

Dec. 18, 1945.

E. PALMER

2,391,265

PAPER ROLL SUPPORTING RACK

Filed Jan. 25, 1944

3 Sheets-Sheet 1

Fig. 2.

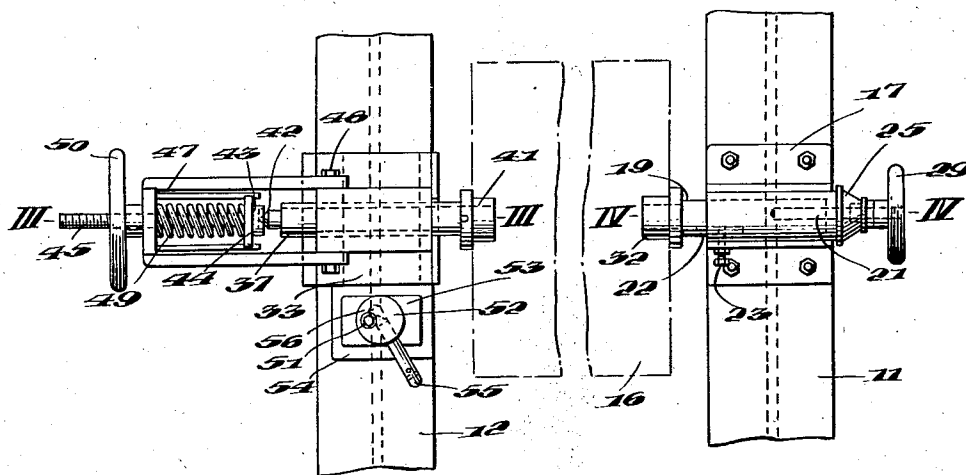
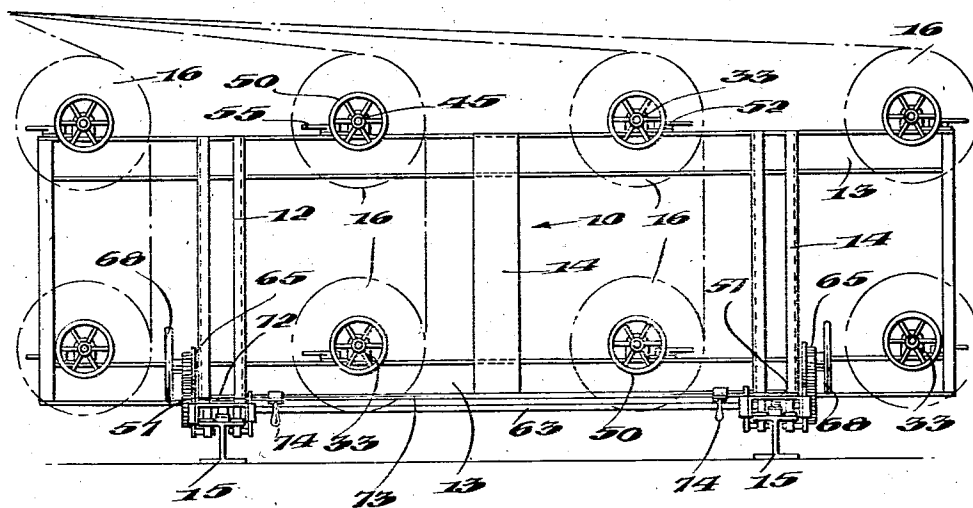


Fig. 1.



Inventor

Edward Palmer,

By

W. J. McNeill

Attorney

Dec. 18, 1945.

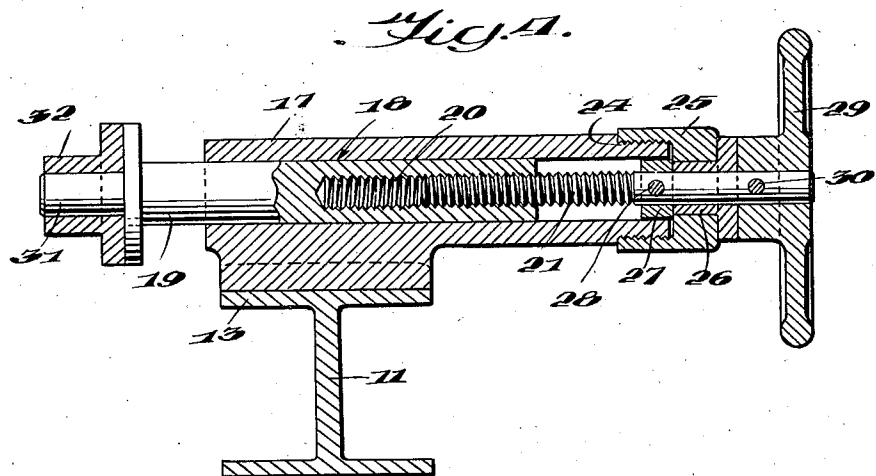
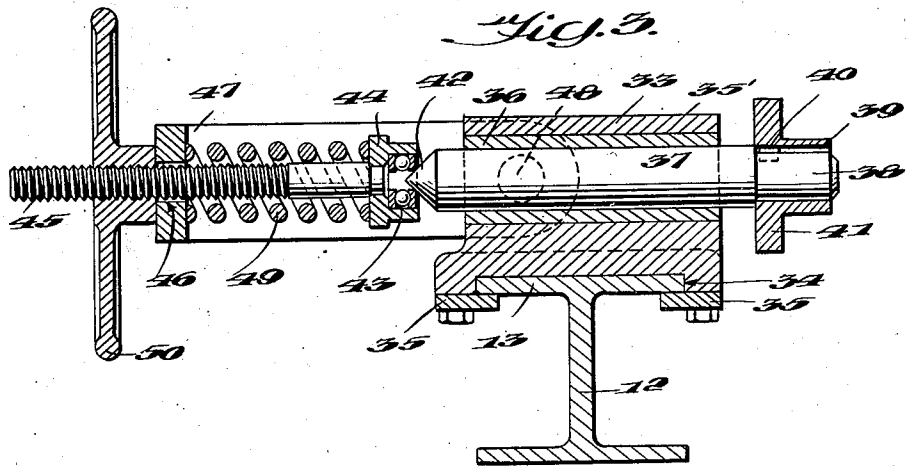
E. PALMER

2,391,265

PAPER ROLL SUPPORTING RACK

Filed Jan. 25, 1944

3 Sheets-Sheet 2



Inventor.

Edward Palmer,

By

W. D. McDaniel

Attorney

Dec. 18, 1945.

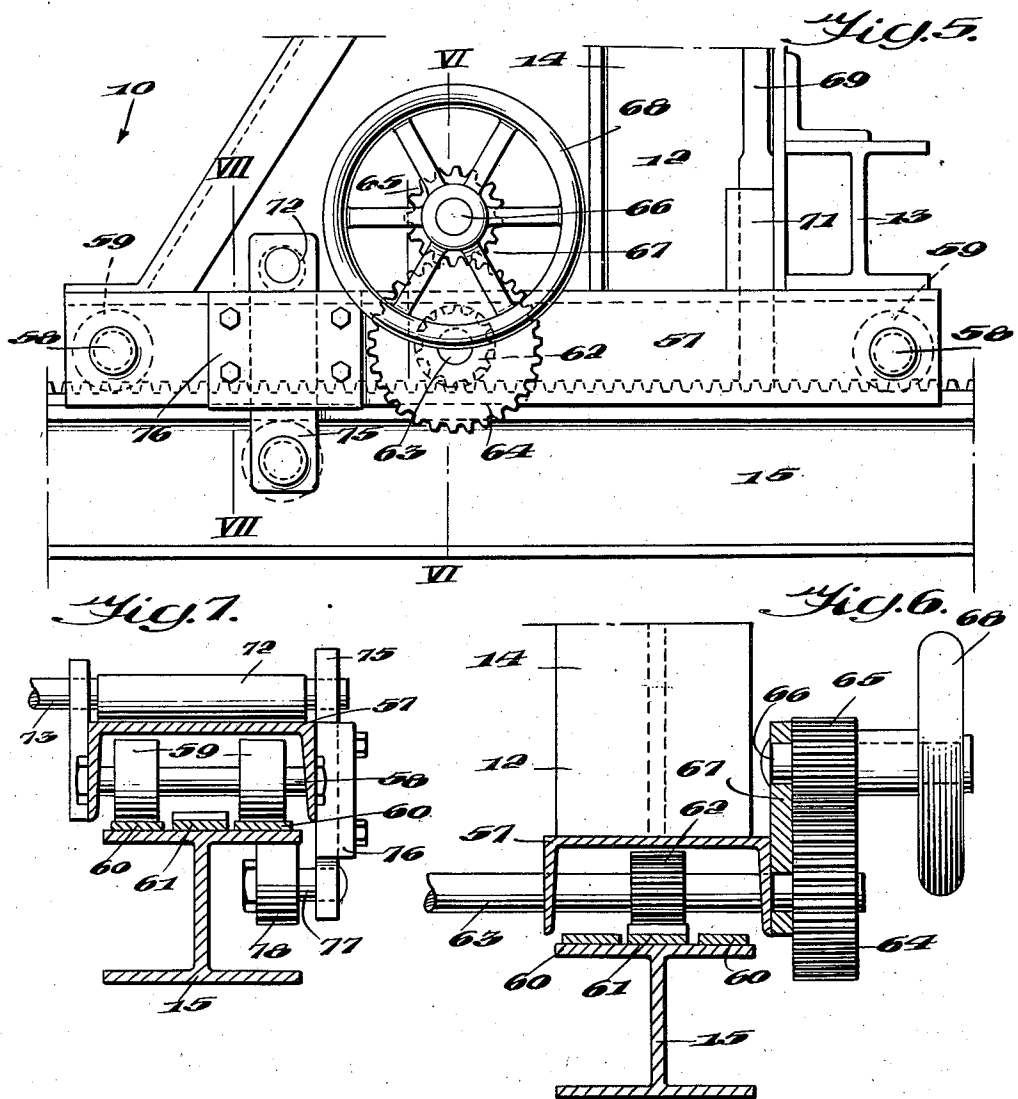
E. PALMER

2,391,265

PAPER ROLL SUPPORTING RACK

Filed Jan. 25, 1944

3 Sheets-Sheet 3



Inventor

Edward Palmer,

By *W. D. McHone*

Attorney

UNITED STATES PATENT OFFICE

2,391,265

PAPER ROLL SUPPORTING RACK

Edward Palmer, Columbus, Ohio, assignor to Ohio
Wax Paper Company, Columbus, Ohio, a corporation of Ohio

Application January 25, 1944, Serial No. 519,615

4 Claims. (Cl. 242—68)

This invention relates to apparatus for supporting paper rolls and, more particularly, to an improved back rack by means of which paper is withdrawn from one or more rotatably supported rolls for advancement to associated cutting, printing or coating machines.

In the operation of cutting machines, particularly, paper is withdrawn from a plurality of frame-carried rotatable rolls and fed to a cutting instrumentality in which a plurality of lengths of the withdrawn paper are cut into sheets of desired dimensions. At present, the paper rolls are supported on frame-journale shafts or arbors which extend completely through axial openings provided in the paper rolls, each shaft or arbor being provided with adjustable chucks by which the rolls are maintained in desired longitudinal positions. Further, frictional brake devices are provided which engage each of the shafts to control their rotational speeds and to apply tension to the lengths of paper withdrawn from the rolls. In the operation of such roll-supporting racks, which are now generally used on all cutting, printing or processing machines in which paper is fed to the machines from revoluble rolls, considerable difficulty is encountered in properly centering the rolls on their supporting shafts or arbors and in applying uniform braking pressures to each of the shafts or arbors so that the paper may be fed in an accurate manner into the associated machine under conditions of uniform tension and without wrinkling or creasing. Frequently, the frictional brake shoes are not uniformly tightened. Even skilled machine operators find it difficult to provide a uniform braking action on each shaft or arbor so that lengths of paper withdrawn from multiple rolls will be under uniform tension. In cutting machines, such lengths of paper in superposed layers are fed through a rotary cutter. If the tension on the paper should vary, the stretch and contraction of the paper will result in producing cut sheets which lack uniformity in dimensions. As a result, it is now customary after initially cutting the paper withdrawn from rolls into sheets, to pass the cut sheets through a trimming machine, wherein another cutting operation is performed to provide sheets which are exactly of the same length.

In accordance with the present invention, I provide a back rack for the support of paper rolls in which the rolls are each subjected to a uniform degree of tension as well as the lengths of paper withdrawn therefrom, so that the initial sheet-cutting operation will produce paper

sheets of precisely the same dimensions and thereby eliminate the time and costs involved in the presently employed sheet-trimming or secondary cutting operation.

It is an object of the invention to provide a paper roll-supporting back rack composed of a pair of transversely spaced, longitudinally extending, vertically arranged frames provided with improved journals for the support of a plurality of paper rolls, and wherein provision is made for adjusting said frames toward and away from each other in order to accommodate paper rolls of varying length.

It is another object of the invention to provide a roll-supporting back rack in which the relatively adjustable side frames are provided with journals adapted for the rotatable support of stud shafts or arbors which, instead of extending completely through the paper rolls, engage merely with the end portions of said rolls, whereby to provide facility and convenience in mounting the rolls on or removing the same from their supporting arbors and in adapting the back rack to paper rolls of varying lengths.

It is a further object of the invention to provide a back rack in which certain of the rotatably mounted stud shafts or arbors have the outer ends thereof engaged with spring pressed thrust bearings, the latter having threaded adjusting means so that desired rotation-retarding forces or pressures may be applied to the shafts or arbors engaged with said bearings, whereby to provide tensioning forces to the lengths of paper withdrawn from each of the rolls and eliminating the use of the customary frictional band brake devices hitherto employed in this connection.

For a further understanding of the invention, reference is to be had to the following description and the accompanying drawings, wherein:

Fig. 1 is a side elevational view of a multiple paper roll supporting back rack formed in accordance with the present invention;

Fig. 2 is a fragmentary top plan view disclosing a complete paper roll support;

Fig. 3 is a detail vertical sectional view taken on the plane disclosed by the line III—III of Fig. 2;

Fig. 4 is a similar view on the line IV—IV of Fig. 2;

Fig. 5 is a fragmentary end elevational view disclosing the mechanism for operating and supporting the adjustable frame member;

Fig. 6 is a vertical sectional view on the plane indicated by the line VI—VI of Fig. 5;

Fig. 7 is a similar view on the plane disclosed by the line VII—VII of Fig. 5.

Referring more particularly to the drawings, the numeral 10 designates my improved back rack in its entirety. In the specific embodiment herein illustrated and described, the back rack is adapted for use in supporting a plurality of paper rolls in order that superposed lengths of paper may be withdrawn from such rolls and fed into a cutting machine, not shown, in which the paper is cut into sheets of desired dimensions. However, it will be understood at this juncture that the paper roll supporting mechanism comprising the present invention may be employed usefully in connection with any other type of machine, such as printing or coating machines in which one or more paper rolls are revolutely supported and paper advanced in the form of a traveling web into engagement with various processing or printing devices.

When used in connection with a cutting machine, my improved back rack comprises a suitably supported stationary frame member 11 and a parallel transversely spaced adjustable frame member 12. Each of these frame members may comprise parallel upper and lower beams 13 which are rigidly united by vertical uprights 14 to produce a substantially rectangular structure. Beneath the frame members are arranged transversely extending bed-forming girders 15. The frame member 11 is rigidly attached or mounted upon the girders 15, while the frame member 12 is adjustably mounted on said girders for movement longitudinally thereof toward and away from the stationary frame member 11, whereby to adapt the rack to paper rolls having different lengths.

In order to effect the rotatable support of a plurality of paper rolls 16 in connection with the rack, the beams 13 of the stationary frame member 11 have mounted on their upper surfaces a plurality of stationary bearing boxes 17. Each of these boxes, as shown in Fig. 4, is formed with a longitudinally extending bore 18 in which is slidably mounted for longitudinal adjustment a non-rotating stud shaft or arbor 19. Each shaft 19 is formed with a threaded axial bore 20 which receives the threaded shank of an adjusting screw 21. Also, each shaft 19 has its outer wall formed with a longitudinally extending slot or recess 22 in which is positioned one end of a set screw 23, the latter being threadedly carried by the bearing boxes 17, as shown in Fig. 2, the set screws 23 serving to prevent rotation of the shafts 19 but to admit of their sliding adjustment in the bores 18. The outer end of each of the boxes 17 is threaded as at 24 for the reception of an internally threaded collar 25, each of the latter carrying a bearing sleeve 26 in which the outer unthreaded portion of the screw 21 is rotatably received. A collar 27 is pinned as at 28 on the unthreaded portion of each of the screws 21, and a manipulating wheel 29 is pinned as at 30 to the outer end of each of the screws 21. The collar 27 of each screw and the hub of each of the wheels 29 engages each end of the associated bearing sleeve 26 to confine the screw for rotation but to permit longitudinal movement thereof.

It will be manifest that when a wheel 29 is rotated, the screw 21 associated therewith, by virtue of its threaded engagement with the bore 20 of the associated shaft 19, will cause the latter to move back and forth in the bearing bore 18. The inner end of each of the shafts 19 is diamet-

rically reduced or shouldered, as at 31, for the rotatable reception of a roll-holding chuck 32.

The opposite or adjustable frame member 12 has the upper surfaces of its beams 13 provided with adjustable bearing boxes 33. As shown more particularly in Figs. 2 and 3, each of the boxes 33 has its under side grooved as at 34 for the reception of the upper web of the adjusting beam 13. The under side of each bearing box 33 is provided with guide cleats 35 by means of which the boxes 33 are retained in connection with the upper webs of the beams 13 but are permitted to slide longitudinally thereon. Each of the boxes 33 is provided with a longitudinally extending bore 35 in which is positioned a tubular bearing lining 36, and slidably mounted in each of the linings 36 is a rotatable stud shaft or arbor 37, the latter being adapted for longitudinal alignment with complementary shafts or arbors 19 carried by the bearing boxes 17. The inner end of each of the stud shafts 37 is reduced in diameter as at 38 and is longitudinally grooved as at 39 for the reception of a pin 40 carried by a roll-engaging chuck or chucks 41, whereby upon rotation of the paper roll 16, rotating movement will be imparted to the stud shafts 37.

The outer end of each of the shafts 37 is conically tapered as at 42 for engagement with a thrust bearing 43 of an anti-friction type. The outer shell 44 of each of the bearings 43 is carried on the inner end of a longitudinally adjustable screw member 45, the threaded shank of which passes loosely through an opening 46 formed in a bail member 47, one of the latter being pivotally mounted as at 48 on each of the bearing boxes 33. A coil spring 49 surrounds each of the screw members 45 and is confined between the outer web of the associated bail 47 and the shell 44 of the thrust bearing 43. The outer end of each of the screw members 45 is received within the threaded hub bore of a hand wheel 50. The spring 49 tends to force the thrust bearing 43 into engagement with the conically tapered end 42 of the complementary shaft 37 and the pressure exercised by the spring 49 in this regard is regulable by adjusting the positions of the hand wheel 50 on its screw member 45. By turning the hand wheel 50 in a clockwise direction, the spring 49 associated therewith may be contracted to an extent disengaging the bearing 43 from the shaft end 42. This permits the bail 47 to swing about its pivotal mounting 48 and to assume a substantially upright position, thereby allowing the associated shaft 37 and its chuck 41 to be withdrawn from engagement with the paper roll 16. Similarly, the complementary wheel 29 may be operated to move its associated shaft 19 in an outward direction, thus withdrawing its chuck 32 from engagement with the axial opening of the associated paper roll. By such means, the rolls may be revolutely mounted in the back rack or conveniently removed therefrom.

To adjust each of the bearing boxes 33 longitudinally of the frame member 12, the beams 13 of the member 12 carry stationary upright studs 51 which, as shown in Fig. 2, rotatably receive eccentrics 52. The peripheral surfaces of these eccentrics are positioned in rectangular openings 53 provided in extensions 54 projecting rigidly and laterally from each of the boxes 33. The eccentrics 52 carry threaded manipulating rods 55 which provide for the convenient rotation of the eccentrics 52 in order to adjust the operating positions of the boxes 33 on their supporting beams 13, providing for coaxial registration of the

roll-supporting shafts or arbors 19 and 37. The inner ends of the rods 55 may be threaded for reception in internally threaded bores 56 provided in the eccentrics. When the eccentrics have been rotated to secure the desired adjustment of their associated bearing boxes 33, the rods 55 may be rotated until their inner ends come into frictional engagement with the studs 51, thus maintaining the adjustment of the eccentrics.

While the longitudinal adjustability of the shafts 20 and 37 compensate for minor variations in the length of paper rolls, and enable the chucks 32 and 41 to properly and securely engage the ends of the paper rolls mounted thereon, nevertheless, such adjustment of the roll shafts or arbors does not provide for major variations in length of the various paper rolls which machines of this kind are required to carry. For example, certain paper rolls may possess a length of approximately 12 inches, while others may possess lengths of from 36 to 48 inches with various gradations in length therebetween. Therefore, use is made of the adjustable frame member 12 which may be moved back and forth on the transverse bed girders 15 to meet the conditions in roll length encountered.

To provide for the convenient adjustment of the frame member 12, the latter is provided over each of the girders 15 with a rigid, horizontally and laterally extending channel member 57, as shown more particularly in Figs. 5, 6 and 7. Each of these channel members at the ends thereof are provided with roller shafts 58 carrying spaced rollers 59, the latter engaging with wear-absorbing strips 60 affixed to the upper surfaces of the girders 15. Between the strips 60, the girders have their upper surfaces provided with linear rack teeth 61 with which are engaged pinions 62 mounted on a pinion shaft 63, said shaft at its ends being journaled at openings provided in the side flanges of the channel members 57. The ends of the shaft 63 are equipped with gears 64, which mesh with pinions 65 fixed for rotation on studs 66 projecting from brackets 67 carried by the sides of the channel members 57. The pinions 65 are formed to rotate with hand-wheels 68, also carried by the studs 66. By rotating the wheel 68, the pinions 62 are revolved, causing longitudinal travel of the adjustable frame member 12 on the girders 15, the rollers 59 facilitating this operation.

To retain the adjustment of the frame member 12 in any of its operating positions, I employ locking plungers 69. These plungers are slidably mounted for vertical movement in guides 71 carried by the uprights 14 of the frame 12. The lower ends of the plunger 69 are formed with teeth complementary to those of the rack 61, so that when the plunger or plungers 69 are lowered, the teeth thereof engage with those of the rack 61 to hold the frame member 12 against major movement. However, to finally lock the frame member 12 in its adjusted positions, use is made of a rotatably mounted eccentric 72, which, as shown in Figs. 5 and 7, are positioned to engage the upper surfaces of the channel members 57. These eccentrics are carried by a longitudinally extending shaft 73 which is adapted to be manually rocked, as by use of the lever arm 74, shown in Fig. 1.

The outer ends of the shaft 73 are received within openings provided in a vertically movable bar 75, the latter being slidably guided by brackets 76 secured to the sides of the channel mem-

bers 57. The lower ends of the bars 75 carry studs 77, each of which receives a roller 78. It will be manifest that by rocking the shaft 75, the eccentrics 72 carried thereby may be rotated to effect the elevation of the bar 75 in order to bring the rolls 78 into firm frictional engagement with the under surfaces of the top webs of the girders 15. This secondary clamping means serves to stabilize the frame member 12 and to prevent undesired shifting movement on the part thereof when in a finally adjusted operative position.

In view of the foregoing, it will be seen that my present invention provides a back rack for supporting one or more paper rolls in connection with a cutting, printing or coating machine in which paper is fed from a roll and advanced in one or more webs through such machines. In the present invention, each paper roll is supported by a longitudinally aligned pair of stud shafts or arbors having end engagement only with the paper roll carried thereby, thus eliminating the long arbor shafts heretofore employed in paper-holding back racks which are difficult and awkward to handle and which deflect longitudinally under the weight of the heavy paper rolls supported thereon. Further, in my present invention, the paper rolls are uniformly tensioned by the employment of the coil springs 49, said springs displacing the frictional brake devices of the prior art and enable each roll to be so held that paper webs being removed therefrom will be under uniform longitudinally directed tensioning forces. It is because of this construction primarily that with the use of the back rack forming the present invention, I am enabled to cut the paper lengths or webs withdrawn from the rolls in multiple order into sheets of uniform length, eliminating the necessity for re-cutting or trimming the edges of such initially cut sheets in order to secure dimensional accuracy. By the provision of the adjustable frame member, the back rack is readily adapted to paper rolls of any commercial length and, concomitantly therewith, secure both convenience and time saving in the matter of mounting or dismounting the paper rolls in connection with the rack. Further, the construction of the machine is such that when paper is being withdrawn from the several rolls, minor adjustments may be found desirable to effect exacting registration of their webs, such adjustment being performed while the machine is in active operation by the manipulation of the hand controls described.

While I have described a preferred form of the present invention, nevertheless, it will be understood that the same is subject to considerable variation or mechanical modification without departing from its essential nature nor the scope of the following claims.

I claim:

1. In a paper roll supporting rack, a frame, a pair of spaced longitudinally alignable bearings carried by said frame, a rotatable arbor mounted in one of said bearings for longitudinal sliding movement therein, a paper roll engaging chuck carried by said arbor for rotation in unison therewith, a normally stationary non-rotatable arbor carried by the other of said bearings, said stationary arbor having one end thereof formed with a bearing extension for the rotatable reception of a roll-engaging chuck and with an annular shoulder disposed for frictional engagement with said last-named chuck, and spring means acting on the rotatable arbor and serving to move the same

longitudinally and the paper roll engaged therewith, whereby to maintain said last-named chuck in frictional engagement with the annular shoulder of the stationary arbor.

2. In a rack for rotatably supporting spirally wound paper rolls, a frame, a bearing on said frame, an arbor rotatably and slidably mounted in said bearing, said arbor being conically pointed at one end, a pivotally mounted bail having an opening formed therein, a threaded rod loosely positioned for sliding adjustment in the opening provided in said bail, an antifriction bearing carried by one end of said rod and adapted for engagement with the conically pointed end of said arbor, a coil spring surrounding said rod and positioned between said bail and said antifriction bearing, and a nut carried by the threaded shank of said rod and cooperative with said bail to control the expansion and contraction of said spring.

3. Rack mechanism for supporting spirally wound rolls of web material comprising a pair of parallel relatively spaced frame members, a pair of spaced longitudinally alignable bearings carried by said frame members, a rotatable arbor mounted in one of said bearings for longitudinal sliding movement therein, a roll-engaging chuck arranged at one end of said arbor for rotation in unison therewith, a normally stationary non-rotatable arbor carried by the other of said bearings, said stationary arbor having one end thereof formed with a bearing extension and an annular shoulder, a second roll-engaging chuck rotatably mounted on said extension in engagement with

said shoulder, a yoke pivotally mounted adjacent to said rotatable arbor, a threaded stem adjustably carried by said yoke, a thrust-receiving bearing mounted on one end of said stem for engagement with the outer end of said rotatable arbor, spring means carried by said yoke and surrounding said stem for maintaining said thrust bearing in engagement with said rotatable arbor, and means for adjusting said stem relative to said yoke to regulate the action of said spring means.

4. Rack mechanism for supporting spirally wound rolls of web material, comprising a pair of spaced frame members, a pair of longitudinally alignable bearings on said frame members, an arbor rotatably mounted in one of said bearings for sliding movement therein, a normally stationary non-rotatable arbor carried by the other of said bearings, the inner ends of said arbors being adapted for axial supporting engagement with a roll of web material arranged therebetween, a bail pivotally mounted adjacent to said rotatable arbor, a threaded stem adjustably carried by said bail, a thrust-receiving bearing mounted on one end of said stem for engagement with the outer end of said rotatable arbor, spring means carried by said yoke and surrounding said stem for maintaining said thrust bearing in resilient engagement with said rotatable arbor, and a nut adjustably mounted on the outer end of said stem engageable with said bail for regulating the tension on said spring means.

EDWARD PALMER.