To all whom it may concern:

Be it known that I, DANIEL E. BURNER, a citizen of the United States, residing at Homer, in the state of Ohio, have invented certain new and useful Improvements in Gyrating Sieves or Bolting-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention is an improvement in gyrating sieves or bolting-machines; and its objects are to prevent one end or side of the sieve-box moving farther or faster than another part thereof or, in other words, to prevent unequal or irregular movements of the sieve-box or of parts thereof; to allow the sieve-box perfect freedom of orbital movement by and with the driving-crank, restraining its movement only by the crank, and to insure that every part of the sieve-box shall describe or move in the same circle, be held exactly in position, and have an equal and exact motion.

To these ends the invention consists in the novel means of supporting or suspending the sieve boxes or bodies of bolters, gyralers, and other sifting-machines (such as are commonly used in flouring-mills and sifting processes generally) adjacent to a single driving-crank preferably arranged horizontally below and centrally of the sieve-box, the said means embodying four vertically jointed members, which are so connected together as to perform the functions of a universal support or suspension for the sieve-box, but which are compelled by their novel arrangement and connection to move uniformly and exactly alike, so that if one of such members be shifted in any direction all the others are compelled to correspondingly and simultaneously shift, with the result that all parts of the sieve-box are kept precisely in line and all parts thereof moved synchronously, if at all.

In my invention the motion of the sieve-box is perfectly regular throughout its entire orbital movement, which corresponds with that described by the crank or driving pin, so that any natural pitch or fall allowed to the sieves in the original adjustment of the sieve-box is fully utilized and constantly maintained and the stock will and must travel in the desired direction during the operation of the machine.

The invention will be clearly understood from the following description in connection with the accompanying drawings, and I refer to the claims for concise summaries of the features upon which protection is desired.

In said drawings, Figure 1 represents a side elevation of a gyratory sieve or bolting-machine embodying my invention. In this case the sieve-box is shown suspended. Fig. 2 is a similar view showing the sieve-box supported. Fig. 3 is a view of the jointed members constituting the principal portion of the invention detached from the sieve-box. In this view a different or modified form of hinge-joint for the members is shown. Figs. 4 and 5 are enlarged side and sectional views of such modified form of joint. Figs. 6 and 7 are face and edge views of the preferred form of joint or coupling device employed in the invention. Fig. 8 is a section through such joint on line 8-8, Fig. 7.

The present invention is equally well adapted for holding the sieve-box in position either by suspending it from the ceiling or overhead supports or for supporting it from the floor, the operation and construction of the jointed members being unchanged in either situation and their use in either manner being merely a matter of choice or selection by the erector or mill-owner.

The apparatus embodying the invention (see Figs. 1, 2, and 3) comprises, briefly, two transverse parallel members A A, four vertical parallel members B B, and two longitudinal parallel members C C, which are connected together by swinging or hinge joints, as hereinafter described. All the members are preferably made of tubing for purposes of lightness and strength, but may be solid and of any desired cross-section.

The members A A are arranged underneath and transversely of the sieve box or body S, which may be of any desired kind, said members A being journaled in boxes r, attached to the sieve-body, as shown, so as to permit the said members to rock. To each end of each transverse member A is attached one
end of a vertical member B by means of a joint so constructed as to permit the members B to swing longitudinally of members A or transversely of the sleeve-box S. The other ends of the vertical members B are connected by similar joints to the ends of the parallel horizontal members C. The members B at the same end of the machine are connected to members A, while adjoining members B at the same side of the machine are connected to members C. The joints connecting members B and C are, however, set at right angles to the joints connecting members A and B, so that members B can swing longitudinally of members C, and thereby longitudinally of sleeve-box S. The members C are kept in parallelism, being journaled at their ends in boxes c, which may either be suspended from adjustable hangers c', attached to the ceiling, as indicated in Fig. 1, or may be attached directly to the base or support beneath the sleeve-box, as indicated in Figs. 2 and 3. In the latter case it is convenient to attach the boxes c to horizontally-disposed side beams c', between which may be secured the pedestal H, in which is journaled a stub-shaft carrying the crank or fly wheel I and belt-pulley j, (shown in Figs. 1 and 3,) said wheel I having a crank-pin i' engaging a yoke or boxing S', attached to the under side of the sleeve-box, so that the location of the crank-wheel imparts a gyratory motion to the sleeve-box in the well-known manner.

It will be noted first that by reason of the peculiar joints between the vertical members B and the opposite members A and C the sleeve-box can move in any direction or gyrate; but the members A B C are so connected that one member B cannot swing in any direction without imparting or causing an exactly similar simultaneous movement of every other member B, because the connecting members A and C and the sleeve-box itself transmit the motion of one member B synchronously to every other member. The members A being journaled in bearings rigidly attached to the sleeve-box, the latter forms a bond between the members A A and holds them accurately and positively in alignment. If one member A is moved, the other is necessarily correspondingly moved by its connection with the sleeve-box. If one member C is rocked, the other is necessarily similarly rocked by reason of the connecting members B A. This peculiar connection between the members, whereby the four vertical members B B are caused to positively move synchronously, insures the most perfect operation of the machine and is not unlike different from the ordinary arrangement heretofore employed, where four independent vertical suspending or supporting members have been used, the only connection therebetween being the sleeve-box itself, such independence of the members permitting irregular motions of the sleeve-box, which materially impair the effectiveness of the old machines, whereas owing to the positive compelling connections between the four vertical members in my machine such irregular movements are entirely prevented.

The joints between the members A B and B C are preferably of the kind indicated in Figs. 1 and 2 and shown clearly in Figs. 6, 7, and 8. Each of said joints consists of a socket-piece D, having bifurcations 75 d, transfixed by a hinge-bolt E', on which is hung a casting E, having a socket e and lug e' at right angles to socket e, lug e' being transfixed by bolt E', which thus secures parts D E together, with sockets D e at right 80 angles to each other and capable of swinging only in one plane toward or from the other. As shown in Figs. 1 and 2, the parts D are rigidly fastened to the extremities of the vertical members B, preferably by tapered pins 85 or through-bolts, (indicated at d') while parts E are similarly rigidly attached to the extremities of the transverse and longitudinal members A and C, as shown. It will be noted that parts D are attached to members A, so as to stand at right angles to each other, (see Figs. 1 and 2,) so that the hinge-joints at opposite ends of said members B will only operate at right angles to each other.

In some instances the form of joint shown in Figs. 3, 4, and 5 may be preferred. These joints are composed of two disks F f, fitted closely together and secured by a through-center-bolt F'. Disk F is provided with a socket F" at right angles to bolt F', and disk 100 f is provided with a socket f" perpendicular to bolt F' and at right angles to socket F". As shown in Fig. 3, the disks f are rigidly secured to opposite ends of the vertical members B, while disks F are rigidly secured to the members A and C. The disks f on opposite ends of members B are, however, set at right angles to each other, so that the proper relation of the series of hinge-joints is maintained.

It will be observed that the principle or function of my apparatus is exactly the same whether it is employed to suspend or support the sleeve-box or whether disk or fork joints or other suitable controlling-joints are employed to connect the members. Its operation may be briefly described as follows: Should one supporting or hanging member B move in any direction, by reason of the controlling connections every other member B is caused to move exactly and synchronously therewith, and the sleeve-box, although given a like movement, is prevented from twisting or turning on its own center or axis. The hinge-joints transmit motion from one member to another, so that all members move in conformity to the motion of the driving pin or crank, and at the same time the vertical members are kept from any independent play or motion, and every part of the sleeve-box moves in exact unison with the central part or drive and relieves said box of all tendency to become irregular or wild in its motion or for one end thereof to have less motion than
the other. The apparatus is light-running and the entire weight of box is carried thereby, relieving the driving-shaft of all weight except that of fly and crank wheel. The free
5 dom of motion of the sieve-box is unrestricted except by the crank, and the friction is re-
duced to a minimum, resulting in saving of power. All parts are readily accessible and
the operation of the machine noiseless, and
a perfect gyratory motion is imparted to the
sieve-box.

The apparatus is applicable to all kinds and sizes of sieve-boxes, no framework is re-
quired, and the height of the sieve-box can be readily regulated by properly proportioning
the length of the vertical members.

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

1. In combination, a sieve-box, four vertical
members each connected at one end to the sieve-box so as to swing only transversely and longitudinally thereof, and two longitudinal members mounted in fixed bearings ad-
35 jacent to the sieve-box and parallel therewith,
the free ends of the vertical members being attached to the adjoining ends of said
longitudinal members by connections which permit the vertical members to swing longi-
25 tudinally of said longitudinal members and compel them to rock therewith, substantially
as described.

2. In combination, a sieve-box, transverse
members journaled thereon near opposite
ends thereof, four vertical members, hinges
connecting the adjoining ends of the trans-
verse and vertical members, and connections
between the other ends of the adjacent verti-
cal members at the same side of the box,
said connections compelling the vertical mem-
30 bers to swing synchronously and vertically
of said longitudinal members and compel them to rock therewith, substantially
as described.

3. In combination with a sieve-box; a pair
of parallel rocking members disposed longi-
45 tudinally of the sieve-box, and four vertical
members each connected at one end to the ad-
jacent end of one of the said rocking mem-
ers, so as to rock therewith and also swing longitudinally thereof, each vertical member
being also connected at its other end to the
adjacent portion of the sieve-box by swinging
and rocking joints; substantially as described.

4. In combination with a sieve-box; a pair
of transversely-disposed rocking members at-
55 tached to the box, a pair of longitudinally-
disposed rocking members adjacent to the
box; vertical members between the transverse and longitudinal members, and connections
between the ends of the vertical members and
60 the adjacent ends of the transverse and longi-
tudinal members respectively; said connec-
tions compelling the vertical members to rock
with the rocking members and also permit-
ting the vertical members to swing longitudi-
nally of the rocking members; substantially

5. In combination with a sieve-box; sus-

pending or supporting devices therefor com-
prising four vertical members, two trans-
versely-disposed rocking members, and two
70 longitudinally-disposed rocking members
and connections between the opposite ends
of the vertical members and the adjacent ends
of the transverse and longitudinal members
respectively, said connections being such that
75 the vertical members rock with the rocking
members and can also swing longitudinally
of the rocking members, the vertical members
being thereby caused to move synchronously
and uniformly, and irregular motions of the
80 sieve-box prevented; substantially as de-
scribed.

6. The combination with a sieve-box, of a
pair of transverse members attached to the
under side thereof and capable of a rocking
85 motion, a pair of longitudinally-disposed rock-
ing members mounted in fixed bearings ad-
30 jacent to and parallel with the sieve-box, and
four vertical members connected at their op-
posite ends to the adjoining ends of the trans-
verse and parallel members by hinge-joints;
the hinge-joints at opposite ends of the ver-
tical members being arranged at right angles
to each other, substantially as and for the
purposes described.

7. The combination of the sieve-box, par-
35 allel rocking members attached to the under
side and transversely thereof, longitudinally-
disposed parallel rocking members mounted
in fixed bearings adjacent to and parallel with
the sieve-box; and vertical members having
their opposite ends connected to adjoining
ends of the transverse and longitudinally-dis-
posed members by rocking or hinge joints,
the said joints at opposite ends of the vertical
105 members being arranged at angles to each
other, substantially as described.

8. The combination of the sieve-box, the
opposite parallel rocking members attached
transversely thereto, and vertical members
110 connected to opposite ends of each transverse
member by hinge-joints arranged to allow the
vertical members to swing transversely of the
sieve-box; with parallel rocking members dis-
posed longitudinally of and adjacent to the
sieve-box, the opposite ends of such longitu-
dinal members being connected to the ex-
115 tremities of the adjacent vertical members at
the same side of the sieve-box by hinge-joints,
disposed at right angles to the hinge-joints
120 connecting the vertical members to the trans-
verse rocking members, substantially as de-
scribed.

9. The combination of the sieve-box, the
transverse members journaled thereon near
to opposite ends thereof, the longitudinal mem-
125 bers journaled in bearings adjacent to the
sieve-box, the vertical members interposed
between the adjoining ends of the transverse
and longitudinal members, and hinge-joints
connecting opposite ends of said vertical
members with adjacent ends of the transverse
130 and longitudinal members respectively, said
joints being disposed at right angles to each
other, with a vertical standard adjacent to the sieve-box, a horizontally-disposed crank carried in said standard, and connections between said crank and sieve-box whereby motion is imparted to the sieve-box from the crank, substantially as described.

10. The combination of the sieve-box, a pair of transverse members journaled thereon near opposite ends thereof, a pair of longitudinally-disposed rocking members journaled in fixed bearings adjacent to the sieve-box, and vertical members interposed between the adjoining ends of said transverse and said longitudinal members; with rocking or hinge joints connecting opposite ends of said vertical members with the adjoining ends of the transverse and longitudinal members respectively, said hinge-joints being composed of two parts pivoted together, and each part having a socket for engagement of a member, the sockets on the two parts being arranged at right angles to each other, and the hinge-joints at opposite ends of the vertical members being also arranged at right angles, for the purpose and substantially as described.

11. In combination with a sieve-box; a pair of parallel members secured thereto and capable of a rocking movement, a pair of parallel rocking members at right angles to the former, parallel vertical rods connecting the adjacent ends of said members, and joints between said rods and members whereby the rods are compelled to rock with the members but are permitted to swing longitudinally of such members; for the purpose and substantially as described.

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

DANIEL E. BURNER.

Witnesses:
LULIE JONES,
FREDERICK C. PETERMAN.