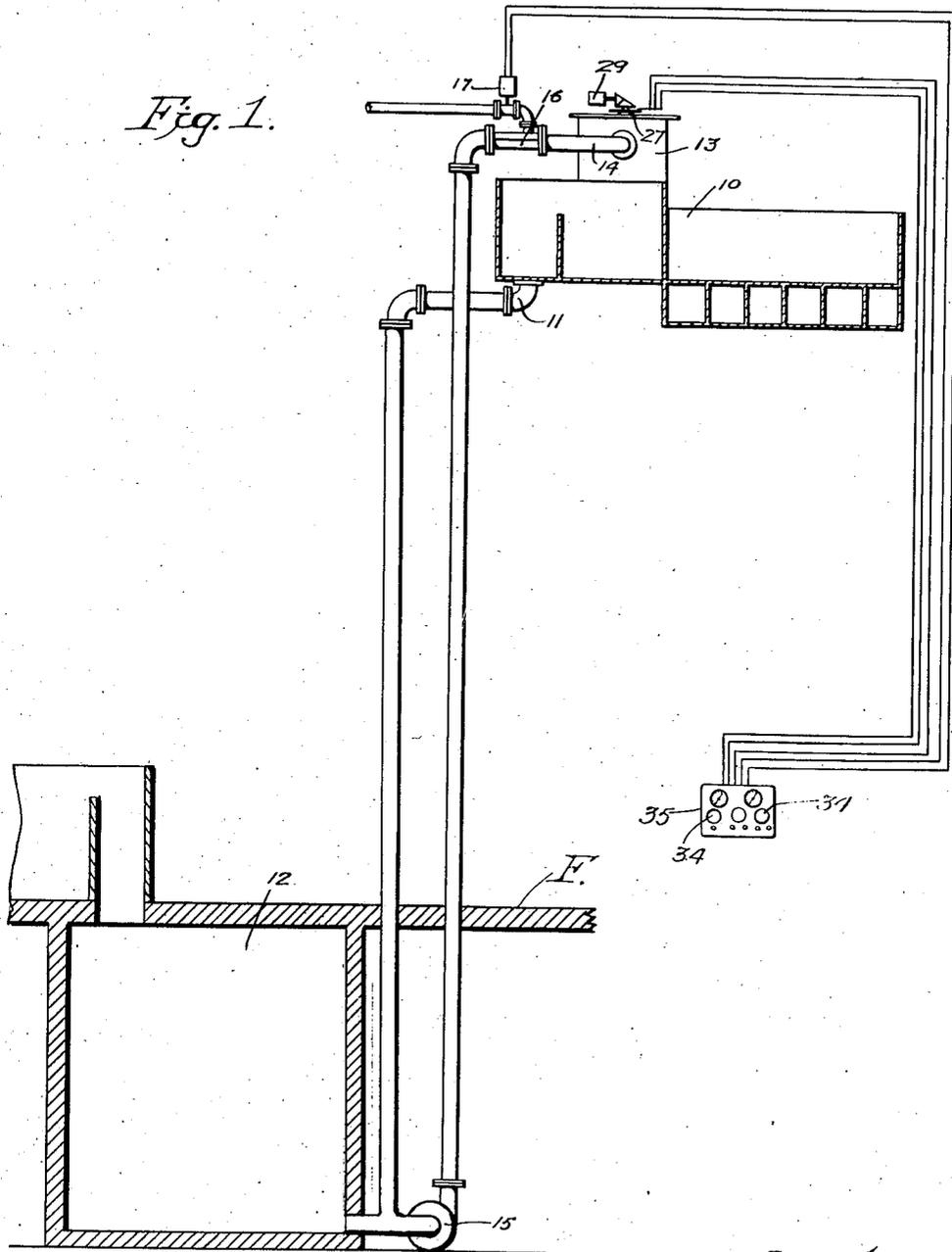
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2,125,298

HYDRAULIC BEATING APPARATUS

Filed July 30, 1935

4 Sheets-Sheet 1



Inventor:—
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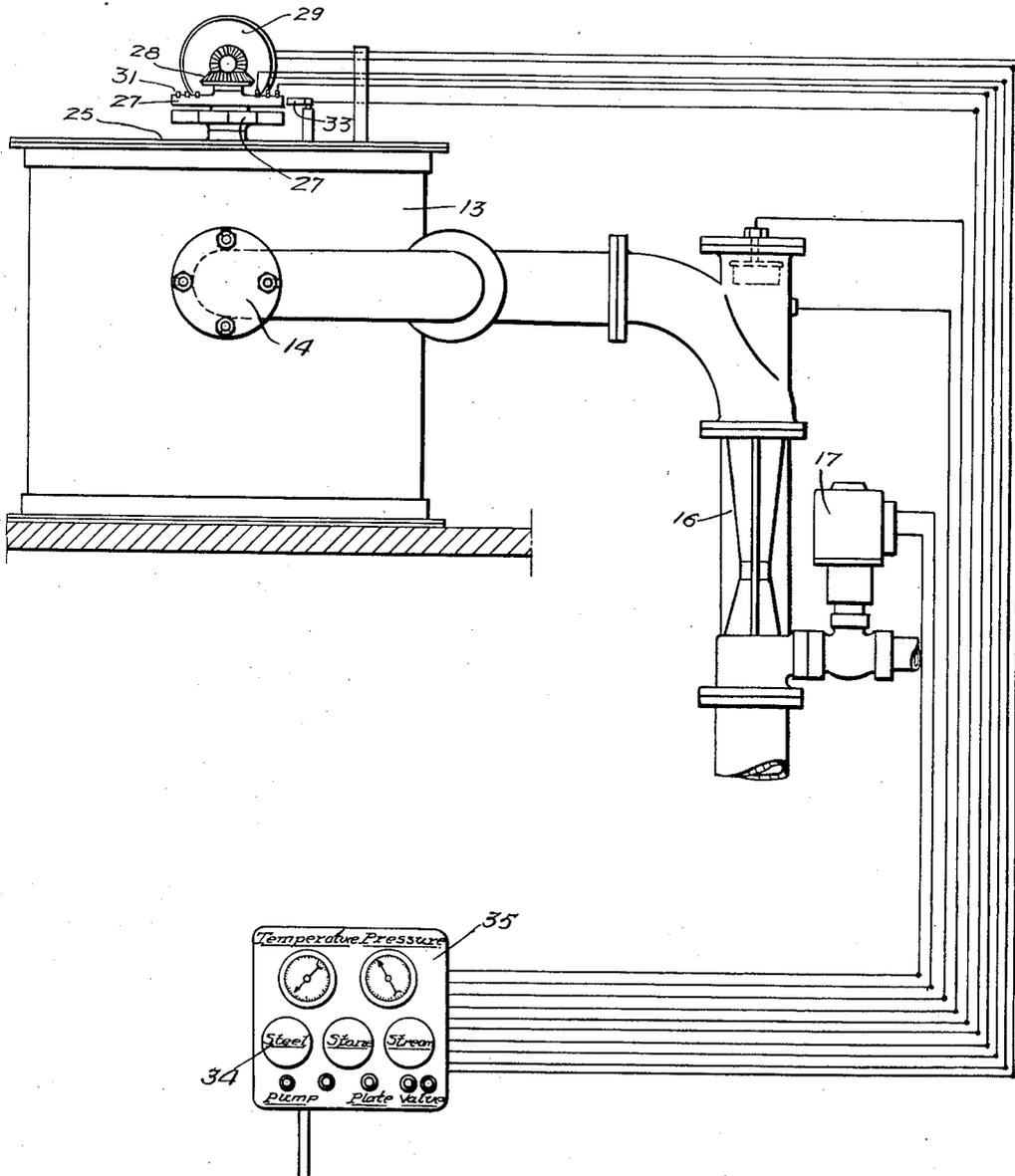
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4 Sheets-Sheet 2

Fig. 2.



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Fig. 3.

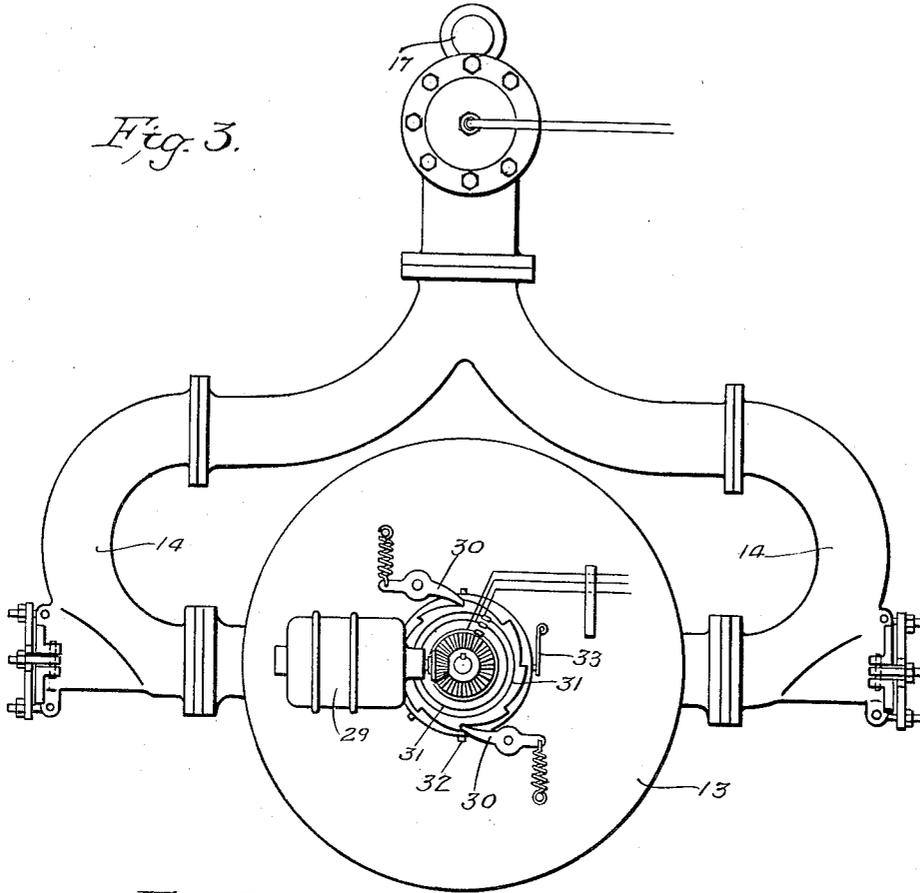
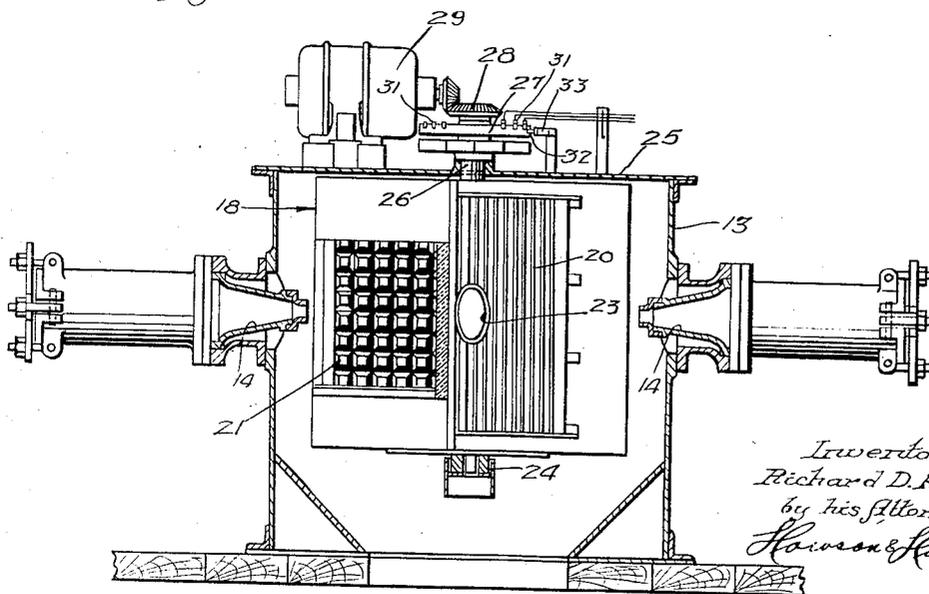


Fig. 4.



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4 Sheets-Sheet 4

Fig. 6.

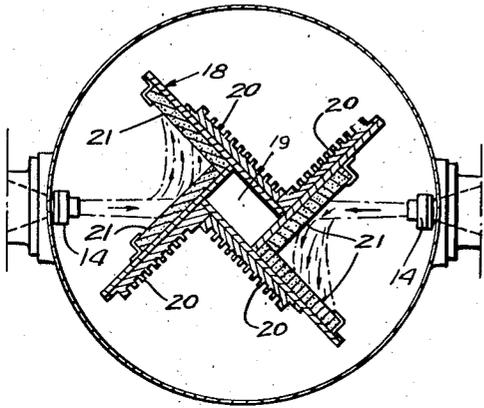


Fig. 7.

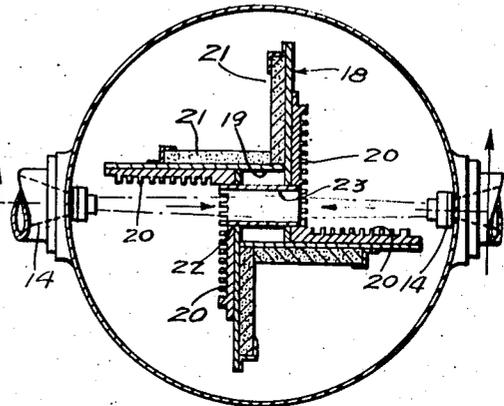


Fig. 8.

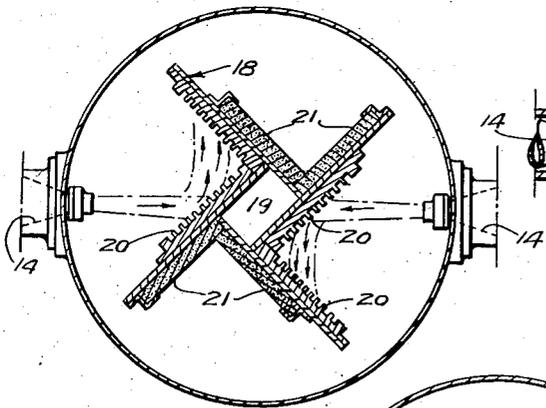


Fig. 5.

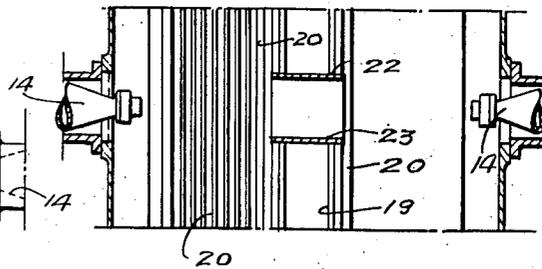
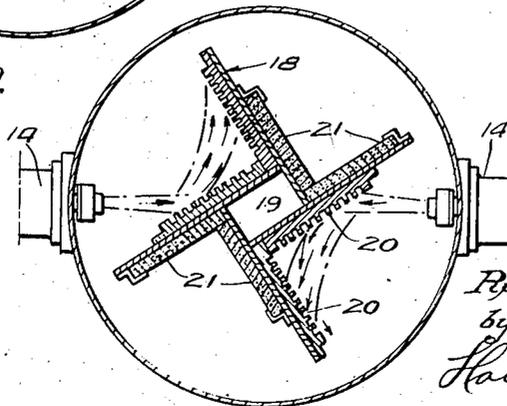


Fig. 9.



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UNITED STATES PATENT OFFICE

2,125,298

HYDRAULIC BEATING APPARATUS

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Application July 30, 1935, Serial No. 33,890

10 Claims. (Cl. 92—20)

This invention relates to apparatus for treating paper stock, and more particularly waste paper stock or other stocks where it is desired in stock preparation to prevent to the greatest possible extent destruction of the fibres and to provide control of the freeness of the stock at will.

An important object of this invention is the provision of stock treating apparatus especially adapted for utilization in stock preparation systems of the type set forth in my copending application Serial No. 750,726, filed October 30, 1934, for Continuous batch method of producing paper stock from waste papers.

A further and more specific object of the invention is the provision of a hydraulic or target beater in which a wide range of stock treatments is possible and in which the stock treatment may be either of the opposed stream or target type, at will.

A further object of the invention is the provision of an arrangement such that variation from one type to another of beating may be made from a remote point, thus permitting the machine handler on the floor and in attendance upon his machine to correct the freeness of the stock which he is utilizing without leaving the machine.

A further object of the invention is the provision of apparatus of this character which may be utilized to replace the Jordan engines ordinarily employed in the final treatment of paper stocks, and particularly waste paper stocks.

These and other objects I attain by the construction shown in the accompanying drawings wherein, for the purpose of illustration, I have shown a preferred embodiment of my invention and wherein:

Fig. 1 is a semi-diagrammatic view illustrating apparatus constructed in accordance with my invention applied to the stuff box of paper machinery;

Fig. 2 is an enlarged semi-diagrammatic view of the hydraulic beater and the connections employed for controlling the operation of the same;

Fig. 3 is a plan view of the beating mechanism;

Fig. 4 is a vertical sectional view therethrough;

Fig. 5 is a section on line 5—5 of Fig. 7; and

Figs. 6 to 9 inclusive are views illustrating different positions of the beating apparatus for obtaining different beating effects.

Referring now more particularly to the drawings, the numeral 10 designates the stuff box from which the stock flows to the cylinders of a paper machine, this stuff box having an overflow 11 leading back to the suction of the pump

at the intake of the pump may be avoided and the developed head, therefore, increased. For a given head, it is possible to reduce the actual horse-power necessary to produce the same. This stuff box is, as usual, arranged considerably above the level of the machine floor F. Arranged above the stuff box is a casing 13 of a hydraulic beater into which opposed jet nozzles 14 are directed. These jet nozzles are supplied by a high pressure pump 15 intaking from the stuff chest 12, and the supply line is preferably equipped with a steam injector nozzle 16 controlled by a solenoid valve 17.

Arranged between the nozzles is a target structure 18 including four pairs of similar target plates. The target plates of each pair are arranged at an angle to one another, preferably a right angle as shown, and the plates of the pair are grouped about a hollow rectangle 19. The pairs forming corresponding sides of the rectangle are identical with one another; one set of identical pairs comprising metallic bars 20 projecting from the face thereof, and the remaining pair comprising basalt lava stones of the character employed in Jordans, or their equivalent, as indicated at 21. One of these groups of plates, and more particularly the group having the bars 20, has those plates thereof which define the rectangle 19 formed with apertures 22 to mount the ends of a conduit 23.

The entire target structure 18 is rotatably mounted on suitable bearings in a lower cross bar 24 and the casing cover 25, and it will be obvious that by rotation of the target either the pair of plates having the bars or the basalt lava stones may be aligned with the nozzles so that the desired cutting action may be had through these target elements. The openings 22 are arranged at the level of the nozzles and it will be obvious that these also may be placed in alignment with the nozzles so that the streams from the nozzles will directly impinge upon one another, thus giving a third type of hydraulic beating action.

The shaft 26 upon the upper end of the target apparatus has secured thereto a disc 27 of electric insulating material and has further secured thereto a drive gear 28 with which a drive gear upon the shaft of a motor 29 is engaged. The motor 29 as indicated is preferably of the included gear reduction type as indicated so that the speed of its drive gear will be relatively slow. The disc 27 includes two sections, the one being a contact section and the other a ratchet section with which pawls 30 are engaged to prevent reverse rotation thereof. The contact disc has contact rings 31

corresponding in number to the operative positions desired for the target and has upon its periphery a series of contacts 32 for co-action with a brush 33. The contact rings are engaged by suitable brushes and are connected to remote signals generally designated at 34, these signals being disposed at a control-board 35 which may be positioned at any point convenient to the machine attendant. The switchboard preferably includes switches for starting and stopping the motor of pump 15, for starting the motor 29 and for operating the control valve 17, as indicated. The switch controlling the motor 29 can be a simple push button switch, since the time of required operation of this motor and the frequency of its operation will not demand utilization of anything other than this. Obviously, by increasing the number of contacts and signal elements it becomes possible not only to place each set of plates in alignment with the nozzles but to vary the angular position of a pair of plates so that the nozzle will find a new impinging point.

In utilization of the apparatus, if it be assumed that the target elements employed comprise the plates having bars, this condition is indicated upon the panel and this type of target apparatus gives an intermediate stock; that is to say, the stock will be intermediate as regards its freeness, the defiberization accomplished, and the extent of hydration. If, for example, the machine tender decides that the stock should be slower, he will press the switch controlling the motor 29 and maintain the switch closed until the signal light indicates that the stone plates are in position for impact by the streams from the nozzles, after which the switch may be released. The stream from the nozzles, as will be noted from the figures showing the several positions of the target, each impact one of the plates of each pair and rebound therefrom to the other of these plates. The initial impact being stronger, the plate directly engaged exerts a pressure tending to rotate the target, and this action is prevented by the ratchet mechanism. By a similar operation to that above described, it is as easily possible to align the apparatus 22 with the nozzles so that the very free stock provided by direct contact of the streams will be formed. In some instances, as for example when employing materials which do not readily defiberize, an increase in pressure at the nozzles may be found desirable, and again it may be desirable to heat the stock in order to assist in defiberization. Where this is the case, the solenoid valve is actuated to set the steam injectors in operation in conjunction with the pump 15.

Such a construction as that described gives the machine tender direct control over the stock and permits this control without the necessity of leaving the machine. Furthermore, the hydraulic beating mechanism accomplishes the results ordinarily accomplished by the Jordan engines, thus eliminating an operation which is at once expensive because of the high horse power required and destructive to the stock because of the reduction of fibre length.

The construction being capable of considerable modification without departing from the spirit of my invention, I do not wish to be understood as limiting myself thereto except as hereinafter claimed.

I claim:

1. In a hydraulic beater, a rotatable structure affording diametrically opposed pairs of similarly arranged angularly related faces, each having an applied target surface, the target surfaces

of adjacent pairs having different characteristics, diametrically opposed nozzles for directing stuff against such surfaces, means to rotate said structure and means to hold the structure in rotatably adjusted positions, said rotatable structure having an opening therethrough alignable with the nozzles to permit streams emitted by the nozzles to come into direct contact with one another.

2. In a hydraulic beater, a rotatable structure affording diametrically opposed pairs of similarly arranged angularly related faces, each having an applied target surface, the target surfaces of adjacent pairs having different characteristics, diametrically opposed nozzles for directing stuff against such surfaces, means to rotate said structure, means to hold the structure in rotatably adjusted positions, said rotatable structure having an opening therethrough alignable with the nozzles to permit streams emitted by the nozzles to come into direct contact with one another, and a control for said rotating means operable from a remote point.

3. In a hydraulic beater, a rotatable structure affording diametrically opposed pairs of similarly arranged angularly related faces, each having an applied target surface, the target surfaces of adjacent pairs having different characteristics, diametrically opposed nozzles for directing stuff against such surfaces, means to rotate said structure, means to hold the structure in rotatably adjusted positions, said rotatable structure having an opening therethrough alignable with the nozzles to permit streams emitted by the nozzles to come into direct contact with one another, a high pressure pump, a conduit connecting the discharge of said pump with said nozzles and a steam injector in said conduit.

4. In a hydraulic beater, a rotatable structure affording diametrically opposed pairs of similarly arranged angularly related faces, each having an applied target surface, the target surfaces of adjacent pairs having different characteristics, diametrically opposed nozzles for directing stuff against such surfaces, means to rotate said structure, means to hold the structure in rotatably adjusted positions, a control for said rotating means operable from a remote point, and means to indicate at such point the position of said rotatable structure, said rotatable structure having an opening therethrough alignable with the nozzles to permit streams emitted by the nozzles to come into direct contact with one another.

5. In a hydraulic beater, opposed nozzles, a movable structure arranged between said nozzles and having target faces for engagement by jets from said nozzles, said structure being movable to withdraw the target surfaces from alignment with said nozzles to thereby permit the nozzle streams to impinge upon one another, a casing containing the structure, and means operable from the exterior of the casing for moving the structure.

6. In a hydraulic beater, opposed nozzles, a movable structure arranged between said nozzles and having target faces for engagement by jets from said nozzles, said structure being movable to withdraw the target surfaces from alignment with said nozzles to thereby permit the nozzle streams to impinge upon one another, a casing containing the structure, means operable from the exterior of the casing for moving the structure, a control for said moving means operable at a remote point, and means to indicate at such point the position of the structure.

7. In a hydraulic beater, opposed nozzles having a supply line, a high pressure pump supplying stuff to said supply line, and an injector in said supply line.

5 8. In a hydraulic beater, opposed nozzles having a supply line, a high pressure pump supplying stuff to said supply line, an injector in said supply line, a target structure interposable at will between said nozzles, and means to operate
10 said target structure.

15 9. In a hydraulic beater, opposed nozzles having a supply line, a high pressure pump supplying stuff to said supply line, an injector in said supply line, a target structure interposable at will between said nozzles, means to operate said

target structure including a control operable from a remote point, and means to indicate at such point the position of the target structure.

10. In a hydraulic beater, a casing, a pair of
5 opposed nozzles entering the casing on opposite sides thereof, a movable structure within the casing including target surfaces for engagement
10 by streams from the nozzles, and means operable from the exterior of the casing for moving said structure to displace the target surfaces from
15 alignment with the nozzles and thereby permit the streams of the nozzles to directly engage one another.

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