

C. A. DUNCAN.

JIG.

APPLICATION FILED MAR. 20, 1911.

Patented June 20, 1911.

3 SHEETS-SHEET 1.

995,848.

Fig. 1 -

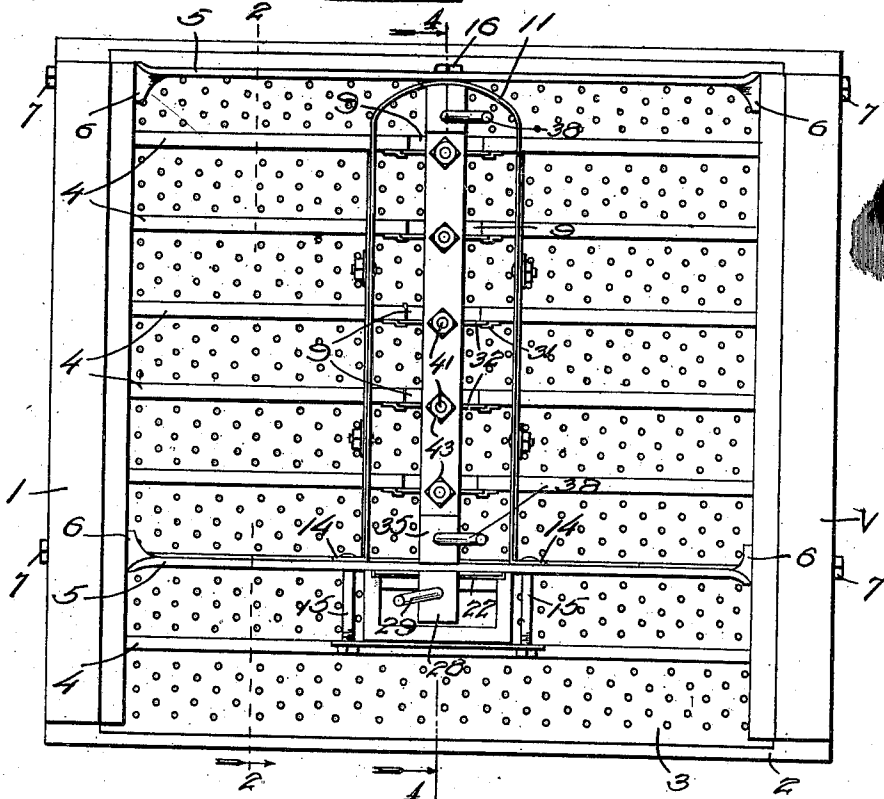


Fig. 7 -

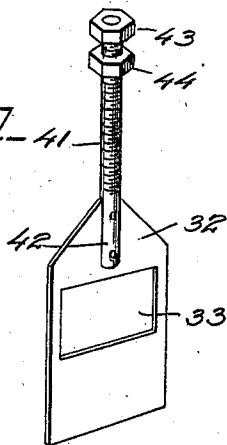
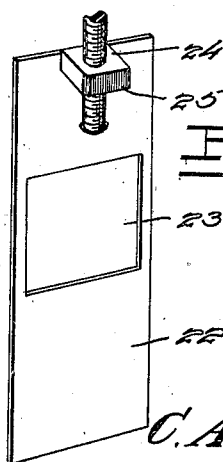


Fig. 6 -



Witnesses

M. Lowell Lowry.

Inventor

C. A. Duncan

By *Harry Ellis Chandler*
Attorney

C. A. DUNCAN.

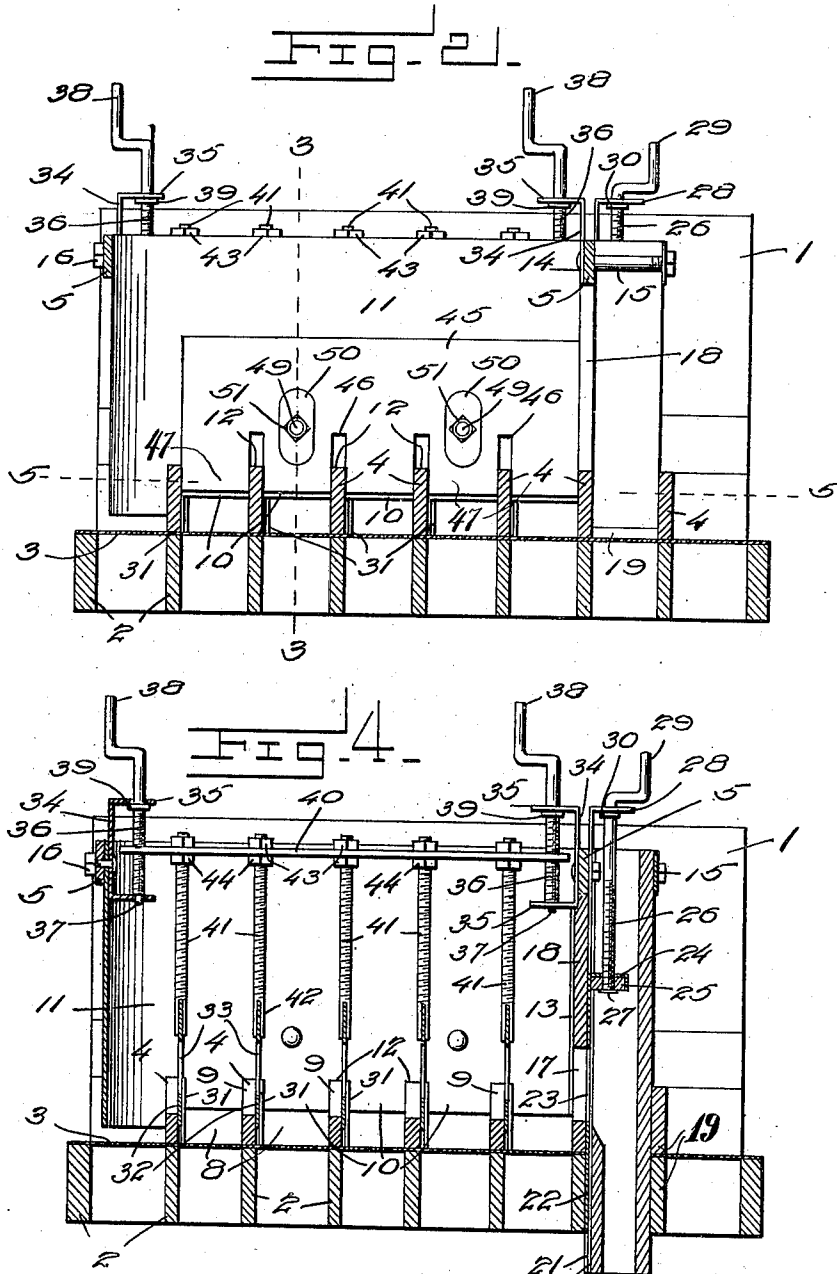
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3 SHEETS-SHEET 2.

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Inventor
C. A. Duncan,

Witnesses
P. H. Cunningham
M. L. L. L.

By Harry E. Chandler
Attorney

C. A. DUNCAN.

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3 SHEETS-SHEET 3.

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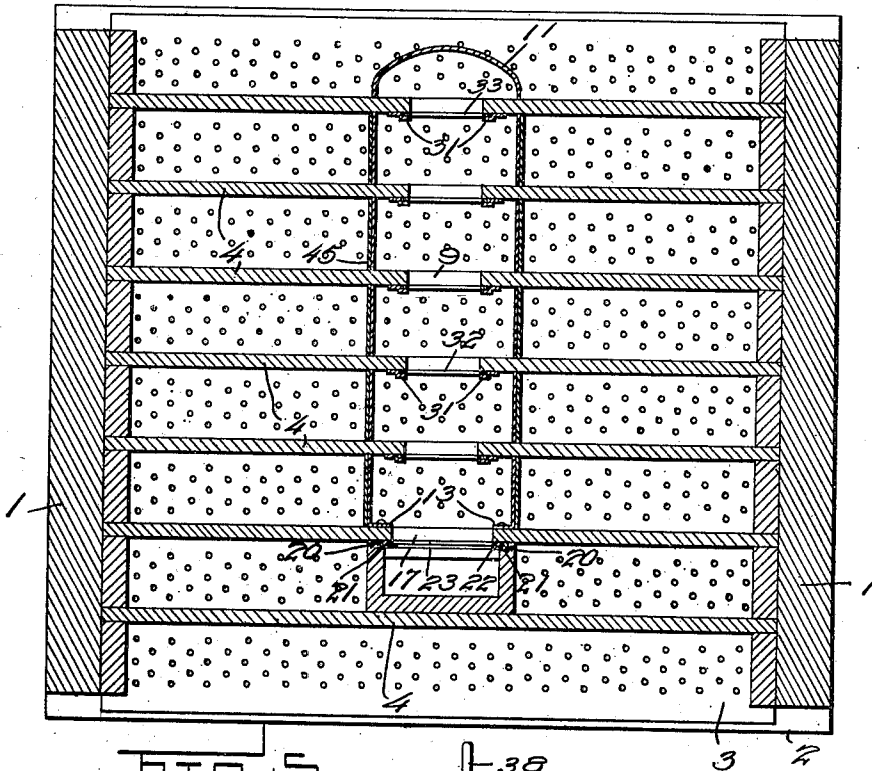


FIG. 5.

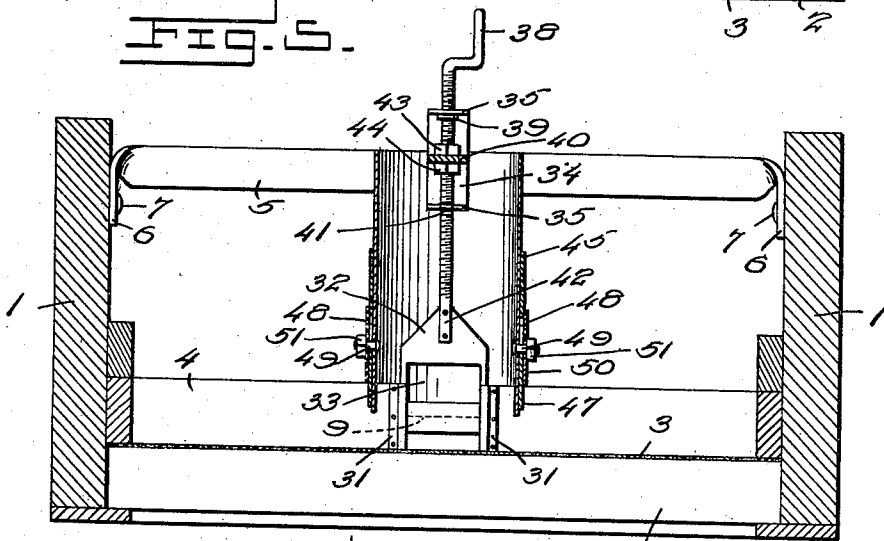


FIG. 6.

Inventor
C. A. Duncan

Witnesses
E. R. Cunningham
M. Louis Lorr

By Harry Elschlagler
Attorney

UNITED STATES PATENT OFFICE.

CHARLES A. DUNCAN, OF MULLAN, IDAHO.

JIG.

995,848.

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Application filed March 20, 1911. Serial No. 615,518.

To all whom it may concern:

Be it known that I, CHARLES A. DUNCAN, a citizen of the United States, residing at Mullan, in the county of Shoshone and State of Idaho, have invented certain new and useful Improvements in Jigs, of which the following is a specification.

My invention relates to improvements in jigs and has particular reference to an improved automatic draw cup which may be readily applied to Hancock jigs or other jigs of similar character and construction.

The leading object of my invention is the provision of an improved form of draw cup for use upon jigs employing the principles of specific gravity for separating the valuable ore from the chats and waste material, which draw cup will permit of the entrance therinto and the passage therethrough of the ore to the discharge chute of the compartment of the jig while excluding from the cup the chats and waste material.

A further object of my invention is the provision of a readily attachable draw cup of this character having readily adjustable parts whereby the controlling gates and the sides of the draw cup may be readily adjusted to adapt the cup for use with different grades of crushed ore to satisfactorily separate the free ore from the chats and further to permit of the adjustment of the jig for different thicknesses of layers of bedding material.

A further object of my invention is the provision of a draw cup for the purposes above set forth which will be provided with independently adjustable gate members for controlling the passage of the ore from the space included between one pair of cross bars of the jig to the space between the adjacent bars and for also providing means whereby the various gates may be simultaneously adjusted either an equal amount or a proportionately increasing amount.

Other objects and advantages of my improved draw cup attachment for ore jigs will be readily understood by reference to the following specification taken in connection with the hereunto annexed drawings forming a part thereof, and it will be understood that I may make any modifications in the specific structure shown and described within the scope of my claims without departing from or exceeding the spirit of the invention.

Figure 1 represents a top plan view of one

of the submerged compartments of an ordinary ore jig. Fig. 2 represents a sectional view of the compartment on the line 2—2 of Fig. 1, my attachment being shown in elevation. Fig. 3 represents a cross sectional view of my improved attachment on the line 3—3 of Fig. 2. Fig. 4 represents a longitudinal sectional view on the line 4—4 of Fig. 1. Fig. 5 represents a transverse sectional view taken on the line 5—5 of Fig. 2, and Figs. 6 and 7 represent perspective views of the gate for the discharge spout.

My improved draw cup attachment for ore jigs is particularly adapted for use in separating the free ore from the chats and waste material in connection with jigs of the type illustrated by the Hancock jig, said jig being provided with a plurality of reciprocating or vibrating sections moving under water. In jigs of this type the ore such as copper or lead to be separated will sink down to the bottom of the tray or section on account of its specific gravity being greater than that of the water and gangue or tailings, the vibration of the section and the movement of the water therein causing the free ore to sink to the bottom of the section the specific gravity of the copper if pure being 8.788 and the specific gravity of lead being 11.33, while the average specific gravity of the quartz or other rock being about 2.6.

In the drawings, the numeral 1 designates the side boards of one of the sections of a Hancock jig, while the numeral 2 designates the connecting base bars thereof, a perforate plate 3 resting on and being secured to said bars 2 to provide a fine screen bottom for the section through which the finer particles of the mineral may pass. Secured at their ends to the side boards 1 of the section are the vertically upstanding dividing slats 4 extending at right angles to the general course or direction of movement of the section. Disposed within the upper edge of the side boards 1 are the brace plates 5 having their ends twisted and bent downward to provide the portions 6 which are secured to the boards by the fastenings 7.

To afford communication between the spaces 8 included between adjacent slats 4, I form centrally in each of said slats the slot or recess 9, while fitting down over said slats and extending between the slats on each side of said recesses 9 are the depending tongues 10 of my improved draw cup member 11, said member being bent into U-

shape and having the slots 12 formed therein into which the upper portions of the slats fit, the base of the U being longer than the tongues 10 to cause said portions to fit down nearer the perforated bottom plate 3 of the section. Said draw cup is formed at the ends of its parallel arms with the inwardly bent flanges 13, the upper ends of said flanges however being cut and bent outward to provide the ears 14 which are secured to one of the brace plates 5 by the fastenings 15 to retain the cup in position, the other end of the cup or base portion of the U being secured to the other brace plate 5 by the fastening 16.

The position of the lower edges of the draw cup is such that they will extend substantially to the top of the ore bed resting on the plate 3, whereby the ore will gradually become engaged between the parallel arms of the cup and will pass rearwardly through the recesses in the slats while to receive the said ore and convey the same either to a receptacle or to a lower similar section where it may be again treated to the separating process, I form the slat against which the inturned flanges 13 rest with the enlarged squared aperture 17 of greater size than the recesses 9 of the other slats, and I also form on said slat the upstanding portion 18 which forms an end closure for the draw cup. Formed in the plate 3 adjacent said slat is a recess in which fits the rectangular lower end of the discharge chute, said chute being formed with the batten strips 19 making a tight joint between the plate 3 and the chute, while the inner edges of the sides 20 of the chute have the rectangular longitudinally extending recesses formed therein in which are sunk and secured the angle plates 21 to provide guides for the gate 22 which fits tightly against said guides and against the upstanding portion 18 of the slat to make a tight joint and prevent passage of material between the gate and the slat. Said gate is formed with the central aperture 23 corresponding in size to the aperture 17, while the front face of the upper end of the chute is open to permit material to pass through the apertures 17 and 23 into the chute. The gate is formed at its upper end with the flange 24 which is bent to lie within the chute and fits around or has formed integral therewith the block 25 having an internally threaded socket in which is engaged the threaded shank of the rod 26 having a flared lower end 27 to prevent its withdrawal from the socket of the block. Said rod extends upward through the inwardly projecting bracket 28 secured to one of the brace plates 5 and has its upper end formed into a crank 29 which fits down against the bracket to limit the downward movement of the rod while the clamp collar 30 secured on the rod bears against the

under face of the bracket. The rod is thus rotatably supported by the bracket but prevented from vertical movement and the turning of the rod consequently serves to vertically shift the gate to move its aperture 23 out of alinement with the aperture 17 of the slat to vary the size of the passage and to make said passage extend from a higher or lower point according to the depth of ore bed to be maintained in the section of the jig.

To either independently or simultaneously adjust the height of the bottom of the passage provided by the apertures or recesses 9 of the slats 4 from the bottom of the jig section, I secure to the face of each slat on the side toward the chute at each side of the recess 9 the guide plates 31 of either Z-shaped plate or held spaced from the face of the slat by the interposed filler plate, while guided by said plates 31 are the controlling gates 32 having the apertures 33 formed therein corresponding in size to the recesses 9. Secured to each of the plates 5 and located within my draw cup are the brackets 34 having the parallel spaced arms 35, while depending through said parallel arms 35 are the threaded shanks 36 of the adjusting rods, said rods having reduced lower ends 37 depending through the lower arms of the brackets and having their upper projecting ends formed with the cranks 38 to facilitate the rotation of the said rod the bearing of the shoulders at the lower ends of the rod against the upper face of the lower bracket arms 35 limiting the downward movement of the rods while the clamp collars 39 secured on the rods bear against the under face of the upper arms 35 and limit the upward movement of the rods.

Engaged on the threaded shanks 26 and having internally threaded apertures in which said shanks fit is the supporting plate 40, the rotation of the rods serving through their threaded engagement with the plate to raise or lower the said plate, the apertures in the arms 35 of the brackets being sufficiently large to allow of play of the rods in said apertures whereby one end of the plate may be raised while the other remains stationary without causing the plate to bind against the rods. Depending from the said plate 40 are a plurality of rods 41 having their upper portions threaded and having lower bifurcated ends 42, the upper ends of the gates 32 fitting and being secured between the furcations of the lower ends of the rods. Engaged on the said threaded upper ends of the rods 41 are the adjusting nuts 43 bearing against the upper face of the plate 40, the turning of said nuts serving to raise or lower the rod and thus the particular gate secured thereto, while engaged on the lower portion of each rod below the plate is a nut 44 adapted to bear

against the under face of the plate, the adjustment of said nut serving to regulate and limit the upward movement of the rod and thus of the gate depending therefrom.

By reference to the drawings, and particularly to Fig. 4 thereof, the construction and operation of the gates for the apertures of the various slats and the method of adjustment of said gates will be thoroughly understood, and it will be seen that the turning of the upper nut 43 serves to vertically adjust the rod and thus its gate, while the turning of the cranks 38 of the adjusting rods serves through the threaded engagement of said rods with the plates 40 to vertically adjust the said plate and thus to simultaneously change the position of the entire set of slat gates.

To enable me to adjust the position of the lower edge of my draw cup with respect to the bottom of the section according to the fineness of the ore to be separated or the depth of the bedding of ore, I secure to the lower portions of the sides of the draw cup the plates 45 having the slots 46 formed therein corresponding to the slots 12 and providing the depending tongues 47 adapted to fit between the slats 4 and lie over the tongues 10 of the draw cup. Said slots 46 are longer than the slots 12, however, to permit the tongues 47 to fit down nearer the bottom of the compartment of the separator than the tongues 10, and formed in the upper portions of the plates 45 are the slots 48 through which the securing bolts 49 carried by the sides of the draw cup project. These slots 49 permit of the sliding of the plates 45 relative to the draw cup while washers 50 and nuts 51 are mounted on the outer ends of the bolts, the tightening of the nuts 51 serving to clamp the washers 50 against the plate 45, the plate being thus held against the side of the draw cup and secured in desired vertically adjusted position.

From the foregoing description taken in connection with the accompanying drawings, the construction of my improved automatically operating draw cup attachment for ore separating jigs will be readily understood, and it will be seen that I have provided an improved attachment of this character which can be quickly and easily applied to jigs of the Hancock type, that is jigs having slats projecting upward from the bottom of their sections, which attachment will serve to collect the free ore and convey the same to the discharge chute of the compartment and which attachment may be adjusted to control the passage of the ore under the edge thereof and which will be provided with independently adjustable gates for controlling the flow or movement of the ore over the various slats to the discharge chute and will also be provided with

independent means for simultaneously adjusting the various slat controlling gates in unison. It will also be apparent that while I have described my improved draw cup for jigs as applied to a jig section of the Hancock type that it can likewise be applied to jigs such as the Hartz jig which have flat beds or bottoms for their sections when used with such jigs however, it being necessary to mount on said beds the dividing slats 4.

A further advantage of the use of my improved automatic draw cup upon Hancock jigs is that it enables me to work both very fine ore and satisfactorily separate the same from the chats and waste rock and also enables me without changing the screen plate to work the coarser ore which cannot be satisfactorily separated by an ordinary Hancock jig unequipped with my automatic draw cup. This result is obtained by employing a screen plate having fine apertures to permit of the passage therethrough of only the very fine particles of the ore, while those particles of the ore which are of too large a size to pass through the apertures will remain on top of the screen and will fit closely together to form a satisfactory bed of sufficient compactness to prevent the chats or loose rock from passing through the bed and screen. This bed will be maintained and supplied from the material which is being separated by the jig, thus doing away with the necessity for supplying additional ore coarser than that to be separated to the compartment, the upward projection of the slats and the regulation by the gates of the height from the bottom of the section of the passages through which the ore moves serving to control the thickness of this bed within the section and keeping a constant thickness of bed in the section irrespective of the percentage of free ore supplied in the material to be separated.

It is apparent from the foregoing description that the ore particles of small enough size to pass through the apertures in the screen plate will be separated by the screen, while the larger and coarser free metal will gradually work under the automatic draw cup and will pass through this cup to the discharge chute and thus be separated from the chats without necessitating the use of a coarser screen, the disadvantage of the use of a coarser screen for this purpose being that the chunks of the bedding material used upon a coarse screen are so large that the interstices between the various lumps forming the bedding are of such size that particles of chats and rock will also pass through the screen, the specific gravity of the said rock not being sufficiently small to prevent the same from sinking downward through the screen when not prevented by the bedding.

I claim:

1. The combination with an ore jig separating section, of a plurality of transversely extending slats projecting upward from the bottom of said section, each of said slats having a recess formed in the upper portion, thereof, a U-shaped draw cup member having slots formed in its lower edge into which the slats project, said member fitting down over the slats almost to the bottom of the section, a chute depending from the under side of the bottom of the section and having its upper end making a tight joint with the ends of the draw cup member, said draw cup inclosing the recesses of the slats, gates having apertures formed therein and normally disposed in alinement with the recesses of the slats, and means for independently or simultaneously adjusting said gates to regulate flow through the recesses of the slats.

2. The combination with a jig section having slats upstanding from its bottom, of a draw cup inclosing the central portion of the slats and having tongues fitting between the slats and extending almost to the bottom of the section, said slats having recesses formed in the upper edge of the portions thereof inclosed by the draw cup, gates for controlling said recesses, and means for independently adjusting the various gates.

3. The combination with a jig section having slats upstanding from its bottom, of a draw cup inclosing the central portion of the slats and having tongues fitting between the slats and extending almost to the bottom of the section, said slats having recesses formed in the upper edges of the portions thereof inclosed by the draw cup, gates slidably secured to the slats, said gates being formed with apertures normally in alinement with the recesses in the slats, and means for independently shifting said gates to move their apertures partially or entirely out of alinement with the recesses.

4. The combination with a jig section having slats upstanding from its bottom, of a draw cup inclosing the central portion of the slats and having tongues fitting between the slats and extending almost to the bottom of the section, said slats having recesses formed in the upper edges of the portions thereof inclosed by the draw cup, gates slidably secured to the slats, said gates being formed with apertures normally in alinement with the recesses in the slats and means for simultaneously shifting said gates in unison to move their apertures partially or entirely out of alinement with the recesses.

5. The combination with a jig section having slats upstanding from its bottom, of a draw cup inclosing the central portion of the slats and having tongues fitting between the slats and extending almost to the bottom of the section, said slats having recesses formed in the upper edges of the portions thereof inclosed by the draw cup, gates slidably secured to the slats, said gates being formed with apertures normally in alinement with the recesses in the slots, and means for independently and for simultaneously adjusting the various gates to move their apertures partially or entirely out of alinement with the recesses of the slats.

6. The combination with a jig section having slats upstanding from its bottom, of a U-shaped draw cup fitting over said slats and having depending tongues fitting between adjacent slats and projecting toward the bottom of the section, plates slidably adjustable vertically secured to the sides of the draw cup, said plates having depending tongues fitting over the tongues of the draw cup, the tongues of the plates being of greater length than the tongues of the draw cup and extending nearer the bottom of the section when depressed than the draw cup tongues, the inclosed portions of the slats having recesses formed therein, and means for controlling the height of the lower portion of the recesses from the bottom of the section.

7. The combination with a jig section having slats upstanding from the bottom thereof, of a U-shaped draw cup fitting over the central portion of said slats and formed with depending tongues fitting between the slats, the inclosed portions of said slats having alined recesses formed therein to provide communicating passages between the spaces provided by the slats, means for regulating the distance between the bottom of the draw cup and the bottom of the section, and means for increasing the distance from the bottom of the section to the lower edge of the passage affording communication between the slats to regulate the entrance of material under the bottom of the draw cup and the passage of said material through the passages.

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

CHARLES A. DUNCAN.

Witnesses:

M. LOUISE LOWE,
B. JOHANSEN.