Sept. 28, 1965 V. E. DAVIS 3,208,416

AUTOMATIC BAG CLOSING SEWING MACHINE

Filed Oct. 3, 1963 2 Sheets-Sheet 1

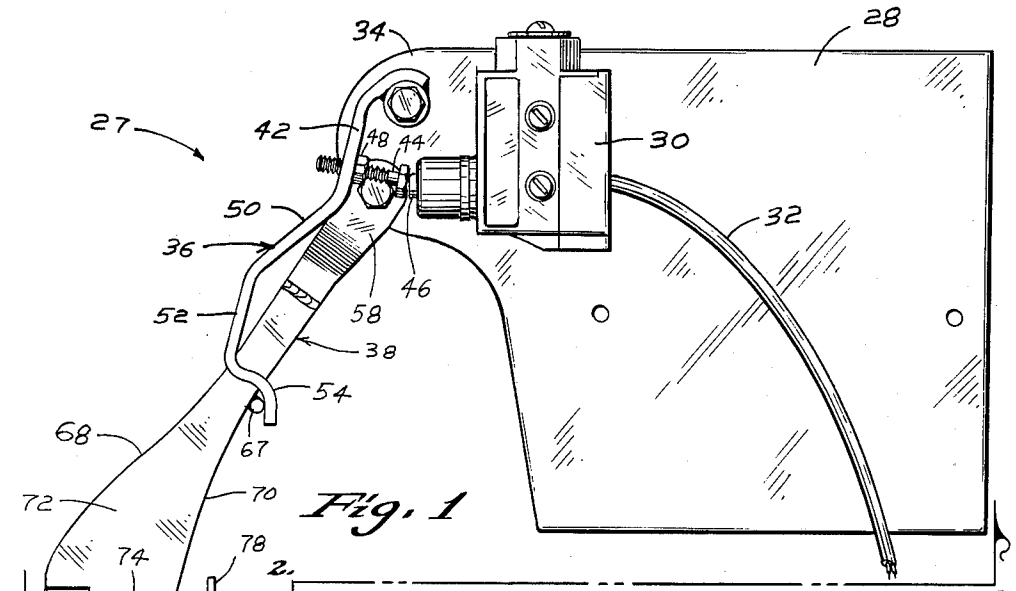


Fig. 1

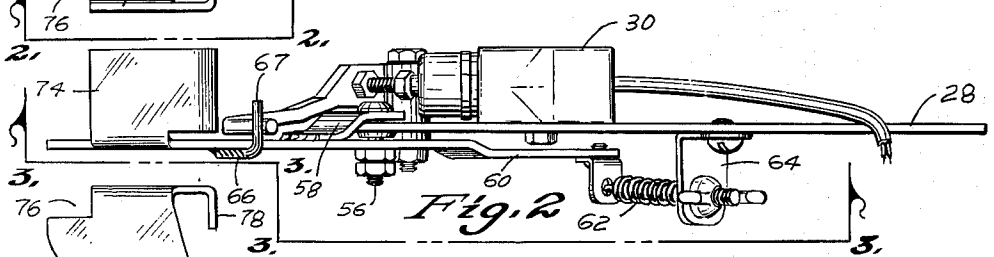


Fig. 2

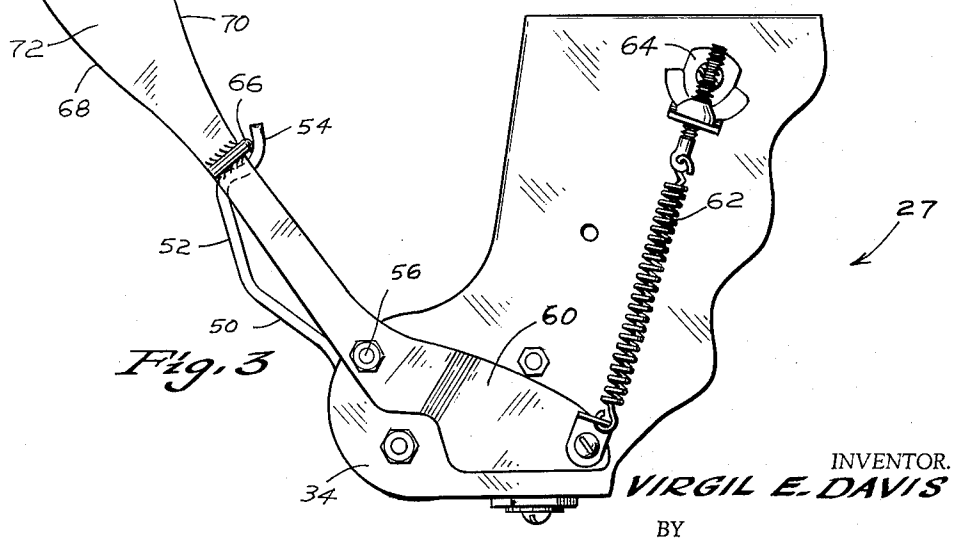


Fig. 3

INVENTOR.
VIRGIL E. DAVIS
BY
Dick + Zarley
ATTORNEY

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AUTOMATIC BAG CLOSING SEWING MACHINE

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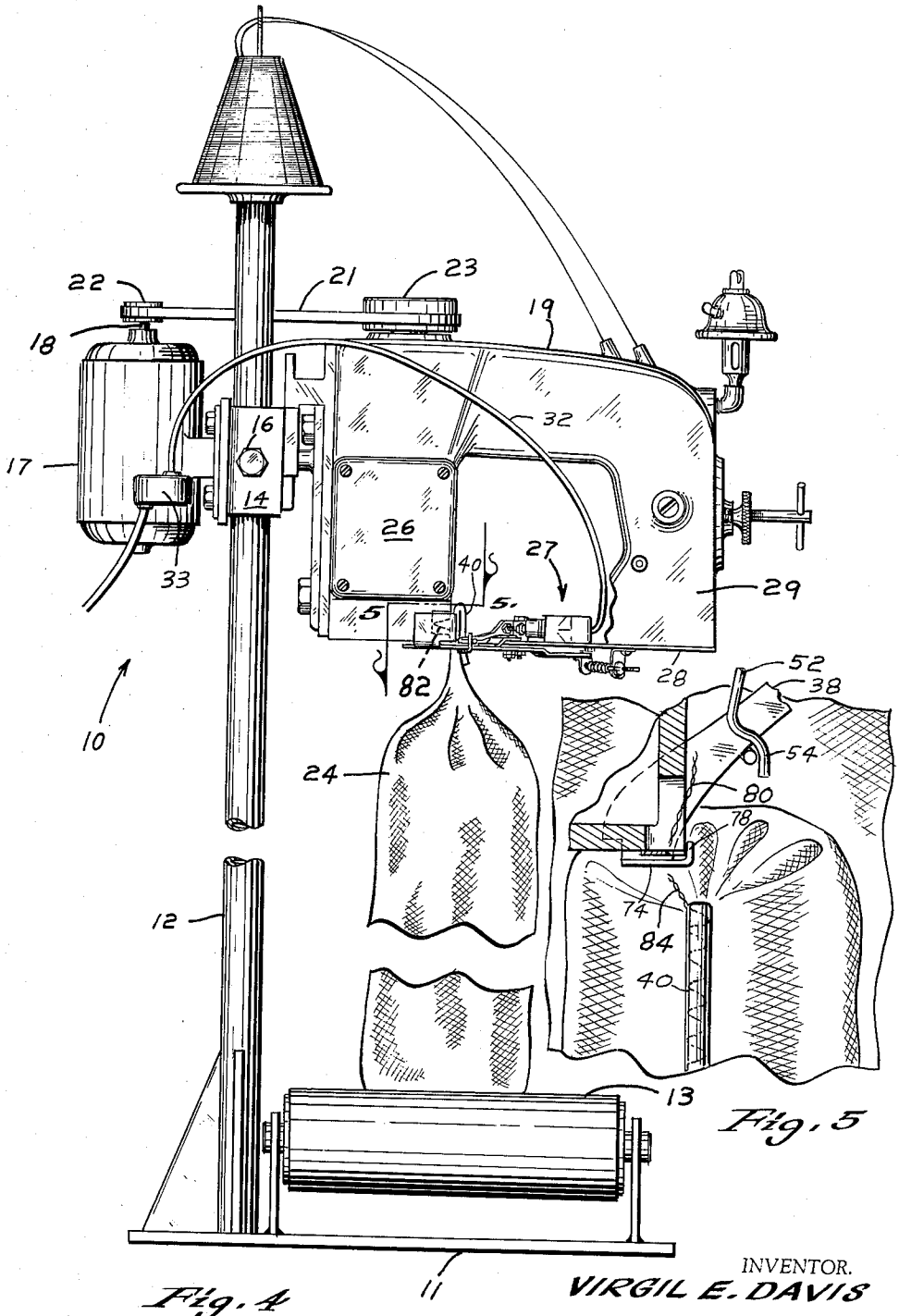


Fig. 4

Fig. 5

INVENTOR.
VIRGIL E. DAVIS
BY
Dick & Zarley
ATTORNEY

United States Patent Office

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AUTOMATIC BAG CLOSING SEWING MACHINE

Virgil E. Davis, 601 E. Locust St., Des Moines, Iowa

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8 Claims. (Cl. 112—11)

This invention relates to sewing machines and more particularly to a sewing machine that will automatically begin operation upon engagement by a bag, sack or the like and then when the bag has been sewn closed, will automatically cut the trailing thread and stop the machine.

It is common practice to close filled sacks and the like by sewing them closed on sewing machines. Usually the sewing machine is manually started and stopped and consequently much manual labor is required. Furthermore, the thread which trails each sack that has been sewn closed must be cut and heretofore has been severed manually from the closed sack. This trailing thread will be at least the width of the operator's hand since next to the sack is the only convenient area of the trailing thread which may be grasped for moving into engagement with a thread cutting means.

Therefore, it is one of the objects of this invention to provide a sewing machine that will automatically sever the thread immediately after the sack or the like has been sewn shut.

A still further object of this invention is to provide a bag or like closing sewing machine that will automatically be started by the bag to be sewn, will sew the bag closed, automatically shut itself off after the bag has been closed and then will automatically sever the trailing thread.

A still further object of this invention is to provide a sewing machine that will automatically quickly close a bag or the like, thus saving substantial time and labor.

It is a further object of this invention to provide a sewing machine which is capable of cutting the trailing thread on a sack to a predetermined length which, as desired, is neither too long nor too short.

It is a further object of this invention to provide a sewing machine including a pair of sack engaging arms which cooperate to open and close an electrical switch for controlling the sewing machine power means.

A further object of this invention is to provide an automatic bag closing sewing machine which is simple in design, economical to manufacture and refined in appearance.

This invention consists in the construction, arrangements, and combination, of the various parts of the device, whereby the objects contemplated are attained as hereinafter more fully set forth, specifically pointed out in the claims, and illustrated in the accompanying drawings, in which:

FIG. 1 is a top plan view of the automatic thread severing device and bag actuated switch mechanism;

FIG. 2 is a side elevation view taken along line 2—2 in FIG. 1;

FIG. 3 is a bottom plan view of the device shown in FIG. 1;

FIG. 4 is a side elevation view of a sewing machine employing the device of FIGS. 1 through 3 with the sewing machine in operation sewing a bag closed; and

FIG. 5 is a top cross-sectional view taken along 5—5 in FIG. 4 and showing in particular the relationship of

the various parts when the trailing sack thread is being cut.

The complete sewing machine including the automatic severing device and bag actuated switch mechanism of this invention is referred to generally by the reference numeral **10** in FIG. 4. The sewing machine includes a base **11** on which an upright standard **12** and a belt conveyor unit **13** are mounted. Although it is no part of this invention, it is preferable that the belt conveyor unit **13** be mechanically driven.

A carriage unit **14** is slidably mounted on the standard **12** and is releasably secured thereto by a set screw **16**. On one side of the sleeve unit **14**, an electric motor **17** is mounted with its output shaft **18** extended upwardly. On the other side of the sleeve unit **14** is mounted a conventional horizontal sewing machine **19** operably driven by an endless belt **21** rotatably mounted on a wheel **22** secured to the shaft **18**, and to another wheel **23** mounted on the sewing machine.

The belt conveyor unit **13** is adapted to convey a filled bag **24** so that the top folded portion (FIG. 4) passes through the sewing machine **19** and is stitched or sewn together by the machine **19**.

This invention, however, is concerned with the following structure apart from the conventional sewing machine structure, but in the embodiment shown in the drawings the invention is in the combination of the sewing machine and the automatic thread severing device and bag actuated switch mechanism. Referring to FIG. 4, the bag **24** is viewed as it passes through the sewing machine **19** toward the viewer. On the right side of a sewing head **26** at the lower edge thereof is the conventional sewing apparatus and the motion feed dogs. These parts have either been eliminated from the drawings or obscured by the adapter device of this invention which is generally referred to in FIG. 4 of the drawings by the reference numeral **27**.

The adapter device **27** comprises a base plate **28** (FIG. 1) which is secured to the bottom end of a sewing machine arm **29** (FIG. 4) by any convenient means such as bolts or the like. A micro switch **30** is mounted on the base plate **28** and has an electrical cable **32** which extends to a junction box **33** in an electrical circuit with the motor **17**.

A nose portion **34** is formed on the base plate **28** and has a pair of pivotal arm members **36** and **38** mounted thereon. These arm members **36** and **38** are normally positioned to extend at an angle into the path of the sack tops **40** as shown in FIG. 4.

Extending from its pivotal connection to the nose portion **34**, the arm **36** has a portion **42** which carries a switch actuating bolt element **44** which is adapted to engage a trigger element **46** on the micro switch **30**. The micro switch trigger element **46** is normally biased to an open position and only through engagement by the bolt element **44** will the micro switch **30** be closed. The bolt element **44** is adjustable relative to the arm **36** and the trigger element **46** by a nut element **48**.

Extending from the arm portion **42** is a portion **50** which extends outwardly towards the sewing machine head **26** and into the path of the sack tops **40**. A third portion **52** extends from the portion **50** in a generally parallel direction to the portion **42** and terminates in an end portion **54** extending away from the sewing machine

head **26** and then generally parallel to portions **42** and **52**.

As shown in FIG. 2, the arm member **38** has a U-shaped end portion pivotally connected by a bolt **56** to the base plate **28**. The end portion includes a leg **58** extending above the plate **28** and a leg **60** below the plate. The outer end of the lower leg **60** is pivotally connected to a spring **62** (FIG. 3) which is adjustably secured to the bottom side of the base plate **28** by a wing bolt and nut assembly **64**. The tension in the spring **62** will ordinarily be maintained at a level sufficient to cause the free end of the arm **38** to engage the lower end of the sewing machine head **26** as shown in FIGS. 4 and 5 prior to a sack **24** entering the sewing machine **19** or just after it has departed therefrom.

The portion of the arm **38** extending outwardly from the base plate **28** is generally straight and includes a rod element **66** welded to the bottom side of the arm **38** and having a portion **67** extending vertically upward for engagement with the portion **54** of the arm **36**. From the rod element **66**, the edge **68** of the arm **38** facing the sewing machine head **26**, tapers outwardly cooperating with the opposite arm **38** side edge **70** to form an enlarged end portion **72**. The edge portion **68** is slightly convex in curvature.

At the outer free end of the arm **38** between the side edges **68** and **70** is an upstanding integral plate element **74** which extends from the edge **70** a little over half the width of the end **72** of the arm **38** and terminates in an L-shaped notch **76** which connects with the edge portion **68**. The upstanding portion **74** is perpendicular to the arm member **38** and has a portion **78** formed integral therewith and extending perpendicular thereto in a direction along the edge **70** of the arm **38**.

In operation, a filled sack **24** will move down the motorized conveyor **13** and through its top portion **40** first engage the portion **50** of the arm **36** thus causing the bolt element **44** to depress the switch trigger **46** resulting in the motor **17** being energized to cause the sewing machine to begin operation. As the sack **24** moves farther into the sewing machine, it will engage the side edge **68** of the arm **38** whereupon this arm will be pivoted toward the base plate **28** and the rod element **67** will move into engagement with the portion **54** of the arm **36** to hold the bolt element **44** in engagement with the switch trigger element **46**. This is obviously necessary since the sack top portion **40** will have moved out of engagement with the arm **36** and the switch **30** would otherwise move to an open position but for the arm **38** maintaining it in a closed condition. The arm **36** is necessary since it is not practical to have a trigger element **46** on an electrical switch such as the micro switch **30** move a substantial distance as would be required by the bolt element **44** being mounted on the arm **38**, since this arm is required to pivot through a substantial number of degrees during its cycle of operation. After the trailing edge of the top end **40** of the sack **24** has passed by the edge **68** of the arm **38**, the arm **38** is pivoted by the spring **62** into mating engagement with the lower edge portion of the sewing machine head **26** as shown in FIGS. 4 and 5. During this pivotal movement of the arm **38**, the upstanding plate element **74** engages the trailing thread **80** (FIG. 5) and moves it into engagement with a pair of mechanically operated scissors-like cutters **82** (FIG. 4) where the string is cut and the sack **24** is left with a trailing thread **84**. It is not desirable to cut the string **80** at its connection to the top end **40** since there would be a likelihood of the arm portion **74** becoming entangled in the top end **40** and causing a malfunction of the device. Furthermore, it is desirable to have a certain amount of trailing thread **84** for purposes of opening the sacks **24**.

As seen in FIGS. 4 and 5, the vertical portion **78** serves as a top for the arm **38** when the arm is biased by the spring **62** to its normal position in the line of travel of the bags **24**. In this position the portion **78** engages the sewing machine head **26** adjacent the cutters **82**.

It is to be understood however that the sewing machine **19** operates only for the minimum amount of time required to sew each sack top **40** since the instant the edge **68** of the arm **38** clears the top portion **40**, the arm **38** moves toward the sewing machine head **26** thereby opening the micro switch **30** and shutting off the motor **17**. The cycle of operation of the device **27** is repeated upon the next sack **24** engaging the arm **36** at the portion **50** which causes the bolt element **46** to close the micro switch **30** and start the sewing machine **19**.

From a consideration of the foregoing disclosure, it will be obvious that all of the initially recited objects of the present invention have been achieved.

Some changes may be made in the construction and arrangement of my automatic bag closing sewing machine without departing from the real spirit and purpose of my invention, and it is my intention to cover by my claims, any modified forms of structure or use of mechanical equivalents which may be reasonably included within their scope.

I claim:

1. In a sewing machine having a power means and means operated thereby for stitching bags or like articles successively fed therethrough in spaced relation, comprising in combination;

a thread cutting means;

an arm pivotally connected to said sewing machine and normally positioned adjacent said cutting means in the line of travel of said bags and upon engagement therewith pivots out of said line of travel;

a spring means in engagement with said arm for yieldably pivoting said arm into its normal position upon each bag passing through said sewing machine, said arm being positioned to pivot into engagement with the trailing stitching thread and move it into cutting engagement with said cutting means when said arm moves to its normal position;

a switch means operatively connected to said arm and during the time said arm is in engagement with said bag said switch is closed thereby as each bag moves away from said arm and said machine said switch is opened; and

a circuit comprising said switch and said power means whereby said power means is inoperable upon said switch being opened and operable upon its being closed.

2. In a sewing machine having a power means and means operated thereby for stitching bags or like articles successively fed therethrough in spaced relation, comprising in combination;

a thread cutting means;

a first arm pivotally connected to said sewing machine and normally positioned adjacent said cutting means in the line of travel of said bags and upon engagement therewith pivots out of said line of travel;

a spring means in engagement with said arm for moving said arm into its normal position upon each bag passing through said sewing machine, said arm adapted to carry the trailing stitching thread into cutting engagement with said cutting means when said arm moves to its normal position;

a second arm pivotally connected to said sewing machine and adapted to be engaged by said bags and pivoted upon entering said sewing machine and prior to said bag engagement with said first arm;

a switch normally biased open and adapted to be engaged by said second arm upon said second arm being pivoted by said bags, said switch adapted to be closed upon engagement with said second arm;

said first arm upon being pivoted a predetermined distance by said bag adapted to engage said second arm to hold said second arm in operative contact with said switch unit said bag leaves said sewing machine

and is out of engagement with said first arm; and

an electrical circuit including said power means and said switch whereby said machine is inoperable when said switch is opened and operable when said switch is closed.

3. The structure of claim 2 wherein axes of pivotal movement of said first and second arms are spaced apart.

4. In a sewing machine having a power means and means operated thereby for stitching bags or like articles successively fed therethrough in spaced relation, comprising in combination:

a cutting means on said machine;

an arm pivotally connected to said sewing machine and adapted to pivot horizontally into a normal position in the line of travel of said bags to a position adjacent said cutting means and then to a position out of the line of travel of said bags upon engagement by one of said bags, said arm having a vertical portion adapted to move horizontally closely adjacent said cutting means;

a spring means in engagement with said arm to yieldingly hold it in said normal position;

said vertical portion of said arm adapted to engage the stitching thread trailing at the rear of each bag and carry it into cutting engagement with said cutting means;

a switch means operatively connected to said arm and during the time said arm is in engagement with said bag said switch is closed thereby as each bag moves away from said arm and said machine said switch is opened; and

a circuit comprising said switch and said power means whereby said power means is inoperable upon said switch being opened and operable upon its being closed.

5. In a sewing machine having a power means and means operated thereby for stitching bags or like articles successively fed therethrough in spaced relation, comprising in combination:

a thread cutting means positioned on the machine adjacent the bag discharge end of the stitching means;

an elongated arm operatively pivotally connected at one end to said machine, said arm adapted to pivot into a position in the line of travel of said bags through said machine, a portion of said arm adapted to engage each bag as it enters said machine and move said arm out of said line of travel; said portion extending at least to the discharge end of said stitching means to hold said arm out of said bag line of travel until at least the stitching operation of each bag has been completed;

a spring means for yieldingly holding said arm in said position in the line of travel of said bags;

an element carried by said arm at its outer end spaced longitudinally outwardly and rearwardly from said bag engaging portion and adapted to move closely adjacent to said cutting means as each bag departs from said machine, and said element being adapted to contact said stitching thread trailing each bag and move it into cutting engagement with said cutting means;

a switch means operatively connected to said arm, said arm adapted to open said switch upon said arm portion moving out of engagement with said bags; and

an electrical circuit including said switch and said power means whereby said power means is inoperable upon said switch being opened by said arm.

6. In a sewing machine having a power means and means operated thereby for stitching bags or like articles successively fed therethrough in spaced relation, comprising in combination:

a first arm pivotally connected to said machine;

a spring means for urging one end of said arm into the path of the sacks moving through said machine, said one end being caused to pivot out of said path by direct bag contact and be returned by said spring upon departure of said sack from said machine;

a thread cutting means on said machine positioned adjacent the one end of said arm when pivoted into the path of sacks moving through said machine;

an element on said one end of said arm adapted to engage the trailing thread at the rear of each sack departing from said machine and carry it into cutting engagement with said cutting means upon said one end pivoting back into the path of said sacks after each sack has departed from said machine;

an electrical circuit including said power means and an electrical switch, said switch being spring biased to an open position and when closed completing the circuit through said power means to operate said machine;

a second arm pivotally connected adjacent said first arm to said machine and having first means adapted to engage said switch means and second means adapted to engage said first arm, said second arm also having third means adapted to engage said sacks engaging said first arm, said third means engagement with said sacks adapted to pivot said second arm to cause said first means thereon to engage said switch thereby starting said power means for operation of said machine; and

said first arm upon being pivoted out of the path of said sack causing said second means on said second arm to engage said first arm and hold said first means in engagement with said switch after said sacks have moved out of contact with said third means thereby maintaining said power means in an operable condition until after each of said sacks have departed from said machine whereupon said first arm may pivot to its position with said one end in the path of said sacks and said first means on said second arm permits said switch to move to its normally open position.

7. In a sewing machine having power means and means operated thereby for stitching bags or like articles successively fed therethrough in spaced relation, comprising in combination:

a cutting means on said machine;

an arm pivotally connected to said machine and adapted to pivot horizontally into a normal position in the line of travel of said bags to a position adjacent said cutting means and then to a position out of the line of travel of said bags upon engagement by one of said bags, said arm having a horizontally disposed plate portion for engagement with said bags and a vertically disposed plate portion adapted to move horizontally closely adjacent said cutting means;

a spring means in engagement with said arm to yieldingly hold it in said normal position;

said vertical plate portion of said arm adapted to engage the stitching thread trailing at the rear of each bag and carry it into cutting engagement with said cutting means; and

a second vertically disposed plate portion is disposed at a right angle to said first vertically disposed portion and said second vertically disposed portion being adapted to engage said machine adjacent said cutting means to limit the pivotal movement of said arm.

8. In a sewing machine having a power means and means operated thereby for stitching bags or like articles successively fed therethrough in spaced relation, comprising in combination:

a cutting means on said machine;

an arm pivotally connected to said machine and adapted to pivot horizontally into a normal position in the line of travel of said bags to a position adjacent said cutting means and then to a position out of the line of travel of said bags upon engagement by one of

said bags, said arm having a horizontally disposed plate portion for engagement with said bags and a vertically disposed plate portion adapted to move horizontally closely adjacent said cutting means;

a spring means in engagement with said arm to yieldingly hold it in said normal position;

said vertical plate portion of said arm adapted to engage the stitching thread trailing at the rear of each bag and carry it into cutting engagement with said cutting means; and

said horizontally disposed plate portion having front and rear sides, the front side being adapted to engage the bags, and said vertically disposed portion

being spaced rearwardly from the front side of said horizontally disposed portion engaging said bags whereby a trailing stitching thread of a predetermined length will be formed on said bags.

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JORDAN FRANKLIN, *Primary Examiner.*