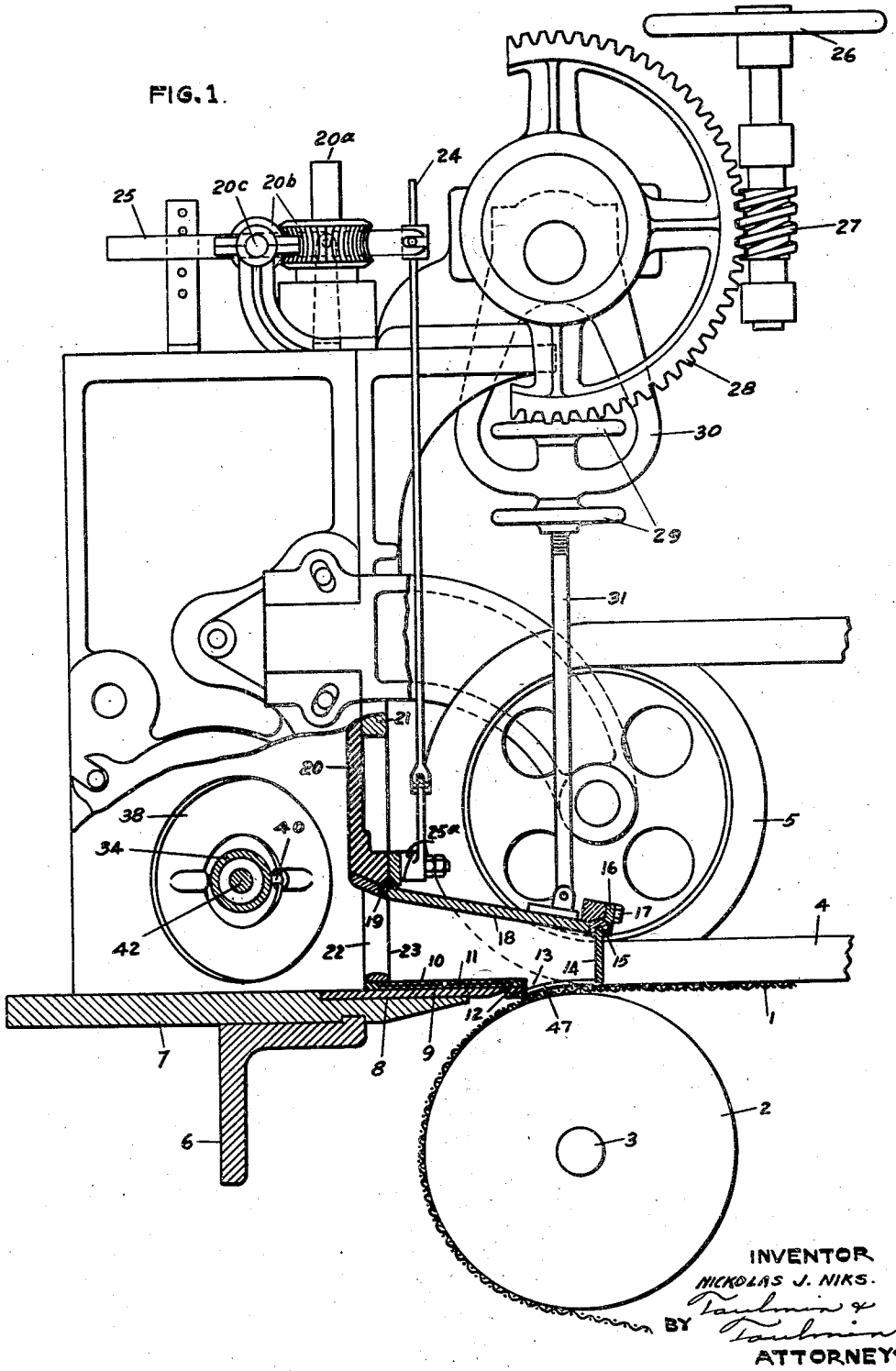
Aug. 11, 1931. N. J. NIKS 1,818,267

PAPER MACHINE

Filed July 24, 1929 5 Sheets-Sheet 1

FIG. 1.



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PAPER MACHINE

Filed July 24, 1929 5 Sheets-Sheet 2

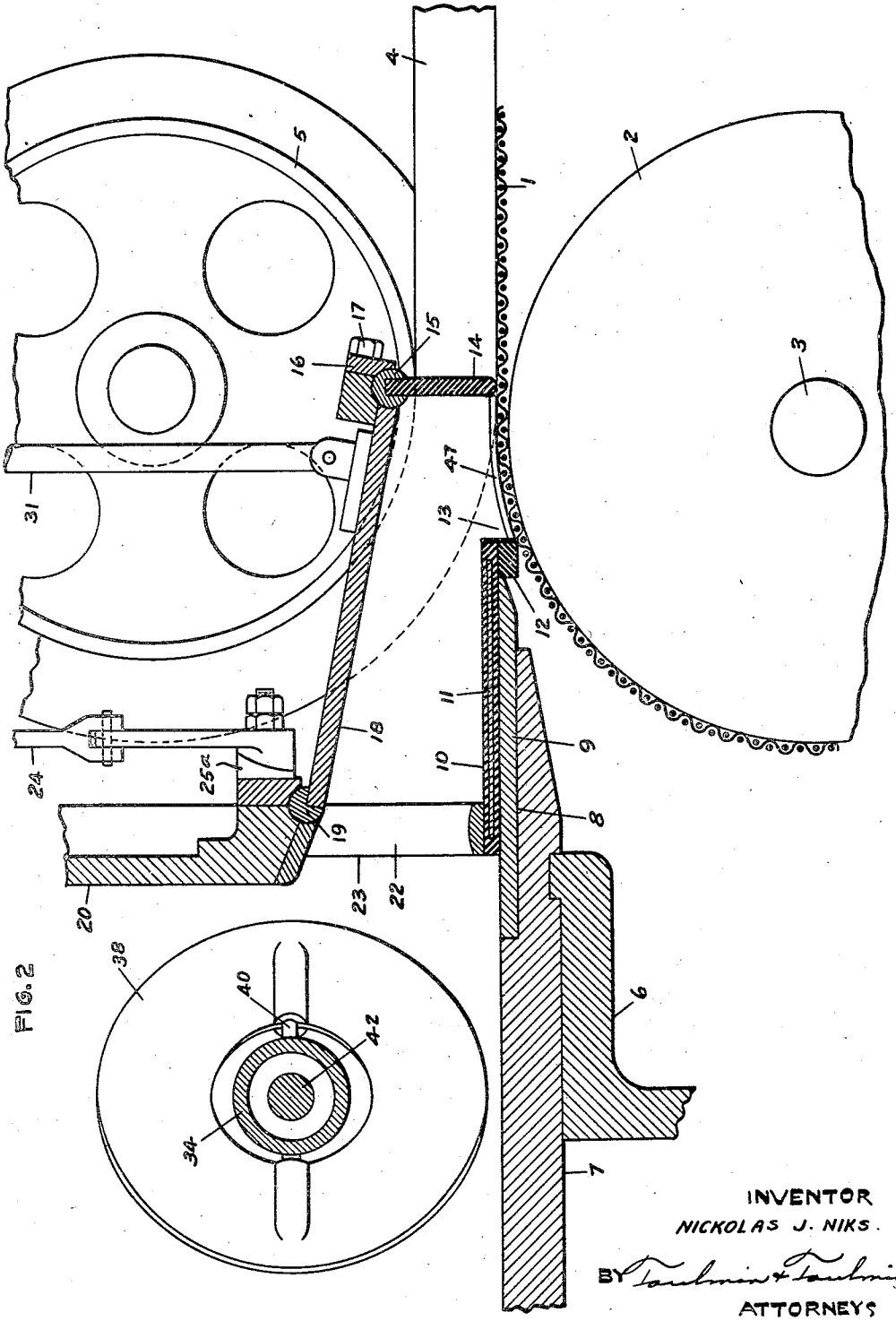


FIG. 2

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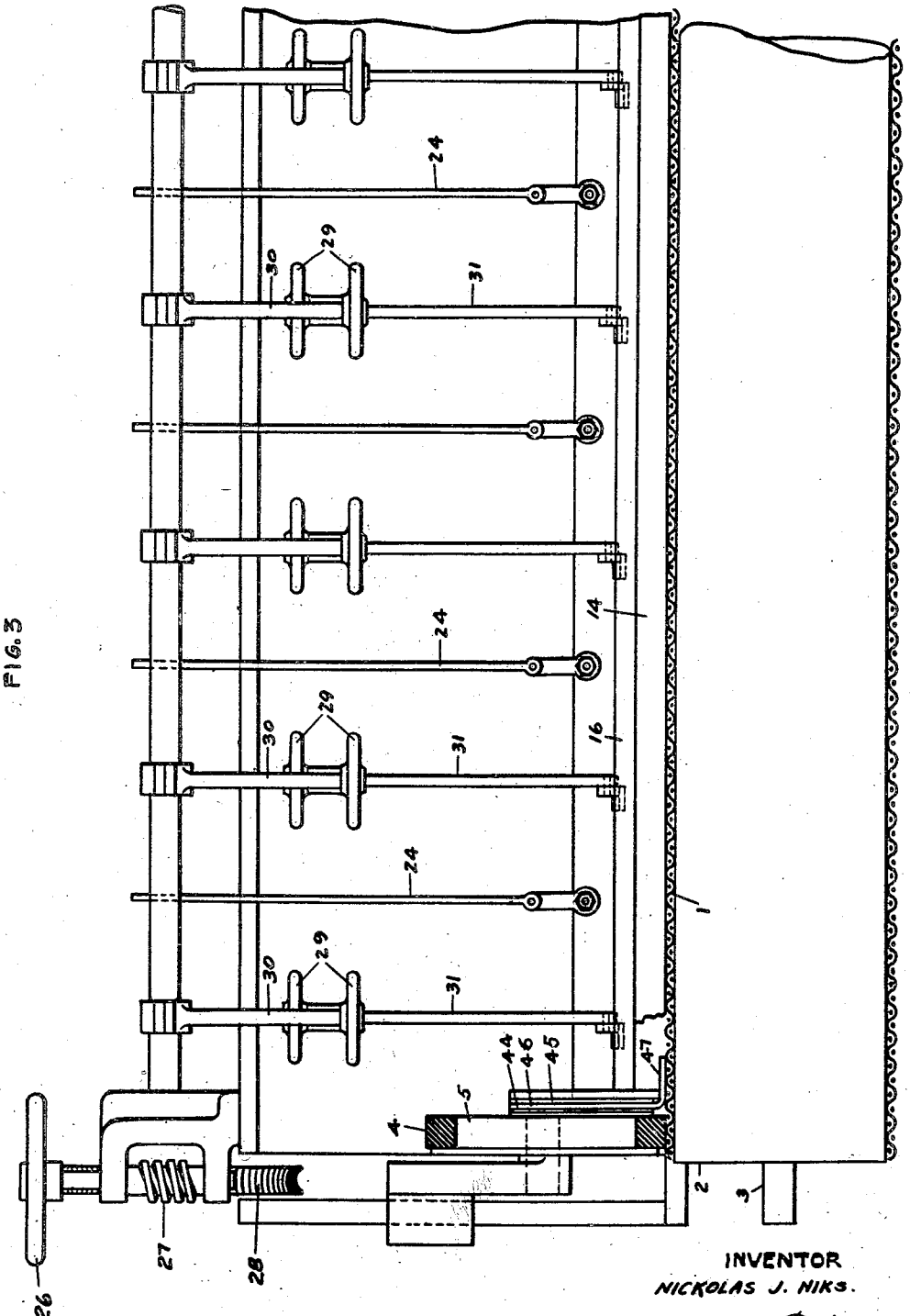


FIG. 3

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Aug. 11, 1931. N. J. NIKS 1,818,267

PAPER MACHINE

Filed July 24, 1929 5 Sheets-Sheet 4

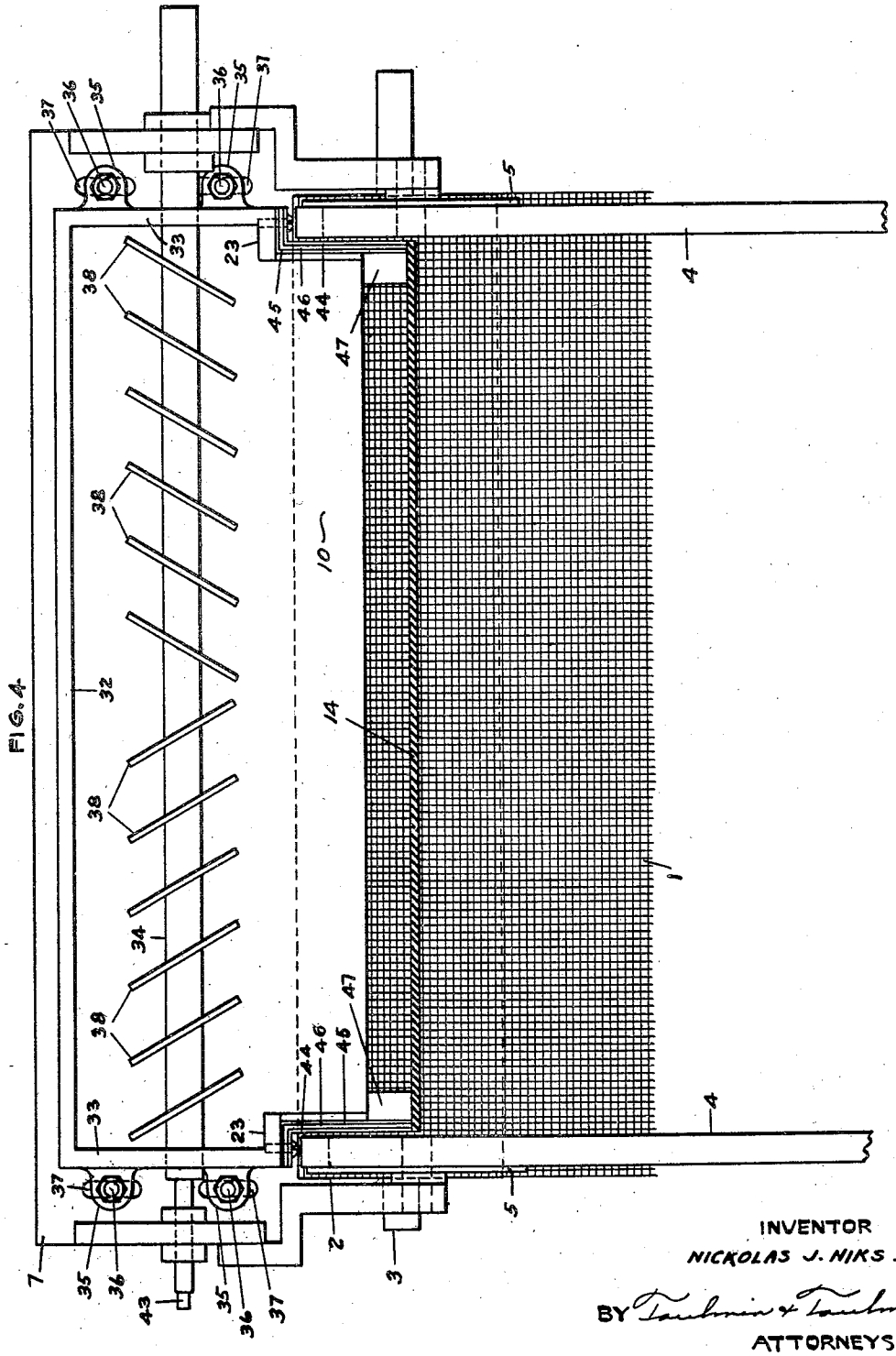


FIG. 4.

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Aug. 11, 1931. N. J. NIKS 1,818,267

PAPER MACHINE

Filed July 24, 1929 5 Sheets-Sheet 5

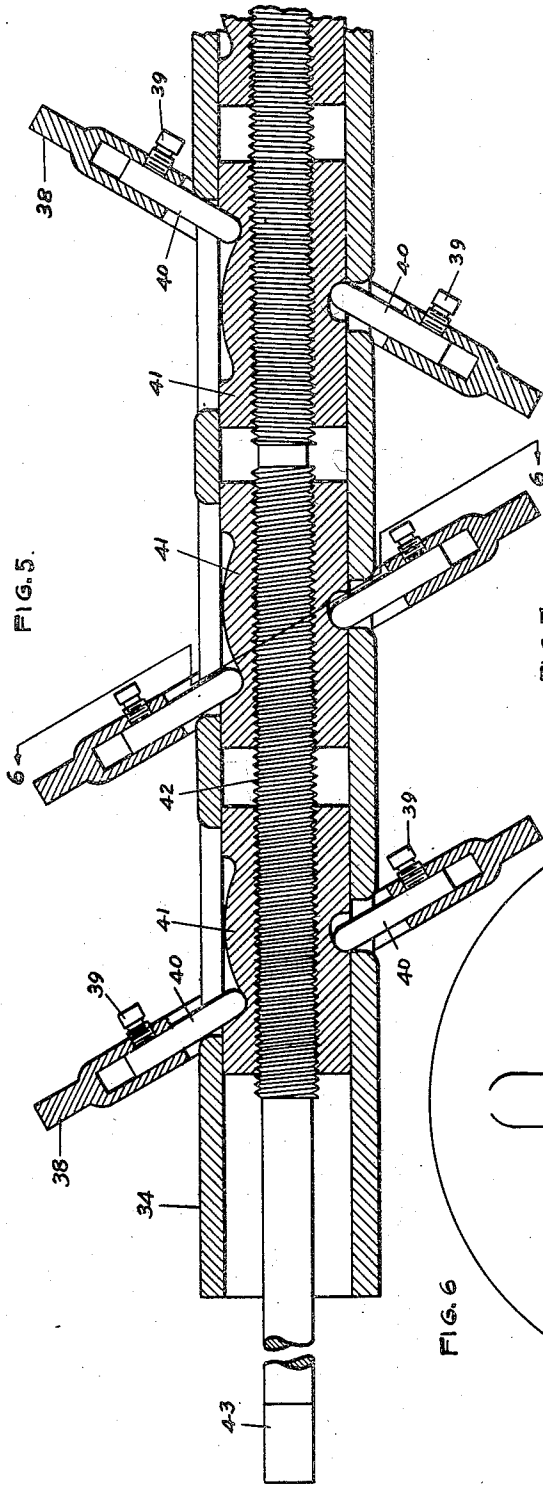


FIG. 5.

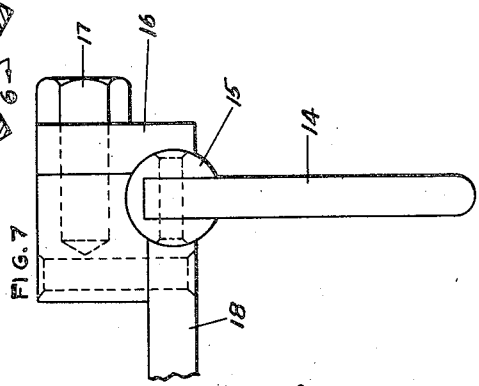


FIG. 7

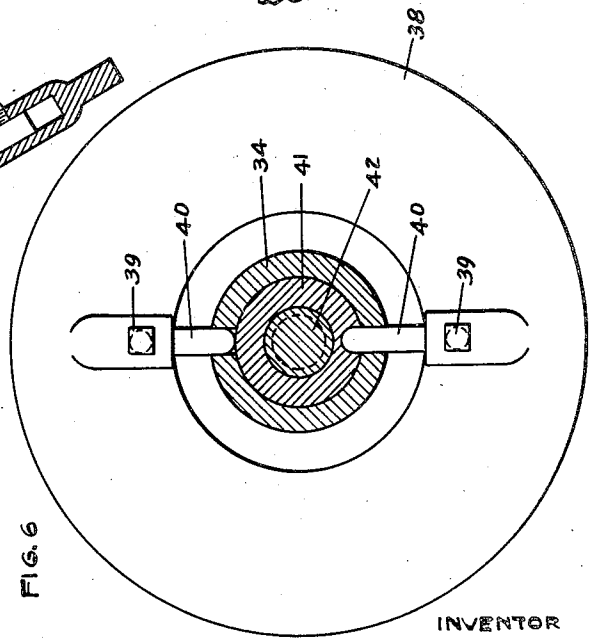


FIG. 6

INVENTOR
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Patented Aug. 11, 1931 1,818,267

UNITED STATES PATENT OFFICE

NICKOLAS J. NIKS, OF CHILLICOTHE, OHIO

PAPER MACHINE

Application filed July 24, 1929. Serial No. 380,549.

My invention relates to paper machines and particularly to the delivery and arrangement of the pulp on the wire at the beginning of the paper making operation.

It is an object of my invention to provide a self-adjusting slice which will compensate for the inequalities of adjustment of the slice in order to provide accurate determination of the thickness of the paper. By having the flexible slice it takes care of the irregularities of adjustment and accommodates any accumulated stock.

It is a further object to so arrange such a slice with respect to the center of the breast roll carrying the wire that it is of the minimum distance from the center thereof so that both sides of the sheet will be made the same without streaks or mottling, as a result of perfect distribution over the wire.

It is a further object to provide a yielding seal between the wire and the stuff box in order to provide an enlarged pool of paper stock so as to provide for an even distribution of stock on the wire.

It is my object to provide soft lumps from being carried on the wire into the stock and thence into the paper as it is being made by scraping from the wire all foreign material before it comes in contact with the stock which is to be made into paper.

It is a further object to reduce the drainage from the paper stock to the minimum by forming this pool and therefore being able to bring the flexible slice close to the center of the breast roll.

It is an additional object to provide means of bodily moving the slice and stock box for adjustment with respect to the breast roll and to the wire.

It is a further object to provide means of arranging the fibers of the paper stock at right angles to one another instead of parallel to one another to thereby make the strength of the resulting paper the same in all directions, to improve the uniformity of the resulting paper and improve its color, opacity and distribution of fibers in it, as heretofore the stirring and distributing mechanism in the stuff boxes consisting of screen rolls have merely delivered the fibers all arranged in longitudinal direction so that the paper would tear in one direction more readily than in another.

Referring to the drawings:—

Fig. 1 is a side elevation partially in section of my invention;

Fig. 2 is an enlarged section showing the arrangement of the slice, stuff box, distributor and seal and the position of the apron;

Fig. 3 is a front elevation of this apparatus with the wire in section;

Fig. 4 is a plan view;

Fig. 5 is a section through the distributor discs and shafts showing the adjusting mechanism;

Fig. 6 is a section on the line 6—6 of Fig. 5;

Fig. 7 is a detail side elevation on the flexible slice.

It will be understood that my invention is applicable to any type of machine, such as a Fourdrinier or Harper Fourdrinier, or with any type of slice or inlet.

Referring to the drawings in detail, 1 is a wire passing over the breast roll 2 carried on the shaft 3. 4 indicates the usual deckel stops and 5 the wheel for guiding such stops. 6 is a support for the bottom 7 of a stuff box. This bottom is cut away at 8 to receive an apron plate 9 on which is mounted an apron comprising a rubber plate 10 having imbedded therein a spring brass plate 11. The end of this apron 10 is provided with a downwardly extending transverse rubber bar or scraper 12 which engages with the surface of the wire 1, forms a resilient seal to prevent the leakage of the stock back along the wire and also serves to scrape off any soft lumps that may be adhering to the wire. This rubber scraper 12 is located back beyond the center line of the breast roll 2, thus giving the opportunity of forming a relatively large pool in the space 13 for the accumulation, settling and distribution of the stock on the wire with the minimum of drainage prior to its exit beneath the flexible strip 14 which constitutes that portion of the slice which is located just in front of the center line of the breast roll in spaced engagement from the wire to determine the thickness of the paper.

It will be understood that this flexible strip

14 is mounted in a circular bar 15 that is adjustably clamped in position with a clamp 16 and bolts 17 to the slice plate 18. This slice plate is pivotally mounted at 19 on the slidable gate 20 which slides on the front 21 of the stuff box regulating the opening 22 through which the stock flows. Marginal front walls 23 divide the opening 22 and serve to hold the rubber apron 10 in position.

The gate 20 is regulated as to its height by the rods 20*a*, gears 20*b* and shaft 20*c*, the rods 24 and lever 25 adjust the clamp 25*a* on hinge 19.

The slice plate with the flexible strip 14 is adjusted in the usual manner by the wheel 26 operating through the worm 27, worm gears 28, adjusting wheels 29 and yokes 30 and links 31. The details of these adjustments form no part of my invention as they may be varied according to standard practice.

Such adjustments which may be made across a wide machine necessarily make it difficult to secure an accurate positioning of the slice with respect to the wire and to thereby maintain uniformity across the paper in thickness and composition. I secure this accommodation by utilizing the flexible strip 14 which accommodates the variations and adjustments and adjusts itself to the flow of paper stock.

The stock box has a rear wall 32 and side walls 33 which carry the distributor shaft sleeve 34. The side walls 33 are provided with eyes 35 that carry bolts 36 adjustably positioned in the slots 37 of the bottom 7, thereby enabling fore-and-aft adjustment bodily of the entire box and associated mechanism.

Mounted in the side walls of this box is the supporting sleeve 34 on which are carried a number of distributor discs 38. These discs are mounted by the set screw 39 on the arms 40 which rest within the screw sleeves 41 that are in turn actuated by the screws 42 from a point outside of the box as at 43. Thus the angularity of the discs 38 may be adjusted in order to determine the throw of the fibers of the stock. These discs are arranged at angles to one another in two groups so that as a result of rotation the fibers in the stock box will be delivered to the wire in crossed condition thereby giving a paper in which the fibers are substantially at right angles to one another making the paper equally strong in all directions, of uniform density, opacity and color. By the formation of relatively long passageways over the apron 10 and the settling in the pool 13 and the movement out on the wire to the minimum of draining under the flexible strip 14, while still in the maximum condition of plasticity I am enabled to deliver to the wire a uniform, crossed fiber product uniformly distributed and resulting in a paper that not only has the above characteristics but which is free from streaks or mottling and is uniform on both sides of the paper. In order to insure such a delivery I have provided on both sides of the passageway leading to the pool 13 deckel pans which form side enclosures. These pans are vertically disposed consisting of a right angle assembly of two brass plates 44 and 45 on either side of a flexible sheet as of rubber or the like designated 46, which sheet is turned over laterally at 47 and rests upon the surface of the wire forming a seal of yielding nature. The rear end of this combination is turned at right angles to be mounted against the wall 23 which divides the exit opening 22 from the box.

Thus I provide a construction of full adjustability, yielding accommodation in irregularities in construction and in operation.

It will be understood that I desire to comprehend within my invention and within the scope of my claims such modifications as may be fairly comprehended within such claims and invention due to necessary modifications to adapt my invention to varying conditions of use and to varying purposes.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. In a paper machine, the combination of a wire and a flexible slice having a free edge.

2. In a paper machine, the combination of a wire and a flexible slice having a free edge, and means to adjust the position of the flexible slice with respect to the wire.

3. In a paper machine, the combination of a wire and a slice having a flexible strip having a free edge adjacent the wire.

4. In a paper machine, the combination of a wire and a slice having a flexible strip having a free edge adjacent the wire, and means of adjusting the slice.

5. In a paper machine, the combination of a wire and a slice having a flexible strip adjacent the wire, means of adjusting the slice and means of adjusting the angularity of the flexible strip independently of the adjustment of the slice.

6. In a paper machine, the combination of a wire, a stock box having exit opening, a slidable door for regulating said opening, a slice plate pivotally connected thereto and a flexible strip on said slice plate adjacent the wire.

7. In a paper machine, the combination of a wire, a stock box having exit opening, a slidable door for regulating said opening, a slice plate pivotally connected thereto, a flexible strip on said slice plate adjacent the wire and means for adjusting said slice plate.

8. In a paper machine, the combination of a wire, a stock box having exit opening, a slidable door for regulating said opening, a slice plate pivotally connected thereto, a flexible strip on said slice plate adjacent the wire, means for adjusting said slice plate and

means for the independent adjusting of the flexible strip.

9. In a paper machine, the combination of a wire, a stock box having exit opening, a slidable door for regulating said opening, a slice plate pivotally connected thereto, a flexible strip on said slice plate adjacent the wire, means for adjusting said slice plate, means for the independent adjusting of the flexible strip and means for adjusting the door.

10. In combination in a paper machine, a wire, a transverse slice, a plurality of adjusting means for adjusting said slice throughout its width and a flexible strip having a free edge for accommodating said adjustments with respect to the wire.

11. In combination in a paper machine, a wire, a transverse slice, a plurality of adjusting means for adjusting said slice throughout its width, a flexible strip having a free edge for accommodating said adjustments with respect to the wire and means for adjusting said flexible strip as to its angularity with respect to the wire and the slice.

12. In a paper machine, a wire, a slice plate, means to adjust said plate at intervals across the wire, a flexible strip on the margin of the plate adjacent the wire for accommodating such adjustment, a pivotal mounting for such slice plate and means to adjust the vertical position of said pivotal mounting.

13. In a paper machine, a wire, a slice plate, means to adjust said plate at intervals across the wire, a flexible strip on the margin of the plate adjacent the wire for accommodating such adjustment, a pivotal mounting for such slice plate, means to adjust the vertical position of said pivotal mounting and a door associated with said pivotal mounting to control the volume of stock issued beneath the slice plate.

14. In combination in a paper machine, a wire, a breast roll, a slice having a flexible marginal strip having a free edge adjacent the wire, a stock box and a flexible delivery apron yieldingly engaging the wire, spaced from the flexible slice strip.

15. In combination, in a paper machine, a wire, a breast roll, a slice having a flexible marginal strip adjacent the wire, a stock box, a flexible delivery apron yieldingly engaging the wire, spaced from the flexible slice strip, said apron being located behind the center of the breast roll and the flexible strip in front of the breast roll whereby a stock pool is formed therebetween.

16. In combination in a paper machine, a wire, a breast roll, a slice having a flexible marginal strip adjacent the wire, a stock box, a flexible delivery apron yieldingly engaging the wire spaced from the flexible slice strip, said apron being located behind the center of the breast roll and the flexible strip in front of the breast roll whereby a stock pool is formed therebetween, said slice strip being located closely adjacent to the center of the breast roll for permitting such escape of liquid from the stock through the wire.

17. In a paper machine, a breast roll, a wire, a slice having a flexible strip with a free edge, and a stock box having a flexible apron engaging the wire.

18. In a paper machine, a breast roll, a wire, a slice having a flexible strip with a free edge, a stock box having a flexible apron engaging the wire and means for adjusting said slice and flexible strip with respect to the wire.

19. In combination in a paper machine, a wire, a slice having a flexible strip with a free edge, deckel pans on either side of said slice and said strip enclosing the sides thereof.

20. In combination in a paper machine, a wire, a slice having a flexible strip, deckel pans on either side of said slice and said strip enclosing the sides thereof and yielding means carried by said deckel pans lying upon the surface of the wire forming a seal therewith.

21. In combination in a paper machine, a wire, a slice having a flexible strip, deckel pans on either side of said slice and said strip enclosing the sides thereof, yielding means carried by said deckel pans lying upon the surface of the wire forming a seal therewith and a yielding apron engaging said wire and forming a passageway for delivery of the stock from a stock box.

22. In combination in a paper machine, a wire, a slice having a flexible strip, deckel pans on either side of said slice and said strip enclosing the sides thereof, yielding means carried by said deckel pans lying upon the surface of the wire forming a seal therewith, a yielding apron engaging said wire and forming a passageway for delivery of the stock from a stock box and means for adjusting said slice with respect to the wire.

23. In combination in a paper machine, a wire, a slice having a flexible strip, deckel pans on either side of said slice and said strip enclosing the sides thereof, yielding means carried by said deckel pans lying upon the surface of the wire forming a seal therewith, a yielding apron engaging said wire and forming a passageway for delivery of the stock from a stock box, means for adjusting said slice with respect to the wire and means for adjusting the flow of stock from the stock box beneath the slice to the wire.

24. In combination with a paper machine, a breast roll, a slice with a flexible strip, a flexible apron having a metallic spring core and a yielding enclosure therefor terminating in a yielding transverse bar engaging the wire at a point below the general level of the apron.

25. In combination with a paper machine,

a breast roll, a slice with a flexible strip, a flexible apron having a metallic spring core, a yielding enclosure therefor terminating in a yielding transverse bar engaging the wire at a point below the general level of the apron and a side enclosure on either side of said slice and apron for yieldingly sealing the sides with respect to the wire and apron and slice against reengaging laterally.

26. In combination with a paper machine, a wire, a supporting breast roll so arranged that a passageway is formed comprising a slice plate on top thereof, a flexible strip above the wire at one end thereof, the other end communicating with a stock box, a flexible apron engaging the wire on the bottom thereof at a point spaced from the flexible slice strip and deckel pans forming the sides thereof whereby a pool for stock is formed on the wire at the end of the passageway before delivery under the flexible strip of the slice.

27. In combination with a paper machine, a wire, a supporting breast roll so arranged that a passageway is formed comprising a slice plate on top thereof, a flexible strip above the wire at one end thereof, the other end communicating with a stock box, a flexible apron engaging the wire on the bottom thereof at a point spaced from the flexible slice strip and deckel pans forming the sides thereof whereby a pool for stock is formed on the wire at the end of the passageway before delivery under the flexible strip of the slice, said slice and apron being so arranged that the apron engages the wire behind the center of the breast roll at a greater distance than the location of the flexible strip with respect to the center of the breast roll.

28. In a paper machine, the combination of a wire, a stock box, a flexible apron having a rubber scraper edge engaging the wire.

29. In a paper machine, the combination of a wire, a stock box, a flexible apron having a rubber scraper edge engaging the wire and a metallic spring core for said apron.

30. In a paper machine, the combination of a wire, a stock box having a stationary bottom, a front wall, side walls and rear wall a slice, said stock box being adjustably positioned fore-and-aft with respect to said wire on said bottom.

31. In a paper machine, a wire, a stock box, a slice and means in said stock box for delivery of the paper stock onto the wire with the fibers at angles to one another, said means comprising a shaft having sets of oppositely inclined discs thereon.

32. In a paper machine, a wire, a stock box, a slice and means in said stock box for delivery of the paper stock onto the wire with the fibers at angles to one another, said means comprising a plurality of discs angularly disposed with respect to the line of flow onto the wire and rotating in said stock box.

33. In a paper machine, a wire, a stock box, a slice and means in said stock box for delivery of the paper stock onto the wire with the fibers at angles to one another, said means comprising a plurality of discs angularly disposed with respect to the line of flow onto the wire and rotating in said stock box, said discs being arranged in two groups in which the plates of the discs are parallel to each other in each group and each group is angularly disposed to one another.

34. In a paper machine, a wire, a stock box, a slice, means in said stock box for delivery of the paper stock onto the wire with the fibers at angles to one another, said means comprising a plurality of discs angularly disposed with respect to the line of flow onto the wire and rotating in said stock box, said discs being arranged in two groups in which the plates of the disc are parallel to each other in each group and each group are angularly disposed to one another, and means for adjusting the angularity of each group of discs.

35. In a paper machine, in combination with a stock box having an opening, a slice plate adjacent said opening, a flexible strip having a circular bar on one edge, and means for clamping said bar to the slice plate.

36. In a paper machine, in combination with a stock box having an opening, a slice plate pivoted at one edge adjacent said opening, and a flexible strip adjustably attached to the other edge of said plate.

37. In a paper machine, in combination with a stock box having an opening, an apron adjacent said opening, said apron comprising a rubber plate reenforced by a flexible metal plate.

In testimony whereof, I affix my signature.

NICKOLAS J. NIKS.