Aug. 25, 1931. R. McC. JOHNSTONE 1,820,142

SLITTING DEVICE

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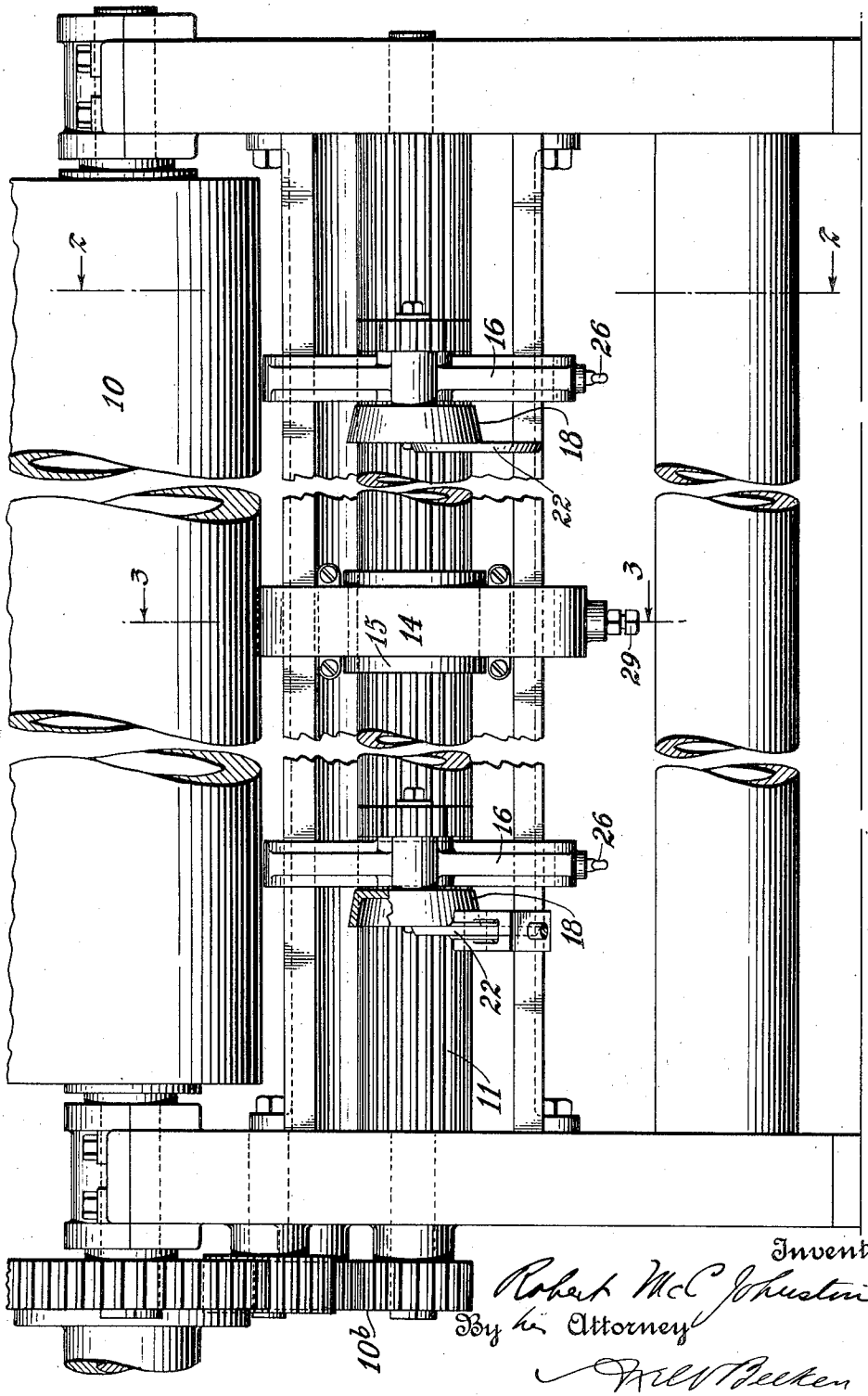


Fig. 1.

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Fig. 2.

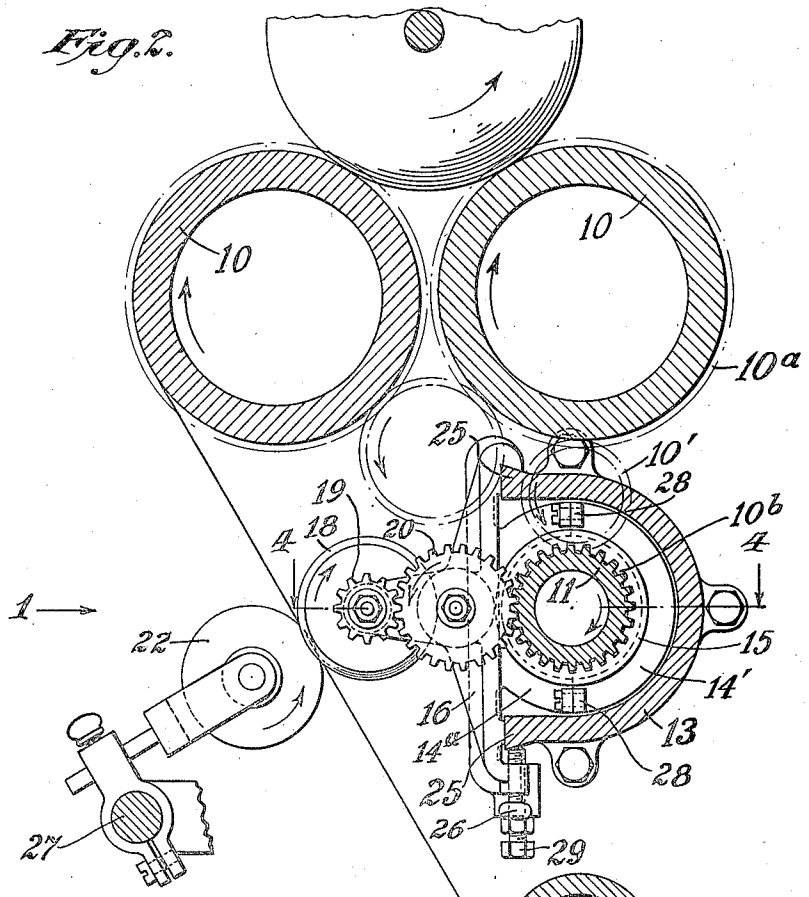


Fig. 3.

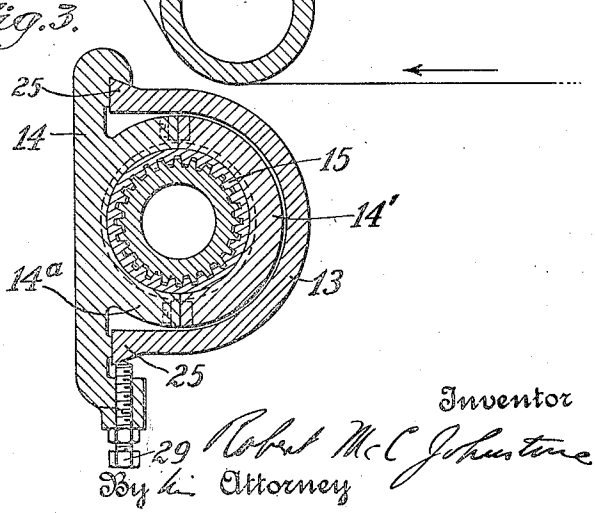
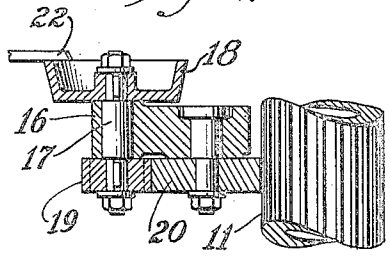


Fig. 4.



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Fig. 5.

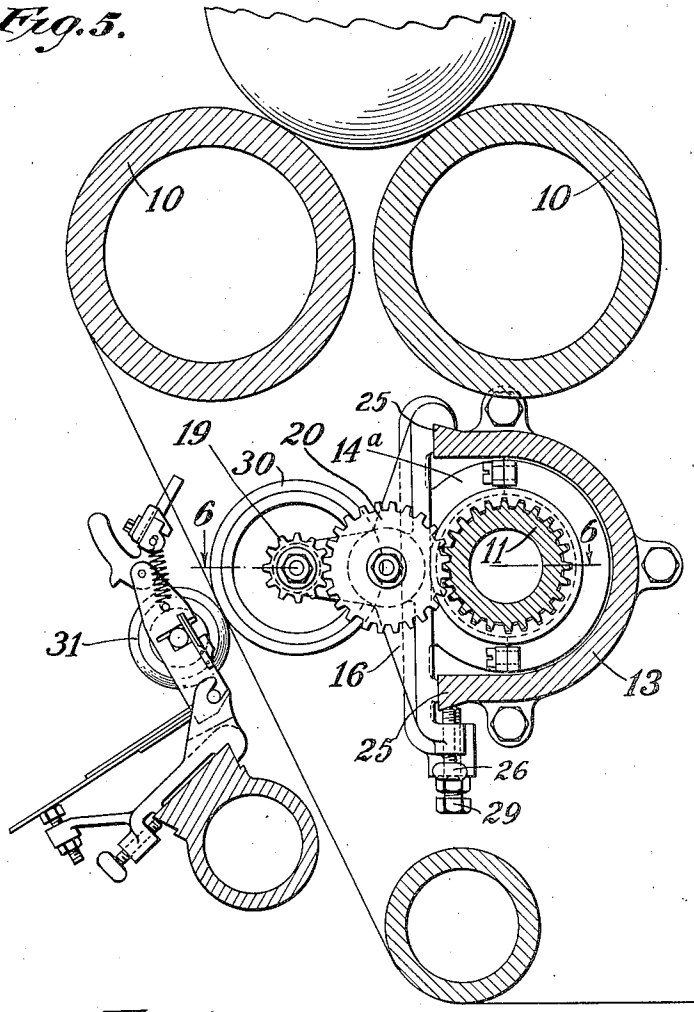
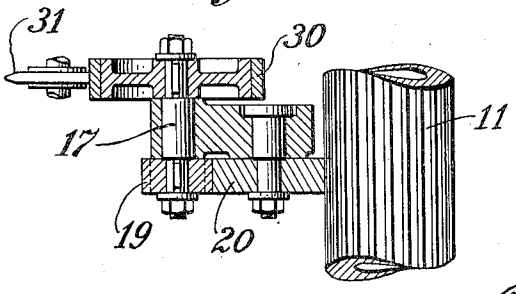


Fig. 6.



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Patented Aug. 25, 1931

1,820,142

UNITED STATES PATENT OFFICE

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SLITTING DEVICE

Application filed October 17, 1929. Serial No. 400,217.

In the art of slitting, as heretofore practiced, it has generally been customary to mount one of the slitting members on a rotatable shaft extending transversely of the machine. So long as the machine was not very wide and did not run at high speeds this arrangement was satisfactory. However, with the advent of machines running at high speeds and operating on very wide webs of flexible material, it has been found that long transverse shafts tend to flex somewhat and to impart vibrations to the slitting elements —a condition that affects the slitting operation adversely.

This invention has for its main object and feature the reduction of vibration of the slitting elements in relatively wide machines.

In the accompanying drawings, the invention is disclosed in several concrete and preferred forms in which:

Fig. 1 is a view looking in the direction of arrow 1 of Fig. 2, generally speaking in front elevation with parts broken away, in section and/or omitted, showing parts of a slitting machine embodying one form of the invention;

Fig. 2 is a cross-sectional view substantially on the plane of line 2—2 of Fig. 1;

Fig. 3 is a cross-sectional view substantially on the plane of line 3—3 of Fig. 1;

Fig. 4 is a detail sectional view substantially on the plane of line 4—4 of Fig. 2;

Fig. 5 is a cross-sectional view similar to Fig. 2 but showing a modified form of slitting means; and

Fig. 6 is a detail sectional view substantially on the plane of line 6—6 of Fig. 5.

The winding means, if any, may take many suitable forms, but as an exemplification there is shown here two winding drums 10 by means of which the slitted sections of web material are wound in a manner well understood. 11 indicates a rotatable driving member extending transversely of the machine and suitably supported adjacent its ends. This driving member is here in the form of a long gear that may receive motion in any suitable way as by means of an intermediate pinion 10′ meshing with a gear 10^a on one of the winding drums and with a pinion 10^b on the end of member 11. 13 is a non-rotating support of ample proportions, here substantially semi-circular in form, extending transversely of the machine adjacent to the driving member. 16 indicates a bracket mounted on the free ends, 25, of the support, said free ends constituting rails extending transversely of the machine. Bracket 16 carries a rotatable slitting element 18, here a shear cutter, on a spindle 17 and suitable transmission means are provided whereby the motion of driving member 11 is transmitted to the slitting element. In the form here shown, spindle 17 carries a gear 19 meshing with pinion 20, which latter engages driving gear 11. It will now be understood that bracket 16 can be adjusted transversely on the support, and that the slitting element will be driven from driving gear 11 in the different adjusted positions of the bracket. It is, of course, not necessary that pinion 20 remain in engagement with gear 11 during the adjustment, but it is convenient to treat bracket 16 and its appurtenances as a slitting unit with pinion 20 slidably related to gear 11 as the unit is adjusted along the face of said gear 11. For in this way the unit can not only be readily adjusted, but other units can be added or removed at will with a very slight amount of work. 26 is a set-screw to bind the bracket on the support when the desired adjustment has been effected. Cooperating with shear cutter 18 is a complementary slitting element 22 of well-known form, which element is freely rotatable and is transversely adjustable on rod 27.

14 indicates a steady-rest conveniently mounted on support 13 and adjustable transversely of the machine in a manner analogous to the adjustment of bracket 16. This steady-rest has a semi-circular extension 14^a with which is associated a cap 14′, the two together constituting a bearing, the parts of which are bolted together at 28, for a freely rotatable shoulder collar 15. This collar may have a smooth base that engages the face of gear 11, but preferably said collar is in the form of an internal gear surrounding gear 11 and capable of sliding thereon. It will now be evident that not only can the slitting

units be adjusted to and driven in any position, but also that the steady-rest can be adjusted to any position to assist in sustaining gear 11 at a point intermediate its length. 29 indicates a set screw to secure the steady-rest to the transverse support after the desired adjustment has been made.

From the foregoing it appears that the driving member can be sustained at different points to suit the slitting operation and that, by reason of the intermediate sustaining means, the vibration of said shaft is minimized; further that by mounting the slitting unit on a non-rotating support instead of on the driving member, said slitting unit will not have imparted to it to any appreciable extent any vibration that may occur in the driving member.

The slitting elements per se may vary widely. In Figs. 1, 2 and 4 are shown overlapping shears of the type known as Koegel slitters. In Figs. 5 and 6, the slitters are of the score-cut type, spindle 17 carrying a backing roller 30 with which engages a score-cutter 31. It may be noted that, when the score-cut type of slitter is used, the backing roller should preferably be driven at the surface speed of the web.

I claim:

1. In a slitting machine: a transversely extending rotatable driving member having a transversely extending uniterrupted driving surface, a transversely extending support adjacent thereto, a bracket transversely adjustable on the support, a rotatable slitting member on the bracket, and transmission means, also on the bracket, to engage different portions of the driving surface of the driving member in differently adjusted positions of the bracket and to transmit its motion to the slitting member.

2. In a slitting machine: a transversely extending rotatable driving gear, a transversely extending support adjacent thereto, a bracket transversely adjustable on the support, a rotatable slitting member on the bracket, and transmission means, also on the bracket, including a pinion to engage different portions of the surface of the driving gear in differently adjusted positions of the bracket and to transmit its motion to the slitting member.

3. In a slitting machine: a transversely extending rotatable driving member mounted adjacent its ends and having a transversely extending uninterupted driving surface, a transversely extending support adjacent thereto, a bracket transversely adjustable on the support, a rotatable slitting member on the bracket, transmission means, also on the bracket, to engage different portions of the driving surface of the driving member in differently adjusted positions of the bracket and to transmit its motion to the slitting member, and a transversely adjustable steady-rest to sustain the driving member intermediate its ends.

4. In a slitting machine: a transversely extending rotatable driving gear mounted adjacent its ends, a transversely extending support adjacent thereto, a bracket transversely adjustable on the support, a rotatable slitting member on the bracket, transmission means, also on the bracket, including a pinion to engage the driving gear in differently adjusted positions of the bracket and to transmit its motion to the slitting member, and a transversely adjustable steady-rest to sustain the driving gear intermediate its ends.

5. In a slitting machine: a transversely extending rotatable driving gear mounted adjacent its ends, a transversely extending support adjacent thereto, a bracket transversely adjustable on the support, a rotatable slitting member on the bracket, transmission means, also on the bracket, including a pinion to engage the driving gear in differently adjusted positions of the bracket and to transmit its motion to the slitting member, and a transversely adjustable steady-rest to engage, in its differently adjusted positions, the face of the driving gear, to thereby sustain said driving gear intermediate its ends.

6. In a slitting machine: a transversely extending rotatable driving gear mounted adjacent its ends, a transversely extending support adjacent thereto, a bracket transversely adjustable on the support, a rotatable slitting member on the bracket, transmission means, also on the bracket, including a pinion to engage the driving gear in differently adjusted positions of the bracket and to transmit its motion to the slitting member, and a transversely adjustable steady-rest including a freely revoluble internal gear to engage, in its differently adjusted positions, the face of the driving gear to thereby sustain said driving gear intermediate its ends.

Signed at the city of New York, in the borough of Brooklyn, county of Kings, and State of New York, this 9 day of October, 1929.

ROBERT McC. JOHNSTONE.